

Eglė SELEVIČIENĖ

DOCTORAL DISSERTATION

**EFFECTIVENESS AND ACCEPTANCE
OF WEB 2.0 TECHNOLOGIES
IN THE STUDIES OF
ENGLISH FOR SPECIFIC PURPOSES
IN HIGHER EDUCATION**

**SOCIAL SCIENCES,
EDUCATION SCIENCE (S 007)
VILNIUS, 2020**

MYKOLAS ROMERIS UNIVERSITY

Eglė Selevičienė

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PROFESINĖS ANGLŲ KALBOS
AUKŠTOJO MOKSLO STUDIJOSE:
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GLOSSARY

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| Acceptance | The positive attitude on the part of a user or decision-maker towards accepting a thing or situation” (Franken, 2007) |
| Affordances | An object’s qualities or properties that define how it can or should be used |
| Communities of practice | Groups of people who share a concern or a passion for something they do and learn how to do it better as they interact regularly (Wenger-Trayner and Wenger-Trayner, 2015) |
| Concept maps | Graphic tools used for organizing and representing knowledge. They include concepts, usually enclosed in circles or boxes, and relationships between concepts or propositions (indicated by a connecting line and linking word) between two concepts. (Novak, 2008) |
| Blended (hybrid) delivery | Delivery mode, where online activities intermingle with classroom sessions and replace a significant percentage (about 20-79%) but not all required face-to-face instructional activities (Mayadas, Miller and Sener, 2015) |
| Educational effectiveness | A phenomenon that reflects whether or not a specific set of resources has a positive effect on achievement and, if so, how large this effect is (Lockheed and Hanushek, 1994). |
| English for specific purposes | Teaching and learning English as a second or foreign language to students in higher education or to people in employment already, where the goal of the learners is to use English in a particular occupation or profession (Gatehouse, 2001; Paltridge and Starfield, 2013; Lesiak-Bielawska, 2015) |
| Face-to-face delivery | Training that takes place in a large or small groups and that is conducted or monitored by a trained facilitator. It occurs in classroom settings, is interactive, featuring behavior modelling, simulations, role play and other activities and should not mean a lecture or traditional instruction, where a teacher talks and students listen (Byham, 2008) |
| CmapTools | A client-server based software empowering users, individually or collaboratively, to visually represent their knowledge using concept maps, to share them with peers and colleagues, and to publish them (Novak and Cañas, 2000) |
| Language skills | The mode or manner in which language is used. Listening, speaking, reading, and writing are generally called the four language skills. Sometimes speaking and writing are called the active/ productive skills and reading and listening, the passive/ receptive skills (Richards and Schmidt, 2013) |
| Learning achievements | Individual progress towards the instructional objectives of a specific study (Darwesh and Al-Jarah, 1997). According to Van Damme et al. (2006), students’ individual achievements in a subject or a combination of subjects is the most prevalent criterion in educational effectiveness research. |

Scaffolding Process that enables a child or novice to solve a problem, carry out a task or achieve a goal which would be beyond his unassisted efforts (Wood, Bruner and Ross, 1976)

Technology acceptance User's behavioural interaction with a particular technology over time and his or her psychological willingness to use or continue using the technology (Dillon and Morris, 1996; Franken, 2007; Schwarz and Chin, 2007)

Web 2.0 The second generation of the Web and its technologies that enable interaction, collaboration and sharing between users (Freedman, 2006; O'Reilly, 2007; Grosseck, 2009; Redecker et al., 2009)

Web 2.0 technologies Openly available online technologies that allow creation, editing and sharing of digital content between (often large) groups of people via a web-browser (Bower, 2017)

Web 3.0 A third generation technology upgrade through 2010-2020s, mainly characterized by semantics of meaning and intelligence (Balaji et al., 2018)

Web 3.0 technologies A set of tools involving markup data, crowd-sourced content, data mining and machine learning to enhance intelligence, underlying frameworks and architecture of the Web towards establishing semantic connections, so that machines understand and interpret what humans exactly want-contextual, relevant results (Balaji et al., 2018)

ACRONYMS USED IN THE DISSERTATION

| | |
|-------------|--|
| A | Attitude towards using |
| ASU | Actual System Use |
| AW | Awareness |
| BI | Behavioural Intention of Use |
| CALL | Computer Assisted Language Learning |
| CMS | Course Management System |
| EFL | English as a Foreign Language |
| ESP | English for Specific Purposes |
| L2 | Second Language |
| MRU | Mykolas Romeris University |
| PEOU | Perceived Ease of Use |
| PU | Perceived Usefulness |
| RQ | Research Question |
| SLA | Second Language Acquisition |
| TAM | Technology Acceptance Model |
| VIKO | Vilniaus kolegija / University of Applied Sciences |
| VLE | Virtual Learning Environment |
| VR | Virtual Reality |

INTRODUCTION

“Science and technology multiply around us. To an increasing extent they dictate the languages in which we speak and think. Either we use those languages, or we remain mute.” – J.G. Ballard, 1974

(An extract from the introduction to the French edition of his science fiction novel “Crash”)

Dissertation topicality. English for specific purposes (henceforth ESP) is a subfield of the English language, the pedagogy and research of which has always maintained a close relationship with technology in its various forms. Radio and television, CD-ROMs and DVDs, tape recorders and CD players, laptops and smartphones, Web 1.0 and Web 2.0 tools, all of these technologies have served one or another purpose throughout the history of ESP. Some of them, say for instance, tape recorders or CD-ROMS, have faded away due to “natural selection” and the processes of technological evolution; others, like smartphones or multiple Web 2.0 technologies are currently being used in ESP contexts around the world to enhance language teaching and learning.

The term “ESP” is generally understood to mean teaching English as a second or foreign language to students in higher education or to people in employment already, where the goal of the learners is to use English in a particular occupation or profession (Gatehouse, 2001; Paltridge & Starfield, 2013; Lesiak-Bielawska, 2015). McDonough (2010) identified at least 20 occupation or profession-related areas, in which English can be vital for efficient communication, including *aviation, commerce, customer care, engineering, finance, human resources, information technology, law, law enforcement, maritime communication, media, medicine, nursing, telecommunication, tourism*, etc. The need of such a profession-oriented international language, according to Hutchinson and Waters (1991), authorities on ESP research, developed for several important reasons: the explosive growth of scientific, economic and, as a matter of course, technological pursuits on an international arena at the end of World War II, as well as the First Oil Crisis in 1973, which ended up with Western experience and massive amounts of capital flowing into a number of oil-rich countries. This impetus gave rise to the demand for English as a global language of science, commerce and technology. Gradually people around the world started learning it not because it was a prerequisite for being considered a well-educated person, but for their own very *specific* wishes and purposes: business people needed a suitable command of English to sell their production abroad, doctors were in need to stay informed about the issues in their own sphere, international students and researchers had to rely on references, available in English (Hutchinson & Waters, 1991).

Another key reason, which contributed to the birth and development of ESP, as noticed by Hutchinson and Waters (1991) and Gatehouse (2001), was the revolution within the spheres of linguistics and language pedagogy. If traditional approaches to language teaching, according to Richards (2006), prioritized grammatical competence as the basis of language proficiency, the new ones concentrated on the ways the language may be used in a number of real-life contexts and placed learners and their very specific needs at the heart of the teaching-learning process. Hence the most widely accepted definition of ESP,

provided by Hutchinson and Waters (1991): “ESP is an approach to language teaching in which all decisions as to content and method are based on the learner’s reason for learning” (Hutchinson & Waters, 1991, p. 19). It goes without saying that this shift in language pedagogy was also spurred by rapidly developing technologies. Using computers in foreign language pedagogy (and naturally in ESP), even though it was primarily the concern only to a small number of language teachers, dates back to the beginning of the 1960s, right after IBM introduced the first electric and mass-produced computer. Thenceforward it captured attention of large numbers of language researchers around the world and developed into a very specific multidisciplinary field, usually referred to as computer-assisted language learning (henceforth CALL). Back in the 1990s, Levy (1997) defined it as “the search for and study of applications on the computer in language teaching and learning” (Levy, 1997, p. 1). To a large degree, according to the author, the nature of CALL at any particular time may be treated as the reflection of the level of development of technology. Warschauer (1996) and Stockwell (2010) noticed that at the same time CALL replicated fundamental pedagogical and methodological approaches, thus its development is traditionally categorized into several distinct phases: *behaviouristic*, *communicative* and *integrative* CALL (Warschauer, 1996). Implemented in the 1960s and 1970s and based on the theories, embodying behaviouristic view of language learning (*Audio-lingual Method*, *Total Physical Response* or *the Structural-Situational Approach*), *behaviouristic* CALL introduced the first generation computer programs for language learners, which entailed translation tests as well as vocabulary and grammar drills, repeated patiently by computers. This early phase of CALL, which applied the objectivist “computer as tutor model” and focused on the idea that “repeated exposure to the same material was beneficial or even essential to learning” (Warschauer, 1996), was supplanted by *communicative* CALL in the 1970s. The latter and related language learning theories (e.g. *Krashen’s Theory of Second Language Acquisition*) emphasized the value of meaning-focused teaching and learning and can be considered one step towards the learner autonomy, when computers and technologies were already being used not as a never-tiring-tutor, but as a learning technology and stimulus. In the 1980s, CALL moved towards its third *integrative* phase, when higher education institutions around the world started applying multimedia and most importantly, World Wide Web for language teaching purposes. Multimedia (CD-ROMs and DVDs) allowed teachers to put more emphasis on language use in authentic contexts by integrating texts, images, sounds, videos and animation, but did not really involve learner interaction. Only with the advent of Web 1.0 (the early phase of World Wide Web) were the language learners able to truly immerse into the authentic learning environment by getting an instant access to countless authentic resources in different formats tailored exactly to their own interests and needs. This was of particular importance to ESP learners, whose very specific interests and needs often go beyond the information presented in textbooks. However, it was the advent of Web 2.0 and its various applications which brought the most significant changes and opened new horizons in the sphere of teaching and learning foreign languages, especially in teaching and learning ESP. As noticed by Lesiak-Bielawska (2015), Web 2.0, more than any other type of technologies, provides ESP students “with an opportunity to engage in authentic discursive practices related to their areas of study or work” (Lesiak-Bielawska, 2015, p.

7). *Blogs and social networking tools, video and audio sharing tools, discussion forums and virtual reality*, all these and hundreds of other types of Web 2.0 technologies allow purposeful communication and collaboration with real likeminded people who are often speakers of a target language. Pop (2010) states that these technologies “can place students into real learning situations where they are exposed and use the target language *in vivo*, where neither the teacher nor the students have total control but which can shape, enhance and amend their communicative competence” (Pop, 2010, p. 1187). It is thus natural that in this third phase of CALL researchers often draw upon sociocultural theories of learning, which view the role of social interaction as crucial in second language acquisition. Moreover, they suggest that due to the omnipresence of technologies in foreign language classrooms, *integrative CALL* is already taken over by the fourth phase, *ubiquitous CALL* (Veselá, 2012), which is both the present and the future of language education.

Dissertation research problem and research questions. Despite the worldwide surge in the use of Web 2.0 technologies within the field of teaching and learning ESP in higher education, it appears from CALL literature (Dashtestani & Stojković, 2015; Golonka et al., 2014; Luo, 2013; Wang & Vásquez, 2012) that preference is traditionally given to the most widely investigated mainstream Web 2.0 technologies that have already grown roots in many spheres of education: *blogs, social networking tools* and *wikis*. Given these types of Web 2.0 technologies always involve written communication, the development of ESP students’ writing skills through the use of these technologies has received more attention from researchers in CALL literature than the development of other language skills (speaking, listening, reading) and knowledge areas, such as ESP vocabulary acquisition. There is lack of empirical reference, however, to how teachers are applying less frequently explored and less widespread types of Web 2.0 technologies in ESP classroom in higher education. What is most important, there is a lack of empirical evidence of what their *effectiveness* in it is, or if to be more precise, of what *effect (if any) the use of Web 2.0 technologies has in supporting the improvement of ESP students’ learning achievements*. The operational definition of *Web 2.0 effectiveness in ESP* in this dissertation is coined resting on the reasoning of Agodini, Dynarski, Honey and Levin (2003) who believe that discussing *technology effectiveness* in education “actually is asking whether they *do* improve students outcomes” (Agodini, Dynarski, Honey & Levin, 2003, p. 4) and that of Lockheed and Hanushek (1994) who similarly address the broader term *educational effectiveness* as “*whether or not a specific set of resources has a positive effect on achievement and, if so, how large this effect is*” (Lockheed & Hanushek, 1994, p. 2). When talking about resources (both material and non-material), the authors refer to them as *inputs*, while achievements are associated with observable *outputs* of educational production. CALL literature suggests the specific spheres which need more nuanced explanations within the area of interest are the effects of Web 2.0 technologies (*inputs*) on students’ achievements (*outputs*) in ESP vocabulary acquisition (Behjat, 2013; Ventura & Martín-Monje, 2016; Dashtestani, 2018) as well as in ESP reading comprehension (Chew & Lee, 2013; Tananuraksakul, 2015; Seiradakis & Spantidakis, 2018).

Moreover, Web 2.0 technologies are frequently integrated into education and consequently in ESP curricula, based on a commonly accepted assumption that once they are

ingrained in virtually every aspect of young people's lives, they will naturally fit the needs of the so called net-generation, will add relevance in creating an authentic playful learning environment and will hopefully be accepted with enthusiasm. The reality is that the use of Web 2.0 technologies in young people's personal lives is always voluntary: they have the freedom to choose (or to ignore) a social media platform, to decide about their willingness (or refusal) to stay online, to distribute their contents on *YouTube* or *Instagram*, to comment on a news article, etc. Requiring learners to use a seemingly familiar Web 2.0 technology (*Facebook*, for example) for educational purposes and to forcibly interact with their teachers may have an adverse effect, commonly known as a *creepy tree house syndrome*. The term was popularized by Stein (2008) referring to a phenomenon, whereas teachers push down hot Web 2.0 technologies, while students push back with vocal disapproval or passive resistance. Investigations into reasons behind this possible resistance or, vice versa, potential acceptance of mandatory Web 2.0 technologies used for teaching and learning ESP in higher education settings are surprisingly scarce. These arguments strengthen the need to search for nuanced explanations and a better understanding of the factors both internal and external that present powerful influences on *the acceptance*, i.e. students' *psychological willingness to use or continue using* teacher-dominated Web 2.0 technologies in ESP classrooms in higher education.

Addressing the twofold research problem, this dissertation falls into two clear domains: *the effectiveness* of Web 2.0 technologies in ESP studies in higher education and *acceptance* of Web 2.0 technologies in ESP studies in higher education. The Web 2.0 effectiveness part primarily focuses on the role of Web 2.0 technologies in higher education, including the sphere of teaching and learning ESP. It further narrows down to investigating the educational effectiveness of a selected Web 2.0 technology *IHMC CmapTools* (henceforth *CmapTools*) on ESP students' achievements in vocabulary acquisition and reading comprehension in a blended-ESP course taught at two higher education institutions in Lithuania. The second, Web 2.0 acceptance field, discusses the issue of Web 2.0 technology acceptance in ESP studies in higher education. It then narrows down to examining user acceptance of a Web 2.0 technology *CmapTools* in a blended ESP course in the context of higher education. The three specific research questions arising from this general focus are as follow:

RQ₁: what effect (if any) does the use of a Web 2.0 technology *CmapTools* in ESP studies in higher education have on students' achievements in ESP vocabulary acquisition?

RQ₂: what effect (if any) does the use of a Web 2.0 technology *CmapTools* in ESP studies in higher education have on students' achievements in ESP reading comprehension?

RQ₃: what factors influence ESP students' acceptance of a Web 2.0 technology *CmapTools* in ESP studies in higher education?

Dissertation research object: the use of Web 2.0 technologies in ESP studies in higher education.

Dissertation research aim. The aim of this present research is to expand the existing body of knowledge about the significance of Web 2.0 technologies in higher education (the sphere of ESP included), their role in supporting the improvement of ESP students' learning achievements and the factors influencing the acceptance of these technologies used in ESP classrooms in higher education.

Dissertation research objectives. To achieve the aim, the following research objectives have been set:

1. To highlight the significance of Web 2.0 and its technologies within the sphere of higher education;
2. To explore the peculiarities of using Web 2.0 technologies in ESP studies in higher education;
3. To explore the drivers of accepting Web 2.0 technologies by ESP students in higher education;
4. To analyze the affordances of a Web 2.0 technology *CmapTools* and integrate it into two mandatory ESP courses in two higher education institutions in Lithuania;
5. To measure the effect of using a Web 2.0 technology *CmapTools* in two mandatory ESP courses in two higher education institutions on students' achievements in ESP vocabulary acquisition;
6. To measure the effect of using a Web 2.0 technology *CmapTools* in two mandatory ESP courses in two higher education institutions on students' achievements in ESP reading comprehension;
7. To determine factors influencing ESP students' acceptance of a Web 2.0 technology *CmapTools* in two mandatory ESP courses in two higher education institutions.

Methodology of the research (methods and implementation). Based on the research questions raised, this dissertation employs a quantitative research methodology. The three research questions are addressed by taking advantage of a quasi-experiment, incorporating a *static-group comparison design* (Campbell & Stanley, 1963; Cook & Campbell, 1979; Martella et al., 2013), whereby 107 first year full-time undergraduate ESP students enrolled in two study programmes in two higher education institutions in Lithuania were assigned to 2 experimental and 2 control groups. The experimental group in each institution was exposed to a one-semester-long treatment using Vygotsky's (1978) sociocultural approach as well as Novak's (1970) and Ausubel's (1969) concept mapping strategy involving the usage of an image-based Web 2.0 technology *CmapTools* in blended (hybrid) classroom settings, whereas control groups received no treatment and were taught in conventional settings, i.e. in a face-to-face delivery course. According to Jenkinson (2009), effectiveness and success of technologies in education as a rule "is measured in terms of student individual performance, as demonstrated by tests assessing factual recall and knowledge of basic concepts" (Jenkinson, 2009, p. 274). Thus, to answer the first two research questions and to compare the effects of the treatment between the participants in experimental and control groups, 2 ESP vocabulary achievement tests (posttests) and 2 ESP reading assignments (posttests)

were used as data collection instruments. The third research question was addressed by making use of a structured attitudinal questionnaire based on the Technology Acceptance Model (Davis, Bagozzi & Warshaw, 1989), administered to the participants assigned to experimental groups at the end of the treatment.

The structure of the dissertation. The dissertation is organized in 7 chapters. *Chapter 1* provides insights into the role and importance of Web 2.0 and its technologies in higher education, which includes the conceptualization of the three generations of World Wide Web (with a specific tribute to Web 2.0 generation), their convergence with philosophies of education, and the classifications of Web 2.0 technologies having educational potential. *Chapter 2* discusses the peculiarities of using Web 2.0 technologies in teaching and learning ESP in the context of higher education through a systematic literature review. It also introduces a Web 2.0 technology *CmapTools* to be used in the subsequent empirical study. *Chapter 3* leads us into the technology acceptance domain of this dissertation. It introduces the concept of technology acceptance and discusses Technology Acceptance Model (TAM) (Davis, Bagozzi and Warshaw, 1989). *Chapter 4* reviews the results of a pilot study, examining university students' attitudes towards the use of Web 2.0 technologies for learning ESP the methodology used in the dissertation research. It also presents the methodology used in the parent research of this dissertation. *Chapter 5* reports on the research findings regarding the effect of a Web 2.0 technology *CmapTools* on students' achievements in ESP vocabulary acquisition and in ESP reading comprehension. *Chapter 6* reveals the research findings related to the acceptance of Web 2.0 technology *CmapTools* by ESP students assigned to experimental groups in the course of ESP. *Chapter 7* is devoted for the scientific discussion. Provided conclusions, limitations and implications for future research finish the dissertation.

CHAPTER 1.

THREE GENERATIONS OF WORLD WIDE WEB

1.1. Conceptualization of Web 1.0, Web 2.0 and Web 3.0

In order to understand the significance, essence and benefits of Web 2.0 in the sphere of teaching and learning ESP and in education in general, it is important to look at the evolutionary process of the World Wide Web, which is usually associated with the three clear-cut stages of development. The World Wide Web was created by computer scientists Berners-Lee, Cailiau and others in 1989, while working for nuclear physics laboratory Conseil Européen pour la Recherche Nucléaire (CERN) in Geneva. One year later Berners-Lee wrote the first Web browser and server. The main idea behind World Wide Web was to make it easy for people to view Web pages, i.e. hypertext documents, anywhere on the Internet. Three most core protocols or components of this earth shattering invention were *Hypertext Transfer Protocol (HTTP)*, specified by the authors as the language computers would use to communicate over the Internet, *Uniform Resource Locator (URL)*, a reference to a web page, which recognizes its location on a computer network together with a mechanism to retrieve it, and *Hypertext Markup Language (HTML)*, which describes how to format pages containing hypertext links. In his seminal work “*Weaving the Web – The Original Design and Ultimate Destiny of the World Wide Web*” Berners-Lee (2000) provided the following definition of the World Wide Web: it is “the set of all information accessible using computers and networking, each unit of information identified by a *URL*” (Berners-Lee, 2000, p. 239). In fact, this definition suits well for the interchangeably used term, Web 1.0, also referred to as the first generation of the World Wide Web. This first generation Web was very passive in nature and generally served for content delivery purposes, therefore it is frequently called “read-only” Web. Still, it offered enormous potential within the sphere of education, especially within foreign language teaching and learning, as both language teachers and learners were offered access to an unprecedented amount of authentic target-language resources: texts, graphics, sounds and video materials via hypertext keywords or links. The era of Web 1.0 coincides with the era of integrative CALL discussed in the previous chapter, when a number of CD-ROMs for language learners was already available. Unfortunately, the quality of recordings offered by CD-ROM technology was imperfect, while learners’ skills to benefit from these recordings were unsatisfactory either. To illustrate, in her paper discussing the findings of two empirical studies investigating how students of English used two English learners’ dictionaries on CD-ROM, Winkler (2001) emphasized that although such dictionaries on CD-ROM already included audio-visual elements, exercises and games, a number of modifications in content and design had to be made to make such dictionaries more effective and helpful to their users. Moreover, learners also needed to gain additional skills to benefit from the content of the dictionaries on CD-ROM contained and could not be modified in any way. In her study, analyzing learners’ attitudes towards CD-ROM multimedia in the business English classroom, Trinder (2002) stated that the benefits of multiple modalities, online support tools, and instant feedback were

believed to have the potential of increasing learner control, motivation, and autonomy. However, a closer look at what was actually available on the market (in that particular case the sub-market of business English multimedia programmes), revealed that many such learning technologies fell short of the claims that had been made for them, at least in the eyes of pedagogues.

Nevertheless, once instructional materials, e.g., texts, video, audio materials and other primary reference resources became available online (even if for consumption purposes only), educational institutions immediately unlocked the educational value of the Web to language learners, no matter what their ethnicity, gender or place of residence were. Masie (1997) was one of the first researchers to define learning through content management systems or home created Web pages as *online*, *Web-based* or *e-learning*, which is “the use of network technology to design, deliver, select, administer, and extend learning” (Masie, 1997, as cited in Cross, 2004, p. 104). One year later Cross popularized the term “*e-learning*” by specifying it as “learning on Internet time, the convergence of learning and networks” (Cross, 2004, p. 104). For him a vision behind e-learning was corporate training and a common learning space. Similarly, Berners-Lee (1989) had stated earlier that one of the visions behind the first generation Web was a common information space, where people could communicate and share information. The most important aspect here is universality, i.e., the fact that a hypertext link can point to anything, regardless of the source, be it personal, local or global, a draft version or a refined product. Another vision was to apply the Web as a realistic mirror reflecting the ways in which people socialize, work, learn or play. Berners-Lee (1989) was expecting that once the state of our interactions was on line, we could then use computers to help us analyze it, make sense of what we are doing, where we individually fit in, and how we can better work together. It seems that these visions which may have seemed as long-term goals came true earlier than expected: at the turn of the century with the advent of Web 2.0 in early 2000.

This new era of World Wide Web or Web 2.0 represents an extremely remarkable step forward in the way knowledge and information can be created, accessed, disseminated or stored. The concept of Web 2.0 was first mentioned by Doherty and O’Reilly at the O’Reilly Media Web 2.0 technology conference brainstorming session in 2004, when discussing this fundamental step forward: “the transition from the Internet’s use as a one-way medium for transmitting information from centralized sources to a global audience of users to its use as a two-way medium by which new software and the unique characteristics of the Internet position users to control their own data and share it with others” (Verdier, 2009, p. 7). In a strange paradox, however, there is still considerable controversy surrounding the term and thus there is no single clear-cut agreed definition of Web 2.0. It seems that this elusive fashionable buzzword comprises a multitude of different connotations and as O’Reilly (2007), one of the founders, emphasized, “doesn’t have a hard boundary, but rather, a gravitational core” (O’Reilly, 2007, p. 18).

O’Reilly (2007) characterized Web 2.0 as a *platform*, “spanning all connected devices. According to him, Web 2.0 applications are those that make the most of the intrinsic advantages of that platform: delivering software as a continually-updated service that gets better the more people use it, consuming and remixing data from multiple sources, including

individual users, while providing their own data and services in a form that allows remixing by others, creating network effects through an “architecture of participation,” and going beyond the page metaphor of Web 1.0 to deliver rich user experiences” (O’Reilly, 2007, p. 17). Freedman (2006) defined Web 2.0 as “*a means whereby just about anyone can contribute to an ongoing “conversation” in which knowledge is both discovered and constructed as it goes on*” (Freedman, 2006, p. 13). Witts (2008) called it *software* that entitles the user or consumer to become the creator or broadcaster. Grosseck (2009) stated that “Web 2.0 refers to the *social use of the Web* which allows people to collaborate, to get actively involved in creating content, to generate knowledge and to share information online” (Grosseck, 2009, p. 478.). According to Redecker et al. (2009), Web 2.0 or “social computing” “refers to the *range of digital applications* that enable interaction, collaboration and sharing between users” (Redecker et al., 2009, p. 19), while in Wilson’s et al. (2011) opinion “Web 2.0 refers to the *second generation of the Web*, wherein interoperable, user-centered web applications and services promote social connectedness, media and information sharing, user-created content, and collaboration among individuals and organizations” (Wilson et al., 2011, p. 2).

As alluded to above, the authors may address Web 2.0 as a *platform, a software, a range of digital applications, a means of communication, social use or the second generation of Web*, however all of the definitions imply its participatory and open nature and incorporate the idea of democracy and user-generated content (anyone can be the creator and anyone can contribute). McLoughlin and Lee (2008) emphasize that in contrast to static and monopolistic Web 1.0, Web 2.0 premises on the idea of collective intelligence, the essence of which is that communities can be significantly more productive when working in close cooperation, than individuals working in isolation. Luo (2013) summarizes that the concept of Web 2.0 encompasses a collection of various connotations, “resulting in an increased emphasis on user-generated content, information sharing, collaborative and cooperative effort, learner-to-learner and learner-to-instructor interactivity, and informal and formal learning, which altogether potentially formulates a newly-emerging paradigm of Web 2.0-based online learning, as compared to traditional Web-based or e-learning paradigms” (Luo, 2013, p. 1). In this dissertation the term **Web 2.0** is operationalized as *the second generation of World Wide Web as well as its numerous technologies that enable interaction, collaboration and sharing between users*. They are definitely numerous: since fatal 2004 the World Wide Web was undergoing a true revolution, when almost each subsequent year has witnessed the birth of a new user-driven technology (or technologies): *Facebook* and *Flickr* opened their access in 2004, *YouTube* and *Reddit* have flourished since 2005, *Twitter* emerged in 2006, *Second Life* and virtual worlds appeared in 2007, *Instagram* and *Pinterest* occurred in 2010; *Google+* and *Snapchat* came out in 2011, etc. These openly available online technologies, allowing creation, editing and sharing of digital content between groups of people via a web-browser, are generally referred to as **Web 2.0 technologies**. This current definition of Web 2.0 technologies, coined by Bower (2017), will be used as an operational one throughout this dissertation.

All the abovementioned and hundreds of other Web 2.0 technologies have already become or are becoming an integral part of our private and professional lives. Moreover, although none of them were initially designed for academic purposes (Crook et al., 2008;

Orehovački, Bubaš & Kovačić, 2012), teachers and researchers embraced the value offered by their essential attributes: openness, ease of participation, communication, information sharing and collaboration. Pop (2010) noticed that the English language teachers were among the first to recognize the benefits deriving from employing Web 2.0 technologies in foreign language acquisition. Wang & Vásquez (2012) are convinced that due to the above mentioned attributes of Web 2.0 technologies, second language research experienced a paradigm shift: it has moved from a cognitive orientation to a social orientation, from classroom contexts to naturalistic settings, from an acquisition metaphor to a participation metaphor, and from foreign language learning to foreign language use. Moreover, it initiated discussions about the mismatch of the existing traditional learning theories and the needs of the younger generation which grew up in the digital age and possesses different learning styles than their predecessors.

These discussions are becoming even more intense in the era of Web 3.0 which started in around 2010 and is set apart from its previous versions by such driving forces as artificial intelligence, virtual and augmented reality, semantic Web or seamless connectivity through digital devices. The recently used neologism Web 3.0 is conceptualized by Balaji et al. (2018) as “a third generation technology upgrade through 2010 – 2020s, mainly characterized by semantics of meaning and intelligence. As an evolving interactive platform for collective intelligence, Web 3.0 comprises a set of tools involving markup data, crowd-sourced content, data mining and machine learning to enhance intelligence, underlying frameworks and architecture of the Web towards establishing semantic connections, so that machines understand and interpret what humans exactly want-contextual, relevant results” (Balaji et al., 2018, p. 2).

The following section will discuss the convergence of the three generations of World Wide Web with philosophies of education, will weigh the revised roles of both teachers and learners and will compare the ways of knowledge building, transmission, reception and storage within a technology enabled educational process in each generation of World Wide Web.

1.2. Convergence of Web 1.0, Web 2.0 and Web 3.0 with Philosophies of Education

The theories describing teaching and learning during the evolution of World Wide Web are in a state of flux. By juxtaposing the conceptual models of static Web 1.0 and dynamic Web 2.0, Talandis (2008), Mc Loughlin & Lee (2008), Dede (2008), Enonbun (2010), Hicks & Graber (2010), Crompton (2012) and Pascoe et al. (2018) draw an interesting parallel with several prevailing learning theory paradigms. They noticed that when raised in a visible form, Web 1.0 greatly resembles the teaching and learning, functioning in a traditional hierarchical *expert-amateur* model (Lave & Wenger, 1991; McDonald & Postle, 1999), where knowledge was acquired in a linear manner. This model was also postulated by Palmer (2005) as ***the objectivist myth of truth*** (see Figure 1):

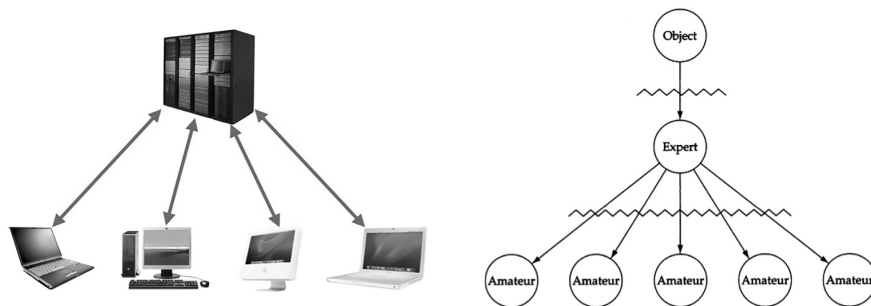


Figure 1. *Conceptual model of Web 1.0 (reproduced from Talandis, 2008, p. 799) compared to the objectivist myth of truth (reproduced from Palmer, 2005, p. 628)*

In Palmer’s (2005) **objectivist myth of truth**, information was transferred down from a trained expert (e.g. foreign language teacher) who was supposed to know the truth about the object to amateurs (e.g. foreign language students) who were only capable to receive, remember and repeat it. Within this traditional model, according to Dede (2008), “authenticated” knowledge was embodied in primary reference sources, such as dictionaries, encyclopedias or instructional materials, such as textbooks. Epistemologically, a single-correct-answer was supposed to underlie any phenomena, regardless of the fact that trained experts themselves may not have fully developed understanding of the causes that lead towards a proper interpretation of reality. Within this traditional context, knowledge transmission and reception closely resembles Web 1.0 (read-only) platform which transferred information from centralized sources to users or consumers who were predominantly capable to read it, but were deprived of an opportunity to modify, edit or make any other input to the suggested content. Moreover, according to Enonbun (2010), similarly to the objectivist learning theory, the platform did not assist in cross-fertilization of ideas and sharing of opinions.

In contrast, the shift from Web 1.0 to Web 2.0 not only enabled the users and consumers of the Internet to become active creators and broadcasters of information, but also offered opportunities to engage and share ideas with like-minded groups of people. Wenger-Trayner and Wenger-Trayner (2015) address these like-minded groups of people as **communities of practice** and define them as “groups of people who share a concern or a passion for something they do and learn how to do it better as they interact regularly” (Wenger-Trayner & Wenger-Trayner, 2015, p. 1). According to them, three elements are crucial to constitute such a community: a shared domain of interest or competence, a community and a shared practice. Moreover, as noticed by Martin (2011), within communities of practice, all learners agree that no person can hold all knowledge regarding the particular subject, so everyone can collectively share experience and expertise. Communities may come in a variety of forms. Some of them may be small in size; others may be very large; some are local, and some cover the globe. A perfect illustrative example of a true global community of practice is users of the largest academic social networking site *Research Gate*. This Web 2.0 technology allows scientists researchers and PhD students

around the world to share papers, follow the activities of others, find collaborators and engage in discussions with like-minded users sharing similar scientific interests. In this perspective, according to Talandis (2008), the conceptual Web 2.0 model mirrors Palmer’s (2005) circular, dynamic and interactive **community of truth** model (see Figure 2). Palmer (2005) suggests, that in the community of truth, “as in real life, there are no pristine objects of knowledge and no ultimate authorities. In the community of truth, as in real life, truth does not reside primarily in propositions, and education is more than delivering propositions about objects to passive auditors” (Palmer, 2005, p. 629).

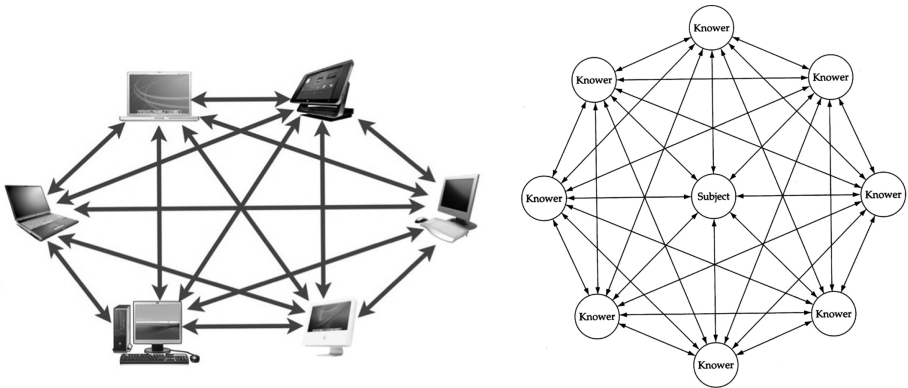


Figure 2. Conceptual model of Web 2.0 (reproduced from Talandis, 2008, p. 799) compared to the community of truth (reproduced from Palmer, 2005, p. 629)

In contrary to objectivism, where, as Figure 1 suggests, an expert or an ultimate authority is the necessary connective core, in Palmer’s (2005) community of truth, the focus is always on the subject. In order to understand it “we have to enter into complex patterns of communication-sharing observations and interpretations, correcting and complementing each other, torn by conflict in this moment and joined by consensus in the next” (Palmer, 2005, p. 630), just like Web 2.0 advances our thoughts and knowledge through connections and interactions with other users and consumers of the Internet (communities of practice) through the processes of collaboration and co-creation, resulting in user-added value. Namely the concepts of co-creation and user-added value, according to Mc Loughlin and Lee (2008), condense the philosophy of Web 2.0, “showing that it is not just an assembly of tools, software, and digital strategies but a set of concepts, practices, and attitudes that define its scope” (Mc Loughlin & Lee, 2008, p. 11).

Some scholars are convinced that by its very nature, Web 2.0 paradigm lends itself towards an epistemologically alternative approach to the objectivist tradition, i.e. towards **constructivist** epistemology and a learning theory, which postulates that scientific knowledge and truth is constituted by people, striving to construct their own subjective idea of objective reality, based on their unique prior knowledge and different dimensions of personal experiences. Teachers in this process act only as guides or facilitators, encourag-

ing learners to question, to explore and to develop their own subjective ideas, attitudes and conclusions (Pascoe et al., 2018; Mattar, 2018; Imathiu, 2018; Echeng & Usoro, 2016; Foroughi, 2015; Crompton, 2012; Enonbun, 2010; Hicks & Graber, 2010; Gunawardena et al., 2009; Mc Loughlin & Lee, 2008; Talandis, 2008; Dede, 2008). As stated by Luo (2013), “constructivism values students’ prior knowledge, considering social interaction as the foundation of all learning experiences and the venue of all learning engagements. Learners achieve their learning goals by actively associating with their prior knowledge and experience, and constructing their own understanding and knowledge through the social interaction that a multitude of social technologies affords” (Luo, (2013, p. 6). Moreover, according to Martín-Monje (2014), Lei et al. (2012), Crompton, (2012), Gunawardena et al. (2009), etc., **social-constructivism** can actually be considered the pedagogical backbone of the introduction of Web 2.0 technologies in education. “Deeply rooted in the cognitive principles of Dewey and Vygotsky, it envisages learning through interaction with others, never as an individual process: meaning is created through social interaction and knowledge is thus socially and culturally constructed” (Martín-Monje, 2014, p. 42). In constructivist philosophical orientation the learners’ scientific knowledge framework can be expanded through the processes of assimilation and accommodation facilitated by an expert (a teacher or a more mature colleague), especially in situations in which learners encounter challenges they cannot solve by themselves.

Being a highly dynamic entity and progressing since fatal 2004 at an extremely rapid rate, Web 2.0 (and communication technologies on the whole) provided an array of new alternatives related to traditional face-to-face classrooms in higher education. Mayadas, Miller and Sener (2015) specified six categories, reflecting the viable options of delivery modes, predominating higher education today:

1. *Synchronous distributed courses*, where Web-based technologies, such as Web-conferencing or other synchronous e-learning media, are being applied to enhance traditional face-to-face activities to students at remote sites in real time.
2. *Web-enhanced courses*, in which online course activities (about 20%) supplement face-to-face delivery without cutting down the number of required class meeting hours.
3. *Blended or hybrid classroom courses*, where online activities intermingle with classroom sessions and replace a significant percentage (about 20 – 79%) but not all required face-to-face instructional activities.
4. *Blended (hybrid) online courses*, in which the majority (about 80 %) of course activities are conducted online, but there are some required face-to-face instructional activities, e.g. lectures, discussions, labs, or other in-person learning activities.
5. *Fully online courses*, where all course activities are conducted online with no face-to-face delivery and no requirements for on-campus activities. This type of delivery is basically used in distance-learning programmes.
6. *Flexible mode courses*, offering multiple delivery modes so that students can choose which delivery modes to make use of for instructional and learning purposes.

What we are witnessing today is that conventional *face-to-face* delivery with course activities, organized around scheduled class sessions, is almost supplanted by the aforementioned technology-enabled instructional options. Naturally, in this scenario, researchers

encounter several levels of uncertainties. For example, if visibility or social presence of teachers at a real time is still required in *Web-enhanced*, *synchronous distributed* or *blended (hybrid)* delivery classrooms, what their role is in above defined *fully online* or *blended (hybrid) online courses* where teachers, learners and institutions are not space and time constrained? Moreover, we are witnessing a situation where formal education on the whole no longer comprises the majority of our learning, as *informal* or *accidental* learning occurs, according to Bell (2011) in the workplace, at home and in the society in general and thus no longer can be considered the only way to conceive knowledge. In fact, knowledge itself can be treated both as a commodity which can be handled and sold, e.g., in online journals or e-books and as a social activity, a resource wherein knowledge flows while people share and refine their ideas (Bell, 2011). Consequently, the continuing implementation of technologies (with specific tribute to the Web 2.0 technologies) in academic contexts challenges different views and opinions whether the existing traditional learning theories are in adequacy with the new options of delivery modes for teaching and learning. Do these learning theories still meet the expectations of today's teachers and learners and envisage their needs in the future? Siemens (2005) and Downes (2007) argue that traditional learning theories: behaviorism, cognitivism and even constructivism were developed in times when learning was not influenced through technologies, therefore they cannot fully explain how learning occurs and knowledge is created in the networked world. According to Siemens (2005), the basic doctrine (and limitation) in these traditional theories is that learning happens exceptionally inside a person. Even **social constructivism**, which postulates that learning is a socially enacted process and, as mentioned before, is traditionally being associated with the introduction of Web 2.0 technologies in education, promotes the dominance of the individual in learning. However, none of these theories, according to Siemens (2005), discuss that when stored and manipulated by technologies, learning may also reside outside an individual, within organizations, non-human appliances or databases. Downes (2007), Siemens (2005) and Bell (2011) propose that teaching and learning approaches in this ever evolving digital age should be based on the theories of connectivism of cognition and instruction and are convinced that Web 2.0 fits well into a connectivist model of learning.

Connectivism, introduced by Siemens (2005) and Downes (2007) is a relatively new philosophy of education of the digital age, which views learning as *actionable knowledge* distributed across networks and therefore this learning consists of the ability to construct and traverse the networks. A network is defined by Siemens (2005) simply as connections between entities. "Computer networks, power grids, and social networks all function on the simple principle that people, groups, systems, nodes, entities can be connected to create an integrated whole. Alterations within the network have ripple effects on the whole" (Siemens, 2005, p. 6). In Downes' (2007) words, "connectivist theory is essentially the idea that if we expose a network to appropriate stimuli, and have it interact with that stimuli, the result will be that the network is trained to react appropriately to that stimuli" (Downes, 2007, p. 331). Contrary to other learning theories, which treat knowledge as an object or state to be built or acquired in the learner's mind, in connectivism, according to Downes (2007) and AlDahdouh, Osório and Caires (2015) we cannot talk about transferring, acquiring

or building knowledge. Rather, the activities we undertake while conducting practices in order to learn are more likely to be understood as progressing or developing ourselves and the society in certain connected ways. In such networked society every person is an equal member of the network, and each connection produces value to him or her. “One’s *Facebook* account, for example, is minimally valuable when only a few friends are connected. As the number grows over 100, however, *Facebook* begins to become as effective as it can be. If you keep on adding friends, however, it begins to become less effective. This is true not only for *Facebook* but for networks in general. For any given network, for any given individual in the network, there will be a certain number of connections that produces maximum value for that member in that network” (Downes, 2007, p. 80). However, according to Downes (2007), the relative utility of connectivity is that its value compared to one that has already been gained from other connections is inevitably reduced having reached a certain point. Moreover, we cannot talk about a single set of best connections. A connection that seems very relevant to one member of the network may appear to be completely irrelevant to others. This is because each member holds different needs, interests and attitudes or speaks a different language. Even if these needs, interests and attitudes coincide, we may acquire the same information from different sources. By the time the source from one connection gets to another, the information which is very new to one member of the network, may appear to be very old to others.

The connectivist learning model, introduced by AlDahdouh, Osório and Caires (2015) (see *Figure 3*), who created it on the basis of Siemens and Downes’ theory of connectivism, offers a unique vision regarding the interaction between learners and information (content). “The content is just a node in the network and learners are mainly not interested in putting it inside their minds. In contrast, learners are interested in using, copying and pasting this content to reach” (AlDahdouh, Osório & Caires, 2015, p. 16). In fact the model strives on the idea of interaction between the nodes. Back in 2000, Berners-Lee stated that anything joined by links can be considered a node: “In the Web a node is a Web page, any resource with a URL” (Berners-Lee, 2000, p. 236). Moreover, in the model the learners themselves are seen as autonomous nodes in the network as they differ from each other in their aims and, therefore, use content in a different manner:

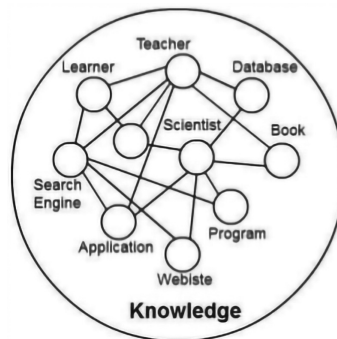


Figure 3. *Connectivism learning model (developed by AlDahdouh, Osório & Caires, 2015, p. 16)*

It is interesting that learners, facing new information in the connectivist learning model are put on an equal footing with scientists, i.e., they are never proposed premeditated solutions to the issues to be addressed and the problems to be dealt with. On the contrary, as connectivist philosophical orientation flourishes on the principle of diversity of opinions and attitudes rather than on their similarity, learners confront disputable, lifelike problems and situations and are forced to seek solutions to them by making connections, by asking, discussing, evaluating and sharing information with others. These activities, according to Anderson and Dron (2011), are reflected in learners' contributions to a number of Web 2.0 technologies: wikis, *Twitter*, threaded conferences, voice threads, etc., while their assessment incorporates self-reflection and teacher assessment of their contributions to the course. Such learners' contributions may come in a variety of forms, e.g., as critical comments, reflections, learning objects and resources as well as other digital artifacts of knowledge creation, dissemination and problem solution (Anderson & Dron, 2011). Anderson and Dron (2011) and Bates (2014) notice that Siemens (2004) and Downes (2007) seem to be rather imprecise about the notion and the purpose of a teacher (or an expert) within connectivist worldview and pedagogical practice, focusing more on individual learner and the way he or she accesses new information. Still, within the connectivist learning model, conceptualized by AlDahdouh, Osório and Caires (2015), a teacher is clearly defined as a specialized fellow node or a partner who has already connected to the network of the right people in the right context (e.g. scientists) or to non-human appliances, e.g. websites, Web 2.0 technologies, programs, databases, etc. However, his or her role is not limited to acting just as a linking node towards these people or appliances. His or her function is rather to provide a learning road map for newcomers to the field, let them immerse into the network, create a unique personal learning environment, discover wisdom and find answers for themselves at their own pace. Any communicational technology, whether it is a mobile phone, an e-mail or one of hundreds of available Web 2.0 technologies, makes the process more feasible and in fact serves as the main connector within the network. According to Downes (2007), this implies a new form of pedagogy, seeking to define "*successful*" networks and describe the practices leading to such networks, both within the individual and within the society and characterized as modeling and demonstration on the part of a teacher and practice and reflection on the part of a learner.

An abundant number of researchers (Montebello & Camilleri, 2018; Wang, Anderson & Chen, 2018; Zulkifley, Nor Hasbiah & Siti, 2017; Tinmaz, 2012; Anderson & Dron, 2011; Shriram & Warner, 2010; Pop, 2010; etc.) are convinced that Web 2.0 fits perfectly into a connectivist model of learning. It is noteworthy, however, that all of the authors discuss the advantages of using Web 2.0 technologies either in *fully online* learning environments, *mobile* learning environments or in *blended (hybrid) online* courses. Anderson and Dron (2011) go so far as defining the connectivist teaching and learning approach as a second or third generation pedagogy of *distance* education. According to them, the connectivist learning model explicitly relies on the omnipresence of networked connections between people, digital artifacts, and content, which would have been inconceivable as forms of distance learning where the World Wide Web was unavailable to mediate the process.

It should be noted that the connectivist approach to teaching and learning has received a lot of criticism. Bates (2014), for instance, warned that one of numerous limitations regard-

ing this approach (e.g. insufficient control regarding the quality of content or participant contribution, or unreliable assessment strategies, etc.) is that it is more appropriate for non-formal learning or communities of practice than for formal education, thus “there is no need for formal institutions to support this kind of learning, especially since such learning often depends heavily on social media readily available to all participants” (Bates, 2014, p. 66). Moreover, Balaji et al. (2018), Foroughi (2015), Hussain (2013), Loureiro, Messias and Barbas (2012), Anderson and Dron (2011) and Wheeler (2009) assert that in general the connectivist principles specified by Siemens and Downes seem to be more relevant and compatible with Web 3.0 rather than with Web 2.0 technologies. According to Hussain (2012), if Web 2.0 is usually associated with social networking, co-creation and collaboration between users, then its transformed version, Web 3.0, also known as *semantic Web*, aligns well with intelligent applications using natural language processing, machine-based learning and reasoning. Despite their attractiveness, the role of both Web 3.0 and connectivism in higher education is still hypothetical. Foroughi (2015) and Wheeler (2009), for example, even question whether students are really prepared to be that autonomous learners, as required by Web 3.0 and connectivist learning, and whether teachers are ready to transfer so much instructional control both to technologies and to students.

The previous sections of this current chapter reviewed the evolutionary process of the World Wide Web and introduced the three main stages of its development: static Web 1.0, flexible Web 2.0 and semantic Web 3.0. They also compared the shifting roles of teachers and learners as well as the ways of knowledge building, distribution and storage within a technology enabled educational process in each of the stage. Considering the research object of this dissertation, a particular attention was paid to the generation of Web 2.0, to its conceptualization and convergence with educational philosophies, namely constructivism, social constructivism and connectivism. Bearing in mind the criticism related to connectivist approach to teaching and learning as well as the fact that the empirical part of this research was planned for blended (hybrid) classroom settings rather than online or distant studies of ESP in formal higher education, *social constructivist* epistemology was drawn upon as the theoretical framework for the Web 2.0 effectiveness part of this research.

The following section of this chapter will address *the means or inputs* via which knowledge is being distributed between the participants of a Web 2.0 enabled educational process, i.e., it will align numerous Web 2.0 technologies, seeking to attain an in-depth understanding of what characteristics make them unique and thus feasible to be used effectively in different educational settings, ESP included.

1.3. Classifications of Web 2.0 Technologies Having Educational Potential

The previous chapters discussed that in comparison to static Web 1.0, the essence of Web 2.0 lies in such **fundamental shared characteristics** as user-generated content, information and knowledge sharing and most importantly collaboration, all of which seem to harmonize well with modern thinking about educational practice (Crook et al., 2008, p. 4). However, having in mind that there are hundreds of Web 2.0 technologies available, each offering countless and unique affordances for their users, it is vital to identify which of them might

be meaningful in a particular area of education, such as ESP, and whether or not a teacher should opt for them. Crook et al. (2008), McLoughlin and Lee (2008), Dohn (2009) and Bower (2017) warn that too often the use of Web 2.0 technologies for teaching and learning purposes is seen as a panacea that will cure all educational ills. The reality is, they notice, that the use of Web 2.0 technologies in education per se will never guarantee an effective and meaningful lesson; vice versa, using technology incompetently can leave a learner confused, indifferent or even hostile. This is echoed by Abunowara (2014), who emphasizes that “the key to successful use of technology in language teaching lies not only in hardware or software but also in our human capacity as teachers to plan, design and implement effective educational activities” (Abunowara, 2014, p. 2). For example, a foreign language teacher who is a strong proponent of drilling techniques, as noticed by Stockwell (2014), may perceive the technology (be it a desktop computer, mobile phone or tablet computer) as a means through which he or she provides answers to questions generated from some kind of a database to develop his or her students’ low levels of cognitive thought processes. A teacher who prefers natural communication between learners may be of an opinion that social networking sites will provide the most favorable environment for his or her students, enabling their communication through the use of *Facebook* or some other social networking tool. The technological affordances of a technology, according to Dohn (2009), Light and Polin (2010) and Bower (2017) also vary by specific learning objectives and content area. Thus, the Web 2.0 technology which seems to work well in a biology classroom might be useless for teaching and learning a foreign language; the tool, which proves to be extremely powerful in one particular ESP course, may appear irrelevant in another; a *fully online* ESP course may require different Web 2.0 attributes than a *synchronous distributed* or a *blended classroom* course.

Therefore, prior understanding about **fundamental dividing characteristics** of Web 2.0 technologies, their educational potentials as well as theoretical guidance are necessary before incorporating them in education and in a particular teaching and learning activity. For this reason a number of classifications of Web 2.0 technologies with educational potential have been produced by different authors (Mejias, 2005; Franklin & van Harmelen, 2007; Churches, 2008; Crook et al., 2008; Grosseck, 2009; Light & Polin, 2010; Orehovački, Bubaš, & Kovačić, 2012; Bower, 2015). However, as noticed by Bailey (1994) in his book “*Typologies and Taxonomies: an Introduction to Classification Techniques*”, grouping items (whether these are technologies, people’s physical characteristics, animals, minerals, etc.) by similarity, is not quite as simple as it may appear. “Imagine that we throw a mixture of 30 knives, forks, and spoons into a pile on a table and ask three people to group them by “similarity”. Imagine our surprise when three different classifications result. One person classifies into two groups of utensils, the long and the short. Another classifies into three classes – plastic, wooden, and silver. The third person classifies into three groups – knives, forks, and spoons. Whose classification is “best”?” (Bailey, 1994, p. 2). This illustrative example suits well when we start analyzing and comparing available classifications of Web 2.0 technologies with educational potential. Whose is the best?

Bailey (1994) notices that although classification is basic to the social sciences, it seldom receives methodological exposition. The author suggests that any classification should be broken down into two essential approaches: typology or taxonomy. The former is primar-

ily conceptual; the latter is empirical (Bailey, 1994). Resting on this suggestion, the current sub-chapter introduces three methodologically sound classifications of educational (Web 2.0) technologies. Preference was given to two taxonomies elaborated by Churches (2008) and Orehovački, Bubaš, and Kovačić (2012) and a typology developed by Bower (2015), as they represent different periods of Web 2.0 development and offer the most helpful strategies for the teachers when confronted with a huge variety of Web services accessible and when deciding which of them are the most relevant if situated in a concrete practical setting.

Churches (2008) was one of the first to arrange contemporary digital technologies (already including Web 2.0 technologies) into a clear taxonomy and to discuss the pedagogical utilities that emerged from integrating them into the educational environment. Churches' (2008) taxonomy, commonly known as *Bloom's Digital Taxonomy*, was based on the famous *Bloom's Taxonomy* of cognitive learning objectives, developed by a team of cognitive psychologists in 1956, as well as on its revised version, elaborated by Anderson and Krathwohl in 2001, known as *Bloom's Revised Taxonomy*. The original *Bloom's Taxonomy* depicted the hierarchical nature of cognitive learning, structured into six categories of thinking skills. The latter were expressed as concept nouns (*Knowledge, Comprehension, Application, Analysis, Synthesis* and *Evaluation*) and were arrayed in an ascending order within the process of cognitive learning, starting with lower order thinking skills (LOWS) and ending with higher order thinking skills (HOTS) (Bloom & Krathwohl, 1956, p. 18) (*Figure 4*).

In *Bloom's Revised Taxonomy*, developed by Anderson and Krathwohl (2001), the six categories were slightly rearranged and expressed as verbs: *Remembering, Understanding, Applying, Analysing, Evaluating* and *Creating*. The last cognitive element, *Creating*, specified by the authors as "putting elements together to form a coherent or functional whole; reorganizing elements into new pattern or structure through generating, planning or producing" (Anderson & Krathwohl, 2001, p. 2), was being considered the highest order thinking skill. However, before this last element could actually be reached, learners must inevitably have passed through all the preceding stages: *Remembering, Understanding, Applying, Analysing, and Evaluating*. The major drawback of this revised taxonomy, according to Churches (2008), was that although the aforementioned elements did encompass objectives and activities incorporated by teachers in their educational practice, they did not really reflect on the contemporary educational objectives, processes and actions, surfacing from the advent and integration of Information and Communication Technologies (ICT) into classrooms, nor did they discuss their influence on learners' lives. Churches' *Digital Taxonomy* (2008), on the other hand, was considered an important update and step forward, facing the new behaviors, actions and learning opportunities emerging as ICT progressed and became more pervasive. Moreover, it was a clear example witnessing the transition from objectivist or cognitivist approach to knowledge building, treating learning as a solitary mental activity, towards a constructivist approach, postulating that learners acquire new knowledge from the real world contexts through participation and interaction, especially when alleviated by technologies.

As it is visible from *Figure 4*, juxtaposing the three versions of Bloom's taxonomies, each of the six cognitive elements within the process of learning in the digital age described in Churches' *Digital Taxonomy* data is fortified with several digital additions. For example,

the lowest order thinking skill *remembering*, which always infers retrieval of information as well as its growth, is enhanced with such digital key words as *googling*, *social networking*, or *social bookmarking*, etc. One of the digital additions for the element of *understanding* includes *blog journaling*. Churches (2008) suggests that students who “talk”, “write” or “type” a daily or task specific journal, show a basic understanding of certain issues. Moreover, blogs can successfully be used to develop their higher level thinking when used for discussion and collaboration. The cognitive category of *Applying* the learned material includes such digital additions as *uploading* materials to websites, the *sharing* of materials via sites like *Flickr* and interestingly, *hacking*, which in this case seems to have no negative connotations and is defined by the author simply as applying a set of rules to achieve a goal or objective. Churches (2008) suggests that *Analyzing* can be realized through *mashing* and *mind mapping*, whereas *Evaluating* and constructive criticism are associated with posting comments to *blogs*, *discussion boards* or *threaded discussions*. However, the most significant adjustment in Churches’ *Digital Taxonomy* is that the cognitive category of *Evaluation* incorporates an additional component of *Collaboration* (justified by such digital additions as *texting*, *twittering*, *chatting*, *skyping*, *videoconferencing*, etc.):

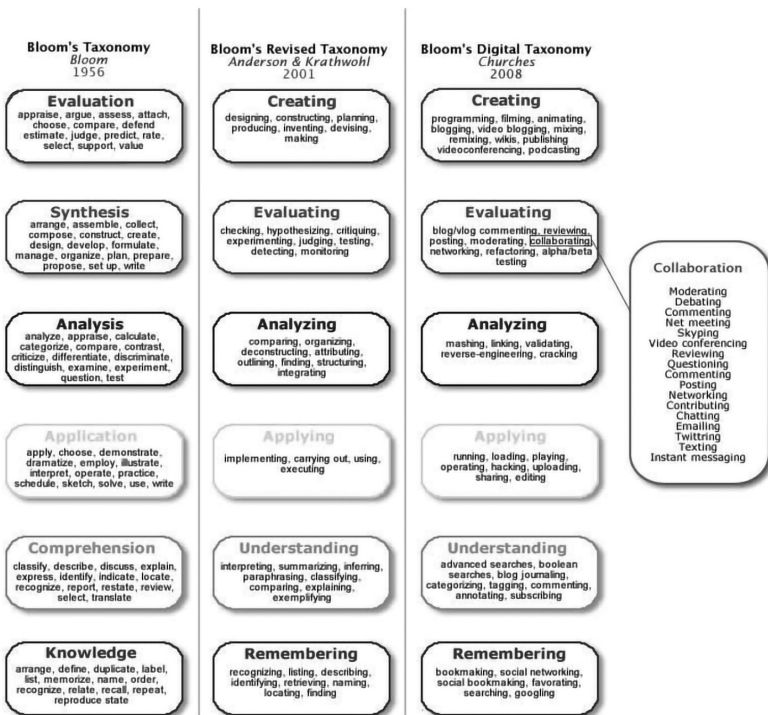


Figure 4. Three versions of Bloom's Taxonomy. Retrieved from: <http://joannmajor.org/taxonomy/index.html>

We may consider it an appropriate and fast reaction to the fact that with the advent of Web 2.0, the Internet has become a much wider space for acquiring and building knowledge and has stimulated the development of new forms of learning skills. Churches (2008) calls collaboration “a 21st century skill of increasing importance” and a key aspect in modern world, leading to collective intelligence. The author (2008) suggests that although collaboration is not necessary in individual’s learning process, the learning process and educational activities can be enhanced and facilitated by integrating digital media and Web 2.0 technologies, including *discussion boards, forums, blogs, wikis, social networks, threaded discussions, bulletin boards, chatrooms, video and audio conferencing, instant, text and video messaging*, etc. Churches’ *Digital Taxonomy* is still being used today in different education contexts, however, due to the fact that since 2008 an array of new Web 2.0 technologies were launched (e.g. *Pinterest, Instagram, Snapchat, Google +*, etc.) and even surpassed the ones, discussed by Churches’ (2008) in his publication, several Web 2.0 related taxonomies were developed.

In 2012 Orehovački, Bubaš, and Kovačić (2012) produced a three-dimensional model of educational Web 2.0 technologies (Figure 5), which also serves as a valuable framework for the selection of the most relevant and sufficiently useful Web 2.0 technology when planning the implementation of any online activity:

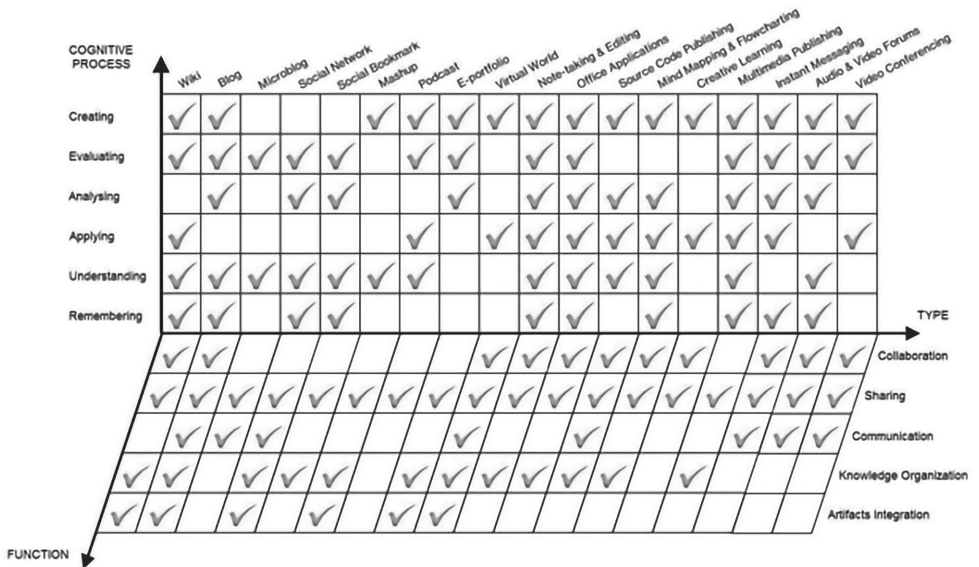


Figure 5. A three-dimensional model of educational Web 2.0 technologies developed by Orehovački, Bubaš and Kovačić (2012)

The first dimension of this model represents the **type** of a Web 2.0 technology (e.g. *wiki, blog, virtual world*, etc.). The second dimension refers to the **function** or affordance of a particular Web 2.0 technology (collaboration, sharing, communication, knowledge organi-

zation, learning support or artifacts integration). The third dimension indicates **cognitive processes** within the framework of the aforementioned *Bloom's Revised* and *Digital Taxonomies* (Anderson & Krathwohl, 2001; Churches, 2008): *Remembering, Understanding, Applying, Analyzing, Evaluating* and *Creating*. The authors suggest that any Web 2.0 technology can be positioned in one or several intersections of these dimensions. "For instance, the Web 2.0 tool *Delicious* can be categorized as a social bookmarking service that enables sharing and knowledge organization, and facilitates cognitive processes like remembering, analyzing and evaluating" (Orehovački, Bubaš, & Kovačić, 2012, p. 2).

The typology derived by Bower (2015) (Figure 6) is considered the latest and the most extensive classification of educational Web 2.0 technologies to this date, stemming from a systematic review of Web 2.0 technologies and a carefully structured typological analysis of their affordances. Having reviewed over a thousand of links from online archive sites, online searches and previous Web 2.0 related empirical literature, Bower (2015) succeeded in identifying 212 contemporary Web 2.0 technologies with educational potential. These were further divided into 37 **types** and consequently logically arranged into 14 **clusters** (including *text based tools, image based tools, audio tools, video tools, multimodal production tools, digital storytelling tools, website creation tools, knowledge organization and sharing tools, data analysis tools, timeline tools, 3D modelling tools, assessment tools, social networking and synchronous collaboration tools*). Each type of a Web 2.0 technology, arranged according to its cluster, its pedagogical affordances as well as examples of concrete tools were described by the author:

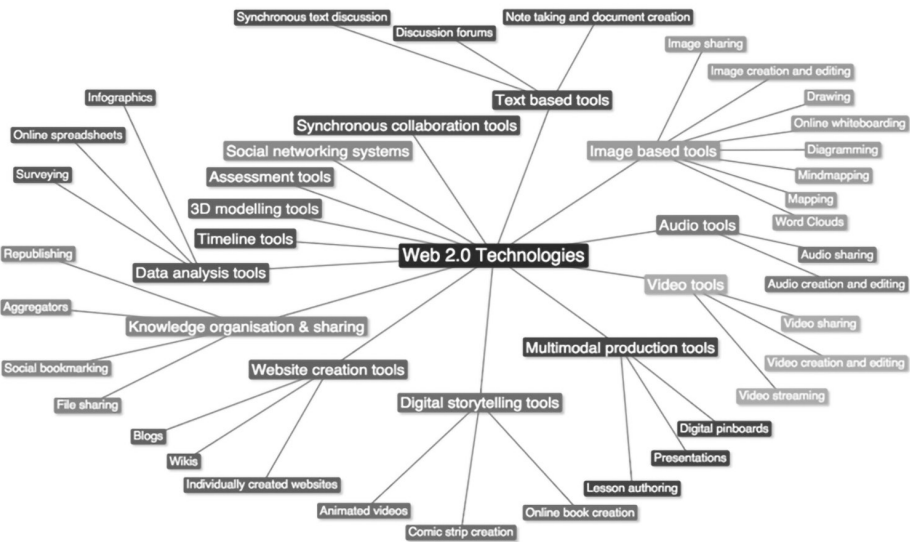


Figure 6. The typology of educational Web 2.0 technologies derived by Bower (2015)

Throughout this dissertation the above discussed classifications of educational Web 2.0 technologies, developed by Orehovački, Bubaš and Kovačić (2012) and Bower (2015) will be repeatedly reflected on, when trying to comprehend the current landscape of Web 2.0 technologies, when distilling the Web 2.0 related empirical research within the sphere of ESP in higher education, and most importantly, when tackling pedagogical issues of using one or another type Web 2.0 technologies in different ESP classrooms around the world. Maintaining focus on pedagogical issues, as noticed by Bower (2017), means that teachers can avoid being distracted by the novelty of new technologies and can concentrate upon how they are affecting learning and how large this effect is. Accordingly, the following chapter will try to seek answers to the question of how Web 2.0 technologies influence learning in ESP classrooms by analyzing the examples of effective use of Web 2.0 technologies in supporting the development different ESP language skills and knowledge areas as reported by ESP researchers.

CHAPTER 2.

EFFECTIVENESS OF WEB 2.0 TECHNOLOGIES IN ESP STUDIES IN HIGHER EDUCATION

Addressing the second objective of this dissertation, the chapter will discuss the peculiarities of using Web 2.0 technologies in teaching and learning ESP effectively within the context of formal higher education through a systematic literature review. Resting on the results obtained through the review, it will propose a Web 2.0 technology to be used in the empirical research of this dissertation.

2.1. The Use of Web 2.0 Technologies in ESP. A Systematic Literature Review

This section will review prior important research and will explore recent trends in the use of Web 2.0 technologies for teaching and learning ESP in formal higher education. According to Webster and Watson (2002), a review of previous, relevant literature is a fundamental component of any academic project. An effective review constitutes a stable foundation for advancing knowledge, confines spheres where a plethora of research exists and unearths areas which need deeper investigation. This review was guided by three main questions:

1. Which types of educational Web 2.0 technologies have already been examined in the area of teaching and learning ESP in formal higher education institutions?
2. Which of the traditional language skills and other knowledge areas have been focused through the use of Web 2.0 technologies?
3. Which theoretical frameworks ground the previous research?

The identification of relevant studies on the usage of *Web 2.0* technologies in the realm of ESP in tertiary education was broken into two stages. Webster and Watson (2002) suggest that when determining the source material for the review, the major contributions are likely to be in the leading journals. Therefore, in the first stage the search was limited to four pre-eminent international peer-reviewed scholarly journals, presenting information, theories, research, methods and materials related to the field of ESP, including:

- *The Asian ESP Journal* (indexed in SCOPUS);
- *English for Specific Purposes* (published by Elsevier);
- *The Journal of Teaching English for Specific and Academic Purposes* (indexed in Clarivate Analytics Emerging Sources Citation Index) (Thomson Reuters Emerging Sources Citation Index);
- *English for Specific Purposes World (ESP World)* (open access journal, indexed in ERIH, Linguistics Abstracts Online, Cabell's Directory of Publishing Opportunities, Genamics JournalSeek, Directory of Open Access Journals (DOAJ), LINGUIST List and Google Scholar).

The search for the literature relevant to the defined area of this review in the first stage was also extended by adding three leading intercontinental and interdisciplinary journals, promoting issues associated with the use of technologies in foreign language teaching, learning and testing:

- *The Journal of Teaching English with Technology* (TEwT) (indexed in Scopus, Index Copernicus, ERIH+, Central and Eastern European Online Library, EBSCO, ERIC, CEJSH, BazHum, Cabell's Publishing Directory, MLA Directory of Periodicals, Australian Research Council journal list, Polish Ministry of Science and Higher Education B list);
- *Computer Assisted Language Learning* (CALL) (indexed in Web of Science Emerging Sources Citation Index (ESCI));
- *ReCall*, published by Cambridge University Press on behalf of the European Association for Computer Assisted Language Learning (EUROCALL).

Searches were conducted to identify publications that contained the following key words: “ESP” OR “English for Specific Purposes”, “English for Academic Purposes”, “Web 2.0” OR “Web 2.0 technologies” OR “Web 2.0 tools”, “Higher Education” OR “Tertiary Education”. Considering the ever-developing nature of Web 2.0 and following the general “rule of thumb” that research literature that is less than 5 years old is preferable (Whitehead, 2013), the review only incorporated articles, published from 2013 to 2018 to restrict the number of research reviewed. Another reason for selecting this time frame was that research on a similar subject matter had already been conducted earlier. Wang and Vásquez (2012) were the first to systematically review the earliest research published in 2005 – 2009, revolving around the integration of Web 2.0 technologies into foreign language learning and teaching settings; Luo (2013) summarized, similar empirical research published from 2008 to 2012, while Golonka et al. (2014) conducted comprehensive literature review on the use of a variety technologies, including Web 2.0 or as they define “network-based social computing technologies” for foreign language teaching and learning, covering the time span 1993 – 2009. It should be noted, however, that the aforementioned reviews summarized the research on the use of technologies in teaching and learning different foreign languages at different levels of education and did not primarily target ESP sphere. To the best of the author’s knowledge, the only researchers who examined the findings of prior research on the use of technologies in ESP instruction in higher education were Dashtestani and Stojković (2015). Still, it needs to be taken into account that Web 2.0 related research comprised only a small fraction of their literature overview. Resting on the typology for CALL literature review, elaborated by Golonka et al. (2014), Dashtestani and Stojković (2015) aimed most of their attention at works, investigating a variety of popular technologies used for learning ESP, such as individual study tools (corpora, electronic dictionaries, electronic glosses/annotation, grammar checkers, automatic speech recognition and computer-assisted pronunciation training tool, etc.), mobile portable devices (tablets, iPods, cell phones and smartphones, etc.) or plagiarism detection software. The aforementioned technologies, however, did not meet the eligibility criteria for this current literature review, as its focus was limited to empirical studies, investigating exclusively the use Web 2.0 technologies in the realm of teaching and learning ESP in formal higher education.

In this current case, the typology of the latest Web 2.0 learning technologies, developed by Bower (2015) and the taxonomy of Web 2.0 technologies with educational potential elaborated by Orehoваčki, Bubaš, and Kovačić (2012), both discussed in the previous chap-

ter, were considered appropriate and were being consulted in order to establish and differentiate *the type* and *the function* of one or another Web 2.0 technology discussed by one or another author. Following Golonka et al.'s (2014) and Luo's (2013) example, this current review targeted only empirical studies that provided evaluative evidence about the effectiveness of a certain Web 2.0 technology in ESP studies in higher education, and not about its descriptions or potential use. Thus, when the title or abstract of the publication seemed to match these pre-established criteria of selection, the full text was analyzed to make sure its content was relevant to the purpose of this current research.

As a result, the selected method of search yielded 17 valid results: 5 relevant articles were retrieved from *The Asian ESP Journal*, 2 from *The Journal of Teaching English for Specific and Academic Purposes*, 1 from *English for Specific Purposes* and 1 from open access journal *English for Specific Purposes World*. Additionally, 7 publications suitable for the review were selected from journals, providing an international focus for the promulgation of innovative research in the area of computer-assisted and technology-enhanced language learning: 3 from *The Journal of Teaching English with Technology (TEwT)*, 2 from *Computer Assisted Language Learning (CALL)* and 1 from *ReCall* journal. *Table 1* depicts the distribution of empirical research on the use of Web 2.0 technologies in ESP studies in higher education in journals:

Table 1. *Distribution of selected empirical studies in ESP journals*

| <i>Journal Title</i> | <i>N</i> | <i>Empirical study</i> |
|--|-----------|---|
| The Asian ESP Journal | 5 | Friedman, 2018; Estaji & Salimi, 2018; Cordova & Dechsubha, 2018; Hernandez et al., 2017; Cedar, 2013 |
| The Journal of Teaching English with Technology | 4 | Dashtestani, 2018; Rico García & Ferreira da Silva, 2018; Papadima-Sophocleous & Yerou, 2013; Tananuraksakul, 2015. |
| The Journal of Teaching English for Specific and Academic Purposes | 3 | Seiradakis & Spantidakis 2018; Choi, 2015; Kakoulli Constantinou, 2018 |
| Re Call | 1 | Park, 2018; |
| Computer Assisted Language Learning (CALL) | 2 | Wang, 2015 ; Wigham & Chanier, 2015 |
| English for Specific Purposes World | 1 | Pašková & Zsapková, 2017 |
| English for Specific Purposes Journal | 1 | McGrath, 2016 |
| Total | 17 | |

In the second round of search, the sources relevant for this investigation were identified by searching four multidisciplinary and subject-related online databases, subscribed by Mykolas Romeris University, Lithuania (henceforth MRU):

- ERIC (via EBSCOhost interface);
- SAGE journals online;

- *Science Direct* (freedom collection);
- *Taylor and Frances*.

Having applied the same method of search and the same search string as in the first round, 12 additional publications, offering a reflection on the use of Web 2.0 technologies in ESP instruction, emerged from the search process in these databases. As *Taylor and Frances* is the publisher of *CALL* journal, it inevitably doubled several publications. Naturally, they were not included twice into the review. *Table 2* depicts the distribution of empirical research on the use of Web 2.0 technologies in ESP studies in international databases:

Table 2. *Distribution of selected empirical studies in international databases*

| <i>Online Database</i> | <i>N</i> | <i>Empirical study</i> |
|------------------------|-----------|--|
| ERIC | 5 | Ventura & Martín-Monje, 2016; Kleanthous & Cardoso, 2016; Shih, 2013; Chew & Lee, 2013; Tananuraksakul, 2015 |
| Science direct | 4 | Kirovska-Simjanoska, 2016; Sokolova et al., 2015; Carrió-Pastor & Skorczynska, 2015; Behjat, 2013. |
| Taylor and Frances | 2 | Tsai, 2018; Wang, 2015 |
| SAGE | 1 | Gao et al., 2016 |
| Total | 12 | |

Unfortunately, no relevant empirical research, carried out in Lithuanian context and published within the selected time frame, was detected. A search of full text articles published in *ESP World* journal, however, produced one single result, which perhaps deserves some attention. In their study “Social Networking Systems in Teaching/Learning English for Specific Purposes”, Kavaliauskienė and Ashkinazi (2014) examined the potential use of social networks by ESP students enrolled in English for Law and Customs Activities study programme at the university in Lithuania. As this research base was more descriptive in nature and did not bear valid empirical witness to the fact that the discussed type of Web 2.0 technologies was truly effective for teaching or learning ESP, it was considered not to fit the pre-selected criteria for the inclusion into the review. However, the terminology used in this paper needs further discussion. It turned out that by using the terms *social networking* and *social networking systems* throughout the study, the authors in fact referred to a variety of Web 2.0 based applications, including media sharing and manipulation websites, collaborative editing and social bookmarking websites, wikis, conversational sites, social network websites and weblogs. A similar tendency of equating the concept of *social networking* with Web 2.0 or with Web 2.0 innovation *social media*, can be also observed in a handful of ESP and ESL related research papers (Laborda & Litzler, 2017; Yunus et al., 2016; Van de Bogard & Wichadee, 2015; Tunde-Awe, 2015; Harwood, 2014). The lines between the enumerated concepts seem to be very thin indeed, therefore, to avoid any sort of terminology-related confusion, in this current review Web 2.0 was treated as the broadest term, referring to the technological and ideological platform on which social media applications evolve, as suggested by Zourou and Loiseau (2013) and Kaplan and Haenlein (2010). Consequently,

the Internet-based applications that build on the foundations of Web 2.0 and that enable the creation and exchange of user generated content, as suggested by Kaplan and Haenlein (2010), were referred to as *Web 2.0 technologies*, *Web 2.0 tools* or *social media* and used interchangeably. Social media is an umbrella term, which, in the opinion of Kuss and Griffiths (2017), Jukić and Merlak (2017), Lomicka and Lord (2016), Kaplan and Haenlein (2010) encompasses many applications, including *social networks*. The latter, according to Kuss and Griffiths (2017) and Lomicka and Lord (2016), are primarily concentrated on connecting people; this feature, however does not apply to all the Web 2.0 and social media applications, therefore the concepts were not used interchangeably.

Findings of the Systematic Literature Review

2.1.1. Types of Web 2.0 Technologies Investigated in the Reviewed Studies

One of the aims of this literature review, was identifying the types of Web 2.0 technologies which had already been examined and proved to be effective in the area of teaching learning ESP in higher education institutions. The distribution of different types of Web 2.0 technologies, investigated by the reviewed studies is outlined in *Table 3*. It suggests, that the most widely applied types of Web 2.0 technologies in ESP studies were blogs and Course Management Systems (CMS): 8 empirical studies on using blogs (or weblogs) and 8 investigating the effectiveness of CMS were identified.

Table 3. *Types of Web 2.0 technologies Investigated in Empirical Research Published from 2013 to 2018*

| <i>Type of Web 2.0 technology</i> | <i>Empirical study</i> | <i>N</i> | <i>ESP area</i> |
|-----------------------------------|----------------------------|----------|--|
| Blogs, weblogs | Hernandez et al., 2017 | 8 | Maritime Education, Information Technology and Multimedia Arts |
| | Pašková & Zsapková, 2017 | | Business |
| | Gao, Samuel & Asmawi, 2016 | | Business |
| | McGrath, 2016 | | Mathematics |
| | Kirovska-Simjanoska, 2016 | | Computer Sciences and Technology and Business Informatics |
| | Kleanthous & Cardoso, 2016 | | Computer science |
| | Chew & Lee, 2013 | | Computer science and information technology |
| | Behjat, 2013 | | Law, Persian literature, physics and electrical engineering |

| <i>Type of Web 2.0 technology</i> | <i>Empirical study</i> | <i>N</i> | <i>ESP area</i> |
|--|---------------------------------------|----------|--|
| Web 2.0 CMS | Cordova & Dechsubha, 2018 | 8 | Occupational safety and health |
| | Seiradakis & Spantidakis, 2018 | | Electrical and computer engineering |
| | Kirovska-Simjanoska, 2016* | | |
| | Sokolova et al., 2015 | | Electrical and power engineering |
| | Wang, 2015 | | Not indicated |
| | Cedar, 2013 | | Nursing |
| | Tsai, 2018 | | Business |
| | Kakoulli Constantinou, 2018 | | Agricultural Sciences, Biotechnology and Food Science and Commerce, Finance and Shipping |
| Social networking | Ventura & Martín-Monje, 2016 | 4 | Not indicated |
| | Shih, 2013 | | Business Communication |
| | Tananuraksakul, 2015 | | Social work |
| | Dashtestani, 2018 | | Engineering |
| 3D virtual worlds | Park, 2018 | 3 | Aviation |
| | Wigham & Chanier, 2013 | | Architecture |
| | Rico García & Ferreira da Silva, 2018 | | Tourism and Hospitality Management |
| Wiki | Estaji & Salimi, 2018 | 3 | Computer and mechanical engineering |
| | Wang, 2015 | | Business |
| | Papadima-Sophocleous & Yerou, 2013; | | Commerce, Finance and Shipping |
| Video sharing | Choi, 2015 | 1 | Business |
| Website creation tools, combined with note-taking and document creation tools | Friedman, 2018* | 1 | Communication for the hospitality and tourism industry |

| <i>Type of Web 2.0 technology</i> | <i>Empirical study</i> | <i>N</i> | <i>ESP area</i> |
|--|------------------------------------|-----------|-----------------|
| <i>Note-taking and document creation tools, combined with synchronous text discussions</i> | Carrió-Pastor & Skorczynska, 2014* | 1 | Business |
| Total | | 29 | |

* *applied more than one type of Web 2.0 technology*

The following paragraphs of this section will discuss each of the identified type of Web 2.0 technologies within the reviewed empirical research as well as the peculiarities of using them for teaching and learning ESP in higher education context.

Blogs and Weblogs in ESP

It seems that over more than a decade foreign language educators have not lost interest into blogs or weblogs and affordances they offer, as the findings of this current literature analysis bear close resemblance to those presented in previous seminal review studies, conducted by Luo (2013) and Wang and Vásquez (2012). The authors conclude that namely blogs were on top of the most commonly investigated Web 2.0 technologies in the subject area within the periods of 2005 – 2009 and 2008 – 2012. In Bower’s (2015) typology of educational Web 2.0 technologies blogs or weblogs fall under the category of website creation tools and are defined by Campbell (2003) as online journals that a person can continuously update with his or her own words, ideas and thoughts through software that enables one to easily do so. Harinarayana and Vasantha Raju (2010) describe them as personal diaries, in which each entry is organized in a reverse chronological order (Harinarayana & Vasantha Raju, 2010, p. 76). Orehovački, Bubaš, and Kovačić (2012) notice that blogs have found a wide application in education, especially in learning a foreign language. According to Chew and Lee (2013), Harinarayana and Vasantha Raju (2010), Pinkman (2005), the incredible and unfading popularity of blogs in foreign language learning contexts can be explained by their user-friendly nature, the simplicity in publishing the content and the peculiarity that permits other users to record their comments. Moreover, educators’ interest into blogs within the sphere of ESL and ESP can be explained and predicted by the fact that they are in fact well-suited for emphasizing any aspect of linguistic knowledge from vocabulary learning to learning grammar and writing (Kleanthous & Cardoso, 2016; Aydin, 2014; Behjat, 2013; Campbell, 2003). Interestingly, the results of this current literature overview suggest that the majority of authors within the field (Hernandez et al., 2017; Pašková & Zsapková, 2017; Gao, Samuel & Asmawi, 2016; McGrath, 2016; Kirovska-Simjanoska, 2016) provided justified findings that the usage of blogs or weblogs is especially suitable and effective for developing ESP students’ writing skills. Others, like Kleanthous and Cardoso (2016) stated that they are beneficial to support ESP students’ writing, speaking and reading activities;

Chew and Lee (2013) perceived the scientific value of blogs for extensive reading (an approach to second language reading, whereas students read long texts for their enjoyment), while Behjat (2013) found them to be effective for teaching and learning ESP vocabulary.

In his seminal article “*Weblogs for Use with ESL Classes*” Campbell (2003) suggests that in ESL classrooms blogs or weblogs can be applied in three different ways: as tutor blogs, as learner blogs and as class blogs. Tutor blogs can serve a variety of purposes: they can give daily reading practice to English language learners, promote their exploration of English websites, encourage online verbal exchange by the use of comment buttons, provide class or syllabus-related information or serve as a resource of links for self-study. Learner blogs, according to Campbell (2003), can either be run by a single learner individually or by small groups of learners collaboratively. This type of blogs is most beneficial for reading and writing activities: an ordinary reading task can be extended by blog postings on the thoughts of individual learners or groups of learners. Individual blogs can also serve as journals for practicing writing and as free-form templates for personal expression. Moreover, as mentioned by Campbell (2003), when writing these journals, language learners cultivate a sense of ownership and responsibility and gain knowledge about practical, legal, and ethical matters for producing a hypertext document. Besides, other users can immediately read the created content, comment on it, engage in discussion and in such a way promote further exchange of ideas. Finally, class blogs are produced collaboratively by the whole class. Campbell (2003) proposes that this kind of blogs can serve as free-form bulletin boards in conversation-based classes. Here learners can post messages, images and links related to classroom discussion topics or express their views on home assignments, etc.

The results of this current literature review imply that researchers, investigating the effectiveness of blogs in ESP classes in higher education, evidently tend to apply them in all three enumerated ways. For example, in Behjat’s (2013) experimental study, which aimed at finding whether blogs could foster Iranian ESP students’ vocabulary breadth, students in experimental groups were introduced to a tutor blog from which they could work on the authentic reading materials and share their understanding with the peers. The analysis of vocabulary posttest results revealed that the ESP students in experimental groups performed better than their counterparts in control groups, however, ESP students of different majors showed different degrees of improvement in their vocabulary breadth. Gao, Samuel and Asmawi (2016) and Kirovska-Simjanoska (2016) described the affordances of individual learner blogs in ESP classrooms. In Kirovska-Simjanoska’s (2016) study, for example, ESP students were required to write in-class reports on what they had learned earlier. Additionally, learner blog was written in *WordPress*, where the students were required to produce three posts on a previously agreed topic. The participants claimed that the blog proved to be a really challenging task, far more exciting compared to their in-class writing.

The approach of incorporating class blogs in ESP studies is well reflected in the empirical research, conducted by Hernandez et al. (2017), McGrath (2016), Kleantous and Cardoso (2016) and Chew and Lee (2013). As an illustration, Kleantous and Cardoso (2016) created a class blog for their ESP students, enrolled in computer science class, using *Blogger*, in which students took on the role of both: authors and followers, as suggested by Campbell (2010). Throughout the semester the teachers uploaded two writing tasks and

two speaking tasks. Students were encouraged to complete them by clear-cut deadlines and provide comments on each other's posts after each task. The teachers monitored all the comments and scaffolded the discussion whenever the comments were not clear. As a consequence, participants stated they improved their ESP writing, speaking and reading skills, especially through the exchange of feedback.

Course Management Systems (CMS)

An interesting new trend that has emerged in the reviewed studies is the frequent usage of Web 2.0-based activities offered by course management systems (henceforth CMSs), as 8 related publications suitable for the review were detected. In general terms, a course management system can be defined as "a set of tools that enables the instructor to create online course content and post it on the Web without having to handle HTML or other programming languages" (*Technopedia*, the tech jargon dictionary). At first glance, as Lorenzetti (2009) notices, it may appear that Web 2.0 technologies and CMSs are like chalk and cheese: Web 2.0 technologies are reliant upon constantly developing content, while course management systems are mainly used to store a large amount of content (course) and to keep it consistent. Moreover, this content is typically unavailable to the outside world and may become unavailable to learners after they leave the course (Wilson et al., 2006). These may be the reasons why CMSs were not incorporated into classifications of educational Web 2.0 technologies, produced by Bower (2015) and Orehovački, Bubaš, and Kovačić (2012), nor were they discussed in the literature review conducted by Wang and Vásquez (2012). Luo's (2013) review also excluded the studies that examined the full courseware, or those reporting on any types of academic online learning program, without implicitly identifying the use of the Web 2.0 technology in it.

However, several authors (Cong-Lem, 2018; Grabar & Rajh, 2014 and Holtzman, 2009) turn our attention by stating, that there is a great difference between traditional, commercially packed CMS programs, such as *Blackboard*, and popular Web 2.0 open-sourced programmes, such as *Moodle*, *Sakai* or *e-folio*. In his study, investigating the affordances of CMS in ESL learning contexts, Holtzman (2009), for example, proposes that *Blackboard*, considering its commercially derived, externally supported, student-centered design, should be treated as a Web 1.0 technology. In contrast, flexible, open-sourced and inclusive nature of *Moodle*, *Sakai* or *e-folio* locates them in the vicinity of Web 2.0 applications. In Grabar and Rajh's (2014) and Holtzman's (2009) opinion, namely the specific feature sets or activities, many of which introduce the possibility for plug-ins and user-created additions, differentiate Web 2.0 CMSs from previous generations of courseware management systems. For example, there are 14 different types of activities or tools available in the standard *Moodle*, including a chat, which allows participants to have a real-time synchronous discussion, a forum, which facilitates asynchronous text discussions between groups of users, or a wiki, a powerful collaborative tool, which enables users to create and edit a document together, generate a class product, or have an individual wiki for each student, visible only to him/her and the teachers. The first two activities or tools are incorporated into Bower's (2015) typology of educational Web 2.0 technologies (2015) falling under the

category of text-based tools, while wikis represent the category of web-creation tools. In prior literature overviews, Luo (2013) and Wang and Vásquez (2012) found them to be one of the most frequently investigated Web 2.0 technologies in foreign language teaching and learning contexts, effective for supporting dialogue between foreign language students, providing a space for collaboration and chronicling students' reflection.

The findings of this current literature review show that researchers in the field (Tsai, 2018; Cordova & Dechsubha, 2018; Seiradakis & Spantidakis, 2018; Kirovska-Simjanoska, 2016; Sokolovaa et al., 2015; Wang, 2014; Cedar, 2013) have increasingly begun seeing the potential of Web 2.0 tools, available in CMS, for teaching and learning ESP, especially in a later time period, since 2016. Research conducted by Seiradakis and Spantidakis (2018) could be considered an epitome of this practice. Their paper reflects the process of designing an online ESP course in Electrical and computer engineering, intended to stimulate students' skills in reading research articles (RA) within the field. The ESP course was built on the university's CMS (*Moodle*) and incorporated in fifteen separate online labs. Each lab introduced online modeling affordances, coaching and scaffolding tasks as well as articulation and reflection tasks. The purpose of coaching tasks (through the use of *Moodle* quizzes) was to provide structured support for the learners to develop their RA declarative genre knowledge. In addition to this, *Moodle* discussion forums were applied as a source of metacognitive genre coaching reference received from peer ESP students. Seiradakis and Spantidakis (2018) notice that by sharing their replies to the genre-related tasks and communicating their ideas in these forums, their research participants not only reported the moves that they were able to detect in a task, but also accessed each other's postings, kept track on their own and their peers' genre observations. Scaffolding genre tasks in this research primarily involved collaborative group assignments through the use of *Moodle* wiki tool to facilitate the co-construction of RA genre knowledge. These assignments involved writing reports on specific facets of genre knowledge, conducting comparative analysis of RA, applying different reading strategies, necessary for RA understanding. In this way, the authors conclude, ESP students were stimulated to articulate and reflect both on their reading strategies and the RAs in accordance with previous works on reading courses within the higher education context. The authors found the inclusion of discussion forums and wikis tools offered by CMS into ESP course to be an effective method for facilitating ESP students' understanding of complicated research articles.

A further example is the research, carried out by Kirovska-Simjanoska (2016), which aimed at determining ESP students' preferences between in-class discussions and online discussions held in CMS (LIBRI). The students were invited to participate in an online discussion forum on a topic chosen by the teacher, following the in-class discussion on student-selected topics. The students' feedback and the participation suggested that students were not particularly interested in discussing on the proposed topic.

Social networks

The third most investigated Web 2.0 technologies among all the reviewed studies were social networks, defined by Kuss and Griffiths (2017) as “virtual communities where users can create individual public profiles, interact with real-life friends, and meet other people based on shared interests” (Kuss & Griffiths, 2017, p. 3). These findings are in fact reminiscent of the results obtained by Luo (2013), who also found social networking tools to be the third most researched technology in area of teaching and learning foreign languages within the time span of 2008 – 2012. Interestingly, the results of this review do not seem to confirm the observations of Dashtestani and Stojković (2015), who discovered, that until 2014 investigations on social networking sites and their effect on ESP instruction were still in a budding trend, and thus concluded that future research should be directed towards investigating the use of this Web 2.0 technology in ESP instruction. Evidently, there is a growing researchers’ interest into the usage of this Web 2.0 technology now, and the tendency can probably be related to the undeniable fact that social networking has become a ubiquitous part of the modern lifestyle around the world. Founded by Mark Elliot Zuckerberg in 2004, *Facebook*, for example, is one of the largest and most popular social networking platforms in existence. As reported by *Statista.com*, a leading online statistics, market research and business intelligence portal, using data from the *Global Web Index* panel, *Facebook* was the most popular social network worldwide as of January 2019, ranked by the number of active users (in millions). It was also the first social network to exceed 1 billion registered accounts in the third quarter of 2012, involving 2.27 billion monthly active users in 2019.

In educational contexts, as suggested by Bower (2015), social networks not only allow students to share user-generated content, post text-thoughts and run polls via their personalized profile pages, but can be also applied to assist them in providing feedback and trouble-shooting support to each other and acquiring skills via comments and voting activities. In the sphere of learning foreign languages, these Web 2.0 technologies, according to Lomicka and Lord (2016), open doors for the learners to improve their digital and multiliteracy skills, communicate *in* and *through* the target language, work in collaboration with other learners, and in such a way develop their linguistic and pragmatic competence. Examples of using social networking tools in ESP domain included four studies, carried out by Dashtestani (2018), Ventura and Martín-Monje (2016), Tananuraksakul (2015) and Shih (2013). As could be anticipated, almost all of the reviewed papers (Ventura & Martín-Monje, 2016; Tananuraksakul, 2015; Shih, 2013) were restricted to *Facebook*. In addition, one research (Dashtestani, 2018) embedded *LinkedIn*, *ResearchGate* and again *Facebook*. It should be noted, however, that ESP teachers tended to apply this Web 2.0 technology to address traditional language skills or knowledge areas of their students: ESP vocabulary (Ventura & Martín-Monje, 2016), reading and writing (Tananuraksakul, 2015) or communication (Shih, 2013). In their study, for example, Ventura and Martín-Monje (2016) explored how the incorporation of *Facebook* could foster foreign language students’ vocabulary acquisition and learning experience in an ESP context. Participants of their eight-week experiment joined a purposefully created *Facebook* group, which complemented to ESP MOOC and focused on the acquisition of ESP vocabulary. The ESP course was divided

into different topics, following the MOOC syllabus but also expanding its scope. The *Facebook* group administrator provided vocabulary input on a regular basis and if necessary elicited the participants' responses, as well as their exchanging of feedback in order to keep the conversations flowing. The results obtained from pre- and post-questionnaires allowed the authors to conclude about a positive impact of the *Facebook* social networking tool on students' motivation to learn ESP vocabulary as well as an improvement in their progress in the MOOC.

In another example Dashtestani (2018) examined the impact of conducting collaborative projects on three social network sites (*Facebook*, *LinkedIn* and *ResearchGate*) on EAP students' attitudes towards EAP and academic content learning. Three groups of students enrolled in three different disciplines participated in collaborative projects on social network sites for four months with the assistance of their teachers. Questionnaires and semi-structured interviews were applied as the instruments of this study. The findings suggest that all the three groups of students had positive attitudes towards carrying out collaborative projects on the aforementioned social network sites, especially regarding opportunities for international communication, enhancing academic vocabulary and literacy, peer collaboration and teacher support. Moreover, the participants gave preference for *Facebook* over *LinkedIn* and *ResearchGate*.

These findings, however, cannot be considered of earth-shattering significance in themselves, as there is quite abundant empiric evidence on the numerous advantages afforded by generic, non-educational social networking sites, such as *Facebook* or *Twitter* on teaching and learning EFL in higher education. However, Orehovački, Bubaš, and Kovačić (2012) draw our attention to the fact that alongside with these general social networks or those, intended for the exchange of experiences and skills between scholars and experts from specific fields (e.g. the aforementioned *ResearchGate* or *LinkedIn*), there exist a variety of tailor-made alternatives designed to address specific areas of education, which can be categorized as online community sites. In their overviews Lin, Warschauer and Blake (2016); Liu et al. (2015); Liu et al. (2013) enumerated at least a dozen of available foreign language learning sites that have social networking characteristics (henceforth SNSLL), including *English, Baby!*; *italki*; *Lang-8*; *LingQ*; *Memrise*; *Mixer*; *Polyglotclub*; *Tongueout*; *Busuu*, *English Café*; *Babbel*; *Hello hello*, *Duolingo*, *Palabela*; etc. Moreover, in the white paper on trends in online language learning courses, Earp (2013) provided an overview and profiles of the offering from the major players in the field, focusing not only on ESL, but also on ESP (Business English in particular). His study incorporated such SNSLL suitable for ESP learners as *Englishtown*; *Open English*; *Global English*; *EnglishCentral*; *Busines*; *Livemoka* (closed down permanently by its owners in 2016), *Tell Me More*; *speexx*; *Busuu*; *goFLUENT*; *englishLIVE.tv*; *italki*; *English Attack!* *Duolingo*, *Babbel*. Unfortunately, as Lin, Warschauer and Blake (2016), Liu et al. (2015), Le Baron-Earle (2014), Liu et al. (2013) notice, there still is a lack of understanding of how these numerous SNSLL can be applied to facilitate teaching and learning for ESL teachers and students. The same concern applies to the sphere of teaching and learning ESP, as affordances of SNSLL seem to have equally been underexploited in ESP classrooms and seem to be neglected by researchers in this domain.

3D virtual worlds

The fourth most popular technology applied by teachers in ESP classrooms was 3D virtual world (*Second Life*, to be more exact), which defines itself as a free 3D virtual world where users (or residents, as they are referred to in virtual world environment) can create, connect and chat with others from around the world using voice and text. As virtual worlds seem to be missing in Bower's (2015) typology of Web 2.0 learning technologies, it was difficult to decide whether they permit tapping into the Web 2.0 logic at all, and if they do, which category of Web 2.0 learning technologies they may be positioned to. However, having in mind that the software incorporates a 3D modeling tool based on most common geometric shapes, allowing users to design and build virtual objects, we may assume that 3D virtual worlds may find shelter in the category of 3D modeling tools, as suggested by Bower (2015). It is interesting, though, that this technology is incorporated under a separate category in Web 2.0 taxonomy developed by Orehovački, Bubaš and Kovačić (2012). Moreover, Orehovački, Bubaš and Kovačić (2012), Balcikanli (2012) and Uzun (2017) highlight that 3D virtual worlds are literally one of the most conventional realizations of affordances, offered by Web 2.0 technologies. In a single place, as noticed by Orehovački, Bubaš and Kovačić (2012), learners are enabled to watch videos, engage in educational games, browse and read professional and academic literature, visit and investigate historical and geographical sites, take an active part in lectures, discussions and conferences, learn foreign languages and become a part of an educational community. Such a community undoubtedly mirrors the features of *community of practice*, as described by Wenger-Trayner and Wenger-Trayner (2015) and discussed in *Chapter 1*. For example, within virtual world community, according to Uzun (2017), there is no authority, gender, age, ethnicity or any other sort of constraint or divergence. In fact residents of this community are embodied by their own 3D graphical representatives (avatars), who can change their morphology, move in the 3D space and are able to communicate in either in asynchronous text-based or synchronous voice-chats, either in groups or individually. These forms of communication help foreign language teachers to create appealing and interactive language learning contexts that assist language learners in hearing, deploying, and practicing the target language (Hismanoglu, 2012; Cheng, Zhan, Tsai, 2010). Moreover, as Hassan et al. (2016) notice, by having a possibility to interact with native speakers students not only practice their aural, oral, reading and writing skills, improve their pronunciation in the target language, but also develop their cultural awareness. Uzun (2017), Hassan et al. (2016), Muñoz Sánchez (2016) and Hismanoglu (2012) are convinced that namely because of their power to establish authentic learning situations where users are able to immerse in authentic discussions, having a perception of being physically present in a real life with native speakers, virtual worlds have attracted a lot of attention from foreign language teachers and researchers (Kruk, 2018; Brooks, 2016; Hassan et al., 2016; Sarac, 2014; Hismanoglu, 2012; Cheng, Zhan & Tsai, 2010; etc.).

Recent examples of incorporating 3D virtual worlds in ESP settings include research works conducted by Rico García and Ferreira da Silva (2018); Park (2018) and Wigham and Chanier (2015). It should be noted that despite of the variety of virtual worlds in-

tended for foreign language learning, including *Second Life*, *Open Croquet*, *Open Sim*, *Open Wonderland*, *World of Warcraft*, *Active Worlds*, *AvayaLive Engage*, etc., all of the detected relevant research studies were limited to exclusively examining the affordances of *Second Life*. The evidence about the true and unfading popularity of this particular virtual world among foreign language teachers substantiates previous findings of Muñoz Sánchez (2016), who carried out an exhaustive literature review on the usage of Virtual Worlds in foreign language teaching and learning within the time frame of 2010 – 2016 and those of Park (2018), who reviewed the related literature published within the period of 2012 – 2017.

The findings of this current literature review show that the roles of incorporating this virtual world in different ESP contexts are endless. For example, Park (2018) explored the potential of *Second Life* for promoting authentic cognitive and metacognitive strategies, by capturing what specific strategies ESP students apply when taking tests on Aviation English in this virtual world. The analysis of the test takers' verbal reports from stimulated recalls showed that different cognitive, metacognitive and communication strategies were being used when taking tests for Aviation English, and that there existed a positive relationship between the total number of cognitive and metacognitive strategies adopted and the test scores. Park (2018) suggests that the use of virtual environments, such as *Second Life*, could dramatically improve language (especially ESP) assessment, by allowing the observation of test takers' use of situated cognition in addition to the collection of their verbal responses.

In their experimental study, Rico García and Ferreira da Silva (2018) analyzed whether *Second Life* as an immersive virtual world facilitated the development of students' ESP skills in tourism and hospitality sector as well as the acquisition of intercultural communication. Although the results obtained from in-class observation and active experimentation implied that experimental groups which received *Second Life* interaction and control groups which were subjected to face to face instruction, showed no significant differences in the acquisition of ESP, a positive tendency regarding the development of intercultural competences was noticed.

In another example, Wigham and Chanier (2015) reported on the affordances of *Second Life* when incorporated in hybrid content and language integrated learning design workshop for architecture students. The authors examined how verbal and non-verbal communication modes were used during collaborative activities in second language and how this usage differed from face-to-face settings. One of their discoveries was that the distribution of verbal and non-verbal modes depended on the role ESP students undertook during collaborative activities.

The findings of this current review related to the usage of 3D virtual worlds in ESP instruction, are more or less identical to those obtained by Wang and Vásquez (2012). In their extensive review, 3D virtual worlds (equally limited to *Second Life* only) were identified as a third most investigated Web 2.0 technology in L2 empirical research within the period of 2005 – 2009.

Wikis

Ranking fifth in this literature review were studies reporting on the integration of wikis in ESP classrooms (Estaji & Salimi, 2018; Wang, 2015; Papadima-Sophocleous & Yerou, 2013). Wikis can be defined as websites where users can collaboratively modify content and structure of a text directly from the web browser. Reasonably, within the typology of Web 2.0 learning technologies, designed by Bower (2015), they fall under the cluster of *website creation tools*.

In her extensive prior research review on the usage of wikis in ESL and ESP studies, published in peer-reviewed journals from 2008 to 2011, Li (2012) concluded that the researched works were predominantly concerned with the use of wikis for collaborative writing, while the four emerging research themes were 1) collaborative writing process, 2) writing product, 3) perceptions of wiki-based collaborative writing and 4) effects of tasks.

The results of this current literature review imply that prior ESP related research mainly investigated ESP students' perceptions of wiki-based collaborative writing and/ or the effects of wiki-based collaborative writing tasks. To illustrate, the experimental study conducted by Estaji and Salimi (2018) investigated the effect of wiki-mediated courses on the computer and mechanical engineering students' collaborative writing performance as well as the advantages and disadvantages of this Web 2.0 technology in an ESP collaborative writing class from the learners' perspective. The wiki-mediated program was used with the participants in the experimental group, while their counterparts in the control group received the conventional writing course. The analysis of one pretest and two posttests as well as semi-structured interview, used as data collection instruments, revealed that there was a statistically significant difference between wiki and non-wiki users considering their writing performance. Furthermore, most of the ESP students found the wiki an effective writing technique with great advantages.

The aim of similar research conducted by Wang (2015) was to improve his students' collaborative writing skills for business English. The findings obtained from two writing tests and a survey questionnaire revealed that students who were enrolled in the collaborative writing tasks acquired knowledge in business writing and found this new learning experience enjoying. The results also indicated that wikis enhanced the participants' development of writing competencies, their interest in learning ESP and the collaboration skills necessary for success in the workplace.

Papadima-Sophocleous and Yerou (2013) explored university students' perceptions regarding the use of wikis in their learning of ESP. The participants were students of the department of Commerce, Finance and Shipping, who worked with wikis throughout the semester and recorded their reflections related to the wiki integration and its perceived effect on their language learning. The results obtained from pre and post questionnaires showed that the participants' wiki experience was a positive one overall.

Video Sharing Tools

Choi (2015) explored ESP students' preferences and perspectives on the use of 20 videos, selected from three video sites (including *YouTube*, *TeacherTube* and *Ted.com*.) for the design and development of an interactive listening comprehension package, through an online questionnaire. In Bower's (2015) typology of educational Web 2.0 technologies, the aforementioned sites are identified as *video sharing tools*, allowing users to source video content for teaching, learning or remixing purposes, as well as broadcast their own videos. *YouTube*, according to Bower (2015), is a commonly used generic video sharing site, while *TeacherTube* is designed especially for teachers to disseminate educational resources. Eventually, *Ted.com* defines itself as a global community, devoted to spreading ideas, usually in the form of short, influential speeches delivered by experts on education, business, science, technology, etc., with subtitles in more than a hundred of languages. Choi (2015) discovered that ESP students mostly preferred videos related to their daily activities or studies, having authentic topics. They favored British accent and slower speakers. Moreover, they indicated they would value the assistance in the form of subtitles and preliminary vocabulary support.

The findings related to the limited usage of video sharing tools in the area of teaching and learning ESP bear close resemblance to those obtained by Luo (2012) in her literature overview covering the timespan between 2008 and 2012. It seems that video sharing tools equally lacked popularity among foreign language researchers, as only one empirical study was detected by the author, while Wang and Vásquez (2012) were not able to identify a single example on the effectiveness of this Web 2.0 technology in the sphere of teaching and learning a second language in the research conducted from 2005 until 2009.

Combination of Web 2.0 Tools Used in ESP Courses in Higher Education Note-Taking and Document Creation Tools, Combined with Synchronous Text Discussion Tools

In their study Carrió-Pastor and Skorczynska (2014) described the results of the implementation of collaborative activities combined with two text-based Web 2.0 technologies for language learning (*Google Docs* tool and online chat) as a way to increase motivation of students enrolled in two Business English subjects. *Google Docs* is a service supported by the search engine Google, which enables users with an account to create, store and share various documents and files. In Bower's (2015) typology of educational Web 2.0 technologies *Google Docs* falls under the cluster of *note-taking and document creation tools*, and allows simultaneous contributions to a document by a number of learners. By observing their ESP students engaged in collaborative activities, Carrió-Pastor and Skorczynska (2014) reached a conclusion that when combined with online chat and shared file creation through the Internet has provided their ESP students with many opportunities for written interaction through a chat, in which students had to refine their communicative skills in English in order to collaborate successfully in the assignment set. The survey conducted

after the assignment revealed that students felt more motivated and found the online collaboration an enriching context in learning business English.

Website Creation Tools Note-taking combined with Document Creation Tools

In the typology of Web 2.0 learning technologies derived by Bower (2015), the category of website creation embraces three types of Web 2.0 tools: blogs, wikis and individual website creation tools. The latter, as described by Bower (2015), allow single users to create websites from available customizable templates through the user interface via point and click. Unlike blogs, which can be considered top researched Web 2.0 technologies of all times both within the sphere of teaching and learning foreign languages and ESP, individual website creation tools do not seem to be extremely popular among ESP teachers. This current literature review was able to detect one single study conducted by Friedman (2018) reporting on the effectiveness of individually created website tools combined with *Google Docs* on ESP students' writing skills. In this study university students enrolled in tourism Industry Communication course explored a number of specialized tourism websites and compiled instances of professional language to collaboratively create a class database on basic terminology and colligational information. This ESP terminology was later used to develop exemplary destination websites for incoming tourism to Japan. The results of online survey allowed the respondents to compare destination descriptions created by ESP students to those obtained from official English websites. Results showed an obvious preference for the student-written texts, as they were easily understood, described concrete experiences and lacked irrelevant information.

This current paragraph provided the evaluative evidence on the most frequently used and analysed types of educational Web 2.0 technologies in the area of teaching and learning ESP in formal higher education institutions. The reasons why they are being used within ESP studies, i.e., which language skills and knowledge areas they are meant to develop, will be dealt with in detail in the following paragraph.

2.1.2. ESP Skills or Areas of Knowledge Researched in the Reviewed Studies

Most of the studies reviewed were investigating the educational effectiveness of different Web 2.0 technologies in developing ESP students' dominant language skills (speaking, listening, reading and writing) and other areas of knowledge, while applying both: the segregated and integrated-skills approach. However, as *Table 4* suggests, a great number of studies (n=13) incorporated into this review (Estaji & Salimi, 2018; Friedman, 2018; Tsai, 2018; Hernandez et al., 2017; Pašková & Zsápková, 2017; Gao, Samuel & Asmawi, 2016; McGrath, 2016; Kleanthous & Cardoso, 2016; Kirovska-Simjanoska, 2016; Tananuraksakul, 2015; Wang, 2015), gave prominence to ESP students' **writing skills**. As a rule these were built in segregation through the use of two popular website creation tools, associated with writing activities: wikis (Estaji & Salimi, 2018; Yu-Chun Wang, 2014; Papadima-Sophocleous & Yerou, 2013) and blogs (Hernandez et al., 2017; Pašková & Zsápková, 2017; Gao, Samuel & Asmawi, 2016; McGrath, 2016; Kirovska-Simjanoska, 2016; Kleanthous &

Cardoso, 2016). Social networking and note-taking and document creation tools, allowing synchronous collaboration in writing, were also reported to be effective for fostering ESP writing by Tananuraksakul (2015) and Friedman (2015). The findings are in line with those of Wang and Vásquez (2012), who also stated that L2 writing represented the most investigated topic area in the research published between 2005 and 2009.

Table 4. *ESP skills/ areas of knowledge researched*

| <i>ESP skill or knowledge area</i> | <i>N</i> | <i>Empirical study</i> |
|------------------------------------|----------|---|
| Writing | 13 | Estaji & Salimi, 2018; Friedman, 2018; Tsai, 2018; Hernandez et al., 2017; Pašková & Zsapková, 2017; Gao, Samuel and Asmawi, 2016; McGrath, 2016; Kleanthous & Cardoso, 2016 [*] ; Kirovska-Simjanoska, 2016; Tananuraksakul, 2015 [*] ; Yu-Chun Wang, 2015 |
| Communicative competence | 8 | Kakoulli Constantinou, 2018; Rico García and Ferreira da Silva, 2018; Dashtestani, 2018 [*] ; Sokolova et al., 2015; Wigham & Chanier, 2015; Carrió-Pastor & Skorczynska, 2014; Shih, 2013; Papadima-Sophocleous & Yerou, 2013 [*] |
| Reading | 3 | Seiradakis & Spantidakis, 2018 [*] ; Tananuraksakul, 2015 [*] ; Chew & Lee, 2013 |
| Vocabulary | 3 | Dashtestani, 2018 [*] ; Ventura & Martín-Monje, 2016; Behjat, 2013 |
| Listening | 2 | Cordova & Dechsubha, 2018; Choi, 2015 |
| Speaking | 1 | Kleanthous & Cardoso, 2016 [*] |
| Conversational skills | 1 | Cedar, 2013 |
| E-literacy skills | 1 | Papadima-Sophocleous & Yerou, 2013 [*] |
| Strategic competence | 1 | Park, 2018 [*] |
| Genre knowledge | 1 | Seiradakis & Spantidakis, 2018 [*] |

* Targeted more than one skill or knowledge area

Three of the reviewed studies (n=3) addressed ESP students' **reading skills** (Seiradakis & Spantidakis, 2018; Tananuraksakul, 2015; Chew & Lee, 2013). Chew and Lee (2013), for example, reported on the scientific value of blogs for extensive reading (which is an approach to second language reading, whereas students read long texts for their enjoyment), Tananuraksakul (2015) discussed the affordances of social networking tools in ESP reading-writing class, while Seiradakis and Spantidakis (2018) described the process of designing and developing online materials for a CMS-based ESP course that aimed in assisting undergraduate ESP students to learn how to read research articles (RA) and to develop RA **genre knowledge** within their field.

The same number of the reviewed studies (n=3) investigated the use of Web 2.0 technologies in building ESP students' **vocabulary**, a knowledge area, which was found to be efficient while taught through the usage of social networking tools (Dashtestani, 2018; Ven-

tura & Martín-Monje, 2016) as well as blogs (Behjat, 2013). Back in 2000, Nunan (2001) called **listening** “the Cinderella skill” in second language learning. It seems that it was not prioritized in Web 2.0-enhanced ESP classrooms either, as only two studies (n=2), published within the period of 2013 – 2018, were detected, focusing attention on this receptive language skill. To illustrate, Cordova and Dechsubha (2018) were interested into the effects of using Web 2.0 based CMS in improving ESP students’ listening abilities, while Choi (2015) explored ESP students’ preferences and perspectives on the use of three video sharing sites for the design and development of an interactive listening comprehension package. Research related to the development of **speaking skills** was even scarcer. Only one empirical research (n=1) conducted by Kleanthous and Cardoso (2016) investigated the affordances of using blogs in the ESP classrooms and their impact on students’ writing and speaking skills. Although blogs are usually associated with collaborative writing activities, in this particular study the participants not only had to write posts on a class blog, created by the teachers, but also provided oral comments, expressing their opinions on the specific task at hand. These comments were recorded in the form of podcast, which in turn were uploaded to the class blog for peer feedback. Kleanthous and Cardoso’s (2016) study is an evident example of how several language skills can be fostered in integration through the use of a selected Web 2.0 technology. In fact, all the four traditional English language skills are seldom segregated in real life in normal communication. Harmer (2007) notices, that when people are engaged in conversation, they are bound to listen as well as speak because otherwise they would not be able to interact with the person they are speaking to. Writing, according to Harmer (2007), is equally rarely done in isolation. “Much of today’s communication is electronic (via emails and text messages, for example). We read what people send to us and then reply fairly instantly. And even when we are writing on our own, we generally read through what we have written before we send it off” (Harmer, 2007, p. 265). It seems that quite a number of researchers perceived the extensive opportunities Web 2.0 technologies can offer for natural communication, while integrating multiple language skills and knowledge areas in an ESP classroom. In other words, they were following an integrated skills approach, which is defined by Aymane Sbai (2016), as “the linking of the language skills for the purpose of real communication” (Aymane Sbai, 2016, p. 3). The findings of this current literature review indicate that eight out of all analyzed studies (n=8) (Kakoulli Constantinou, 2018; Rico García & Ferreira da Silva, 2018; Dashtestani, 2018; Sokolova et al., 2015; Wigham & Chanier, 2015; Carrió-Pastor & Skorzczynska, 2014; Papadima-Sophocleous & Yerou, 2013, Shih, 2013) targeted the development of their ESP students’ **communicative competence**, which can be defined as “the ability to use language, or to communicate, in a culturally-appropriate manner in order to make meaning and accomplish social tasks with efficacy and fluency through extended interactions” (Tarvin, 2014, p. 2). Kakoulli Constantinou (2018), for instance, reported on effectiveness of *G Cloud for Education* (the cloud computing services by Google) in two blended ESP courses, which, according to the author, were useful in developing not only traditional language skills, but also transferable 21st century skills, including communication, the use of ICT, collaboration, creativity, critical thinking as well as **intercultural awareness**. Carrió-Pastor and Skorzczynska (2014) tried to create conditions similar to real-life situa-

tions for their business English students. The authors claim that the usage of note-taking and document creation tools, combined with synchronous text discussions provided opportunities for exchanging information, negotiating and decision-making. Moreover, the students simultaneously developed their skills, related to searching and analyzing information, communicating in writing and making oral presentations. However, as it may be understood from the findings obtained by Park (2018), Rico García and Ferreira da Silva (2018) and Wigham and Chanier (2015), the most relevant Web 2.0 technology allowing to warp threads of different language skills and activities in ESP classroom was virtual world *Second Life*, “due to its immersive reality, real-life scenarios and sense of co-presence, encouraging the development of ESP and the acquisition of **intercultural communication** and diversity awareness in a monolingual and monocultural education setting.” (Rico García & Ferreira da Silva, 2018, p. 87). Park (2018) additionally found *Second Life* to be effective for promoting authentic **cognitive, metacognitive and strategic competences**, by capturing what specific strategies ESP students apply when taking tests on Aviation English in this virtual world.

2.1.3. Theoretical Framework Grounding the Reviewed Studies

Blaschke (2014) emphasizes that “when incorporating any kind of media into courses’ curriculum, educators should consider the construct of the course, the technologies used and the pedagogical approaches followed to design and deliver the desired learning activities” (Blaschke, 2014, p. 1). Although there exist a considerable amount of foreign language teaching and learning theories and methodological approaches, the results of this current literature analysis show that almost half of the reviewed studies (n=14) (Rico García & Ferreira da Silva, 2018; Friedman, 2018; Hernandez et al., 2017; Pašková & Zsapková, 2017; Kleanthous & Cardoso, 2016; McGrath, 2016; Gao, Samuel & Asmawi, 2016 ; Kirovska-Simjanoska, 2016; Choi, 2015; Tananuraksakul, 2015; Sokolova et al., 2015; Behjat, 2013; Cedar, 2013; Chew & Lee, 2013) did not indicate their theoretical groundings or were not driven by any clearly-identifiable theoretical framework (Table 5). The results are hardly distinguishable from the findings of previous overview on the usage of Web 2.0 technologies for foreign language teaching and learning, conducted by Wang and Vásquez (2012). 56% of the studies they had reviewed similarly either did not explicitly indicate the theoretical framework or did not frame their work with any particular theory at all.

Table 5. *The theoretical frameworks identified in the reviewed studies*

| <i>Theoretical framework</i> | <i>N</i> | <i>Empirical study</i> |
|--|----------|---|
| <i>No clearly-identifiable theoretical framework</i> | 14 | Rico García & Ferreira da Silva, 2018; Friedman, 2018; Hernandez et al., 2017; Pašková & Zsapková, 2017; Kleanthous & Cardoso, 2016; McGrath, 2016; Gao, Samuel & Asmawi, 2016 ; Kirovska-Simjanoska, 2016; Choi, 2015; Tananuraksakul, 2015; Behjat, 2013; Cedar, 2013; Chew & Lee, 2013 |

| <i>Theoretical framework</i> | <i>N</i> | <i>Empirical study</i> |
|--|----------|---|
| <i>Collaborative learning approach</i> | 5 | Dashtestani, 2018; Estaji & Salimi, 2018; Ventura & Martín-Monje, 2016; Carrió-Pastor & Skorczynska, 2014; Wang, 2015 |
| <i>Social constructivism</i> | 4 | Kakoulli Constantinou, 2018 [*] ; Cordova & Dechsubha, 2018; Papadima-Sophocleous & Yerou, 2013; Shih, 2013 |
| <i>Metacognitive theory</i> | 2 | Seiradakis & Spantidakis, 2018 [*] ; Park, 2018 |
| <i>Communicative Language Teaching Approach</i> | 1 | Sokolova et al., 2015 |
| <i>Genre theory</i> | 1 | Seiradakis & Spantidakis, 2018 [*] |
| <i>Input theory (Krashen, 1981)</i> | 1 | Cordova & Dechsubha, 2018 |
| <i>Content and Language Integrated Learning (CLIL) approach</i> | 1 | Wigham & Chanier, 2015 |
| <i>Connectivism</i> | 1 | Kakoulli Constantinou, 2018 [*] |

In this current research five reviewed studies (n=5) (all those discussing the affordances of text-based and website creation tools) (Dashtestani, 2018; Estaji & Salimi, 2018; Ventura & Martín-Monje, 2016; Carrió-Pastor & Skorczynska, 2014; Yu-Chun Wang, 2014), were supported by **collaborative learning approach**. According to Smith and MacGregor (1992), “collaborative learning is an umbrella term for a variety of educational approaches, involving joint intellectual effort by students, or students and teachers together. In most collaborative learning situations students are working in groups of two or more, mutually searching for understanding, solutions, or meanings, or creating a product. There is wide variability in collaborative learning activities, but most center on the students’ exploration or application of the course material, not simply the teacher’s presentation or explication of it” (Smith & MacGregor, 1992, p. 11). As noted by Pastor-Martinez (2011), Pistorio, (2010) and Casal (2016), the concept of collaborative learning stems from Vygotskian socio-constructivist theory, where learning and knowledge construction is assumed as a shared social interaction either between groups of students or between students and teachers. The role of this shared collaboration serves as a tool helping students to advance through the *Zone of Proximal Development*, defined by Vygotsky (1978) as the distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers” (Vygotsky, 1978, p. 86). Smith and MacGregor (1992) draw our attention that both in theory and practice, the most concentrated effort in collaborative learning is usually focused on the teaching of writing. This trend is clearly visible in the reviewed ESP-related and Web 2.0 supported research, driven by the collaborative learning approach. Estaji and Salimi (2018) and Wang (2015), for example, discussed the promotion of collaborative writing through typical Web 2.0 technologies intended for writing purposes- wikis, while Carrió-Pastor and Skorczynska (2014) described the results

of the implementation of collaborative writing activities, involving note-taking and document creation tools, combined with synchronous text discussions.

Four reviewed studies (n=4) in the subject area (Kakoulli Constantinou, 2018; Cordova & Dechsubha, 2018; Papadima-Sophocleous & Yerou, 2013; Shih, 2013) were underpinned by **constructivism** or **social constructivism** learning theories. The former, according to Bates (2015), postulates that we achieve meaning or understanding by assimilating information, relating it to our previous knowledge and by cognitively processing it. The latter states that this process works best through discussion and social interaction, allowing us to test and challenge our own understandings with those of others.

One study (n=1) carried out by Kakoulli Constantinou (2018), reporting on the educational effectiveness of collaborative *G suite for Education*, concluded that this Web 2.0 technology can cater perfectly for any ESP class which is governed not only by social constructivism, but also by elements of **connectivism**, the theory stating that “knowledge is distributed across a network of connections, and therefore that learning consists of the ability to construct and traverse those networks.” (Downes, 2007, p. 3). Considering that previously discussed collaborative learning approach can also be treated as part of a socio-constructivist epistemology (Casal, 2016; Pastor-Martinez, 2011; Pistorio, 2010), we may conclude that roughly 30% of all the reviewed works were more or less constructivism-oriented. This is in line with the ideas of Pascoe et al., 2018; Matar, 2018; Imathiu, 2018; Echeng and Usoro, 2016; Foroughi, 2015; Crompton, 2012; Enonbun, 2010; Hicks and Graber, 2010; Gunawardena et al., 2009; Mc Loughlin and Lee, 2008; Talandis, 2008; Dede, 2008, who believe that by its very nature, Web 2.0 paradigm lends itself towards constructivist learning theory and epistemology. The obtained results also substantiate previous review carried out by Luo (2013), who noticed that a great number of the researchers in her literature review chose constructivism and Vygotsky’s (1978) socio-cultural theory to support their studies. Wang and Vásquez (2012) also discovered that the majority of works they analyzed were framed along socio-cultural and socio-cognitive dimensions, including socio-constructivism, socio-cultural theory, socio-cognitive theory, activity theory, etc.

One study (n=1), carried out by Cordova and Dechsubha (2018), claimed to have followed the philosophy of **social constructivism**, combined with Krashen’s **Input hypothesis**. The Input hypothesis, which, according to Krashen (1985), is the central part of an overall theory of **second language acquisition**, postulates that “humans acquire language in only one way-by understanding messages, or by receiving “comprehensible input”” (Krashen, 1985, p. 2). The language learners’ progress in second language acquisition, according to Krashen (1985), occurs naturally, when this input is at the level one step beyond their current linguistic competence, but still intelligible to them. Language learners’ current linguistic level is referred to as “*i*” by Krashen, while next naturally occurring level is defined as “*i+1*”. At this level, according to Krashen (1985), learners then are able to understand language, containing unacquired grammar with the help of context, which includes extralinguistic information, their knowledge of the world and previously acquired linguistic competence. Dunn and Lantolf (1998) notice that from the first glimpse it may seem that the structure “*i+1*” is reminiscent of Vygotsky’s *Zone of Proximal Development*, therefore researchers assume that it should be feasible to integrate the two concepts in a way that

would be productive for SLA research. However, Dunn and Lantolf (1998) argue that indeed they are completely unrelatable, as they stem from incommensurable theoretical discourses. In their opinion, “acquisition for all intents and purposes involves moving from one actual developmental stage to the next, with no attention given to the ripening process, which plays a central role in Vygotsky’s thinking. Krashen saw movement from one stage of interlanguage competence to the next as ultimately affixed and predictable process, independent of cultural and historical influences. Thus, for Krashen, an individual’s linguistic future is certain; for Vygotsky, the future is open, uncertain and depends on the material and interactional (i.e., cultural and historical) circumstances in which the individual is situated” (Dunn & Lantolf, 1998, p. 422).

Cordova and Dechsubha (2018) who investigated the effects of using Web 2.0 based CMS in improving ESP students’ listening abilities, did not explicitly specify how close the philosophy of social constructivism and Krashen’s Input Hypothesis relate (or complement each other), and did not describe the sequence of “*i+1*” in fostering their ESP students’ listening comprehension, acquisition and learning experience. Therefore it is not really clear what counts as evidence that Krashen’s Input Hypothesis is feasible in this particular study on Web 2.0-supported ESP classroom.

In another example Wigham and Chanier (2015) selected a methodological **Content and Language Integrated Learning (CLIL)** approach to combine two disciplines: architectural design and language learning by using a 3D virtual world *Second Life*. According to Marsh (2006), one of the earliest contributors to the development of this modern and popular approach, CLIL is “a generic “umbrella” term to refer to diverse methodologies which lead to dual focused education where attention is given to both topic and language of instruction. It is used to describe any educational situation in which an additional (second/foreign) language is used for the teaching and learning of subjects other than the language itself” (Marsh, 2006, p. 32). Through the prism of language, Marsh (2006) refers to CLIL as education “using languages to learn and learning to use languages”. From the perspective of topic or content, he views it as “education through construction, rather than instruction” (Marsh, 2006, p. 32) and strongly believes that **socio-constructivism** (both social and cognitive), can successfully be applied as a philosophy to ground CLIL interventions. Methodologically, as suggested by Casal (2016); Gustafsson et al. (2011), Pastor Martínez (2011), Pistorio (2010), CLIL requires a **collaborative approach** and group settings. In aforementioned study, carried out by Wigham and Chanier (2015), we can clearly see this fusion of content and language learning with cooperative learning methodology in a Web 2.0-based classroom, with small groups of students engaged in compulsory foreign language sessions, articulated around the architectural design scenario and incorporating group assignments with dual-focused objectives.

One more study incorporated into this current literature review was driven by a combination of theories directly related to ESP teaching and learning. To illustrate, Seiradakis and Spantidakis (2018) reported on the process of designing an online ESP course, intended to introduce engineering students to the genre of reading research articles. Their course design was theoretically grounded by the concept of metacognitive genre awareness combining the theories of **metacognition** and **ESP school genre analysis**. In his seminal

article “*Genre analysis: a key to a theory of ESP?*”, Dudley-Evans (2000) states that although being a part of ELT, ESP is definitely a specialist area of language, having elaborated its own procedures like needs analysis, its own teaching methodology and its own materials, based on specialized texts. Moreover, ESP has embraced different approaches to text analysis, such as register or rhetorical analysis of key grammatical features found in ESP texts, notional or functional approach, related to the context and communicative purposes of ESP, or the current prevailing approach, *genre analysis*, developed by Swales (1990) and Bhatia (2004). According to Bhatia (2004), “genre analysis is the study of how language is used in a particular setting. It focuses on such issues as rhetorical styles, discourse styles, discourse types and relates research in socio-linguistics, text-linguistics and discourse analysis to the study of specialist areas of language” (Bhatia, 2004, p. 168). A genre-based approach, as suggested by Negretti and Kuteeva (2011), may further foster the development of ESP students’ metacognitive knowledge of genre-related features of academic communication. Thus, applying a *metacognitive* theoretical framework in research, according to Negretti and Kuteeva (2011), can help identify how and when awareness of genre shapes language learners’ understanding of specialized texts: their intention, subject matter or effectiveness of reasoning. Or as in one more reviewed study, conducted by Park (2018), exploring the potential of 3D virtual worlds for promoting cognitive and metacognitive strategies of aviation students, it may even be beneficial in capturing what specific strategies and informed choices are being exploited by language students when taking ESP tests in virtual world environments.

2.1.4. Peculiarities of Using Web 2.0 Technologies in ESP Studies in Higher Education

One of the purposes of this section was to provide an overview of recent empirical research on the effective use of Web 2.0 technologies in ESP studies in formal higher education to confine spheres, where a plethora of research exists. It aimed at investigating which types of Web 2.0 technologies had already been examined in this specific area of interest, which of the traditional language skills or other knowledge areas had been addressed effectively through the use of these technologies and which theoretical frameworks grounded the previous research. The review only incorporated articles, matching the pre-selected criteria and published within the time frame of 2013 – 2018. To this end 29 full text articles were detected and analyzed, providing interesting insights and potential directions for the empirical research of this dissertation. Back in 2010 McDonough (2010) identified more than 20 profession-related areas, in which English was vital for effective communication, including aviation, commerce, customer care, engineering, finance, human resources, information technology, law, law enforcement, maritime communication, media, medicine, nursing, telecommunications and tourism. It appeared that all the spheres enumerated by McDonough (2010) were addressed by the researchers, additionally incorporating agricultural sciences, biotechnology, food science or mathematics. The majority of them used quantitative approach and quasi-experimental designs to determine causal relationships between the usage of the preselected Web 2.0 technologies and ESP students’ language

acquisition. This is in a good agreement with Agodini, Dynarski, Honey and Levin (2003) as well as Jenkinson (2009) who believe that research measuring the effect of a technology upon learning is very much consistent with experimental research designs, involving experimental and control groups. When experimental designs are used, they state, “differences in outcomes between the two groups can be interpreted as causally related to technology application” (Agodini, Dynarski, Honey & Levin, 2003, p.4). Some of the reviewed studies, however, were of mixed-design, additionally employing such research methods as interviews, focus groups or observations.

1. Web 2.0 technologies examined in reviewed publications. In his typology of educational Web 2.0 technologies Bower (2015) identified at least 37 types of Web 2.0 technologies, suitable for teaching and learning purposes. It was discovered, however, that the reviewed research hardly examined 9 types of this diverse spectrum. Moreover, these were the most prevalent (and the most widely investigated) types of Web 2.0 technologies that have already grown roots in any sphere of education, i.e., *blogs*, *social networking tools*, *wikis* and *virtual worlds*. Interestingly, the ESP scholars tended to stick to one particular product or apply only the generic version of it, for some reason avoiding its tailor-made alternatives. For example, the absolute majority of publications, reporting on the effectiveness of social networking tools in ESP classrooms, incorporated *Facebook*, the most popular generic, non-educational social networking site globally, and tended to ignore the fact that there exists a huge variety of foreign language learning sites that have social networking characteristics. The major gap identified from the first part of this review, however, is that there exists too little empirical proof on how researchers are applying less investigated (or less popular) types of Web 2.0 technologies in ESP classrooms in higher education, and on what their effectiveness in it is. Instances of these apparently neglected types of Web 2.0 technologies (following Bower’s (2015) typology in the clockwise direction) include:

- *image-based tools* (e.g., image sharing, creation and editing; drawing; diagramming; mind-mapping, etc.);
- *audio tools* (e.g. audio sharing; audio creation and editing);
- *multimodal production tools* (e.g., digital pinboards, presentations, lesson authoring);
- *digital story telling tools* (e.g., animated videos, comic strip creations, etc.);
- *knowledge organization and sharing tools* (e.g., aggregators, social bookmarking);
- *data analysis tools* (e.g. surveying, online spreadsheets, etc.);
- *timeline tools*;
- *assessment tools*.

The results are hardly distinguishable from one of the first overviews of this kind, conducted by Wang and Vásquez (2012), covering the earliest Web 2.0 related research published in 2005-2009. These authors equally noticed that researchers tended to focus on the mainstream Web 2.0 technologies and excluded less-studied tools such as social annotation and bookmarking tools. However, an interesting new trend emerged in the reviewed studies (especially those published in 2018) that ESP teachers choose to increasingly apply the

Web 2.0 tools, incorporated by course management systems, for example, *chats*, allowing participants to have a real-time synchronous discussion, *forums*, facilitating asynchronous text discussions or even *wikis*, ideal for collaborative writing activities.

2. Language skills and knowledge areas addressed in the reviewed publications. The research findings show that the emphasis given to different language skills was diversified. Among all the reviewed studies, the majority of researchers have put their attention namely on *ESP writing*, taught through the use of wikis, blogs and social networking tools. Feak (2013) notices that in general the research lens of ESP always appears to be more focused on writing than on other key language skills, such as, for example, speaking. “One factor, contributing to this phenomenon, is that in some ESP contexts, specifically English for Academic Purposes (EAP), written genres have been considered as more central to professional success” (Feak, 2013, p. 35). Such areas as, for example, business, commerce, finance or shipping may require mastery in writing skills; the central core in medicine would definitely be the vocabulary; while in aviation and maritime education the focus would always remain on developing ESP students’ aural and oral language skills as well as the correct pronunciation of specific terms. Another, even more important factor, as noticed by Feak (2013), is the relative ease of obtaining and compiling written data into usable form for analysis. The findings are again in line with those of Wang and Vásquez (2012), who also stated that second language writing represented the most widely investigated topic area in the research published between 2005 and 2009. Hyland (2013) declares that writing is perhaps the central activity of all institutions. “Complex social activities like educating students, keeping records, engaging with customers, selling products, demonstrating learning and disseminating ideas largely depend on it. Not only is it hard to imagine modern academic and corporate life without essays, commercial letters, emails, medical reports and minutes of meetings, but writing is also a key feature of every student’s experience” (Hyland, 2013, p. 95).

Other language skills and knowledge areas that were targeted in the reviewed studies in descending order were reading, vocabulary acquisition, listening and finally speaking. Only several studies, incorporated into this current overview, addressed these skills and knowledge areas developed in segregation, however, quite a number of them followed an integrated skills approach, whereas the teaching of dominant language skills and the development of different knowledge areas is conducted in conjunction with each other, and thus targeted the development of ESP students’ communicative competence, intercultural awareness, RA genre knowledge or examined the affordances of Web 2.0 technologies in promoting ESP students’ authentic cognitive, metacognitive and strategic competences.

3. Theoretical underpinnings of the reviewed research. Blaschke (2014) notices that with a huge variety of both technologies and theoretical approaches available, finding the approach that aligns well with the use of a particular technology and thus has the most meaningful learning outcome, may prove to be a great challenge for teachers. This may be one of the reasons why almost half of the reviewed empirical studies were not driven by or did not indicate any theoretical framework. The finding is in line with the previous

overview conducted by Wang and Vásquez (2012) and echoes the concern expressed by Blaschke (2014) and Wang and Vásquez (2012) that future empirical research, concentrating on the use and effectiveness of Web 2.0 technologies in education, including the sphere of teaching and learning foreign languages, should be better designed and theoretically grounded to enhance transferability and external validity within this sphere of interest. The remaining part of the articles, discussing the affordances of Web 2.0 technologies in ESP instruction, were mostly framed along *constructivist* or *socio-constructivist* dimensions and were frequently supported by *collaborative learning approach*. The obtained results also substantiate previous reviews carried out by Luo (2013) and Wang and Vásquez (2012) who similarly noticed that the majority studies incorporated into their literature reviews also chose constructivist learning theory and epistemology to support their research. This allows a conclusion that ESP researchers perceive the scientific value of Web 2.0 technologies and opportunities to enhance communication, productivity and sharing within their classes (Bower, 2015, p. 1).

Other educational and language learning theories or approaches mentioned in the reviewed studies were *connectivism*, *Krashen's Input hypothesis*, *Content and Language Integrated Learning (CLIL)* as well as the theories of *metacognition* and *genre analysis*. Although the latter is directly associated with the sphere of teaching and learning ESP with *genre* being a central concept of it, this was one solitary exceptional instance.

It should be noted, however, that the results of the majority of empirical studies incorporated into this review, cannot be easily generalized to the larger population due to several facts. First, some of them were conducted by taking “narrow-angle” perspective and in very restricted contexts (e.g., ESP of aviation, or ESP for architecture). Second, the majority of the studies, with the exception of two (Pašková & Zsapková, 2017; Sokolova et al., 2015), were short-term studies, i.e. the data were collected during relatively short periods of time: as a rule the studies were usually conducted over 12 weeks (one academic semester). Nevertheless, the findings of this literature overview supplied valuable insights into the reality and reflection of how, when and why Web 2.0 technologies are applied in ESP classrooms in higher education and were helpful when planning the empirical part of this dissertation. They were also valuable when selecting a Web 2.0 technology to be used in the subsequent empirical study of this dissertation. The latter is introduced in the following section of this chapter.

2.2. Image-based Web 2.0 Technology CmapTools

The results obtained from the systematic literature review on the effective use of Web 2.0 technologies in ESP studies in higher education provided first indirect foundations for the empirical part of this dissertation. It became clear, that it should primarily concentrate on researching the Web 2.0 technology which hadn't received excessive attention from researchers within the area (as is the case with such mainstream technologies as *blogs*, *social networking tools*, *virtual worlds* or *wikis*), which is framed with a particular educational theory and which can preferably assist in enhancing ESP students' vocabulary acquisition, since it is considered to be one of the major linguistic obstacles as reported by researchers within the sphere.

When conducting her PhD internship at Aveiro University (Portugal) in 2016 the author of this dissertation had an opportunity to guest participate and observe a Web 2.0-enhanced ESP (business English) course delivered at Águeda School of Technology and Management of the University of Aveiro (UA). The host teacher introduced her to *CmapTools*, a Web 2.0-supported concept mapping tool which seemed to meet the aforementioned requirements. It definitely fell out of the category of so called “hot” Web 2.0 technologies, thus it was interesting to learn about its design, specific features and affordances, to observe step-by-step procedures on how the technology was being integrated into the blended (hybrid) classroom settings and to witness how ESP students were dealing with it. Moreover, as the library of University of Aveiro subscribes a number of externally published electronic journals and bibliographic research databases on behalf of its staff and students, state-of-the-art literature related to the software was retrieved by making use of such online databases as *SCOPUS*, *EBSCOhost*, *JS-TOR*, *ERIC*, etc., digital repository *Repositorio Institucional da UA* or a tool aggregating a wide range of resources *B-On Biblioteca do Conhecimento Online* to gain insight into the usage of the software within different educational contexts, including teaching and learning ESP as well as into its theoretical underpinnings. The search string was *CmapTools*, *computer-supported concept mapping*, *Web 2.0-supported concept mapping*, *English for Specific Purposes (ESP)*. As a result, 23 identified studies were detected, screened and analysed. 5 of them (Dias, 2010, 2011; Hunter, 2013; Balula, Martins, & Marques, 2014; Omar Abdul-Majeed, 2015; Soleimani & Rostami abu Saeedi, 2016) targeted the use of *CmapTools* in ESP teaching and learning contexts. It is necessary to note that the technology appeared to have been applied and investigated much more widely in Portuguese and Spanish speaking countries than in the remaining part of the world. No relevant empirical studies carried out in Lithuanian context were detected. The findings of the analysis were subsequently reported in a publication: Selevičienė, E., Burkšaitienė, N. (2016). *CmapTools* and its use in education. In *Journal of Teaching English for Specific and Academic Purposes*, 4 (3), pp. 631 – 640¹.

The sections below will conceptualize *CmapTools*, will establish its category within latest typologies and taxonomies of Web 2.0 technologies, will briefly explain key characteristics and will discuss the theories supporting the usage of the technology.

*CmapTools*² is a freeware, developed as the result of the research conducted by American scientists Novak and Cañas in around 2000. It is defined as *a client-server based software kit empowering users, individually or collaboratively, to visually represent their knowledge using concept maps, to share them with peers and colleagues, and to publish them* (Cañas et al., 2004; Novak & Cañas, 2004; Novak & Cañas, 2006; Frisendal, 2012; Drapper, 2015, Ng, 2015).

When trying to attribute it to the latest typology of educational Web 2.0 technologies, developed by Bower (2015) (see *Chapter 1, Figure 6*), it appeared that *CmapTools* had not been linked by the author to any of the suggested types of Web 2.0 technologies and had not been included in any of its clusters. Bower's (2015) explanation regarding the possible insufficiency of his typology is fairly simple: he states that due to their rapid evolution it

1 <http://espeap.junis.ni.ac.rs/index.php/espeap/article/download/438/272>

2 <http://cmap.ihmc.us/>

was physically impossible to incorporate all the existing Web 2.0 technologies in his review. On the other hand, the author believes that this lack leaves scope and enormous potential for the researchers to explore how benefits offered by less commonly used and less investigated technologies can possibly be integrated into learning designs.

The same tendency can be observed within the taxonomy of Web 2.0 technologies, derived by Orehovalčki, Bubaš, and Kovačić (2012) (see *Chapter 1, Figure 5*), as Web 2.0 supported concept mapping applications seem to equally be missing there too. Thus, the question regarding the place of *CmapTools* within the existing typologies and taxonomies of Web 2.0 educational technologies arises. Resting on the definitions provided by Cañas et al. (2004), Novak and Cañas (2004, 2006, 2008), Frisendal (2012), Drapper (2015) and Ng (2015), suggesting that *CmapTools* is primarily focused on visual representation of users' knowledge and their conceptual understanding, we may presume that within Bower's (2015) typology it may be attributed to the cluster of *image-based* tools in close proximity *mind mapping* tools, etc. Or it can be categorized as a *knowledge organization technology* within the three-dimensional model of educational Web 2.0 technologies developed by Orehovalčki, Bubaš, and Kovačić (2012). This group of Web 2.0 technologies, according to the authors similarly encompasses the subcategory of *mind maps*. The latter, they suggest, can be described as schematic views enabling the display of ideas, thinking or knowledge and helping the users to adopt, organize and store information. Bower (2015) similarly points out that "mind mapping tools support the development of images to represent interrelated concepts in the form of a visual knowledge network that can be shared via URL. This can be used to represent conceptual and even metacognitive understanding" (Bower, 2015, p. 4). Even though both aforementioned definitions may infer that the notions of both *mind* and *concept mapping* tools can be understood and used interchangeably, Ng and Hanewald (2010, 2015) argue these are indeed two fairly different visualization tools. *Mind maps*, they highlight, "tend to start with a central theme with other ideas radiating (branches) from it, generating elements without the immediacy of having to establish an intrinsic conceptual framework" (Ng & Hanewald 2010; Ng 2015, p. 115), while concept maps allow for a clear networked structure with linking words and directional arrows. Selevičienė and Burkšaitienė (2016) propose that if *CmapTools* is to complement the existing typologies and taxonomies of Web 2.0 educational technologies, it could definitely be attributed to the category of *image-based* tools (as suggested by Bower, 2015) or *knowledge organization* applications (as suggested Orehovalčki, Bubaš and Kovačić, 2012) and fit the missing independent type of *concept mapping* tools. Other *concept mapping* software that could equally find shelter in this category of Web 2.0 technologies alongside with *CmapTools* are such open source and commercial products as *Inspiration*³, *Kidinspiration*⁴, *EDGE Diagrammer*⁵, *SemNet*⁶, *SmartIdeas*⁷, *MACOSOFT*⁸, *Visual Understanding Environ-*

3 <http://www.inspiration.com/>

4 <http://www.inspiration.com/Kidinspiration>

5 <http://www.pacestar.com/edge/>

6 <https://sourceforge.net/projects/semnet/>

7 <https://support.smarttech.com/software/other-software/ideas>

8 <https://macosoft.ro/>

ment (VUE)⁹, etc., all discussed by Martínez, Pérez, Suero and Pardo (2013), Ng (2015) and Tajeddin and Tabatabai (2016).

The principal procedure of *CmapTools* [and in fact of any previously mentioned concept mapping software], according to Novak and Cañas (2006) is to name concepts, which can take the shape of a rectangle or a circle and then to draw lines with labels describing the relationships between these concepts. They allow learners “to create nodes and connecting lines by simply clicking and dragging. Nodes can have labels, images, roll-over notes, and hyperlinks. These meaningful connections between concepts are called “propositions”” (Colosimo & Fitzgibbons 2012, p. 2). The creators of *CmapTools* characterize *CmapTools* as a user-friendly software, which is applied “extensively throughout the world by users of all ages and for a large variety of applications” (Novak & Cañas, 2004, p. 1). Ng (2015) also claims that it is used globally in all spheres of knowledge and by users of all ages to express their understanding graphically. In particular, she emphasizes, the technology “is used in schools, universities, government organizations, corporations and small companies and other organizations both individually and in groups, for education, training, knowledge management, brainstorming and information organization” (Ng, 2015, p. 115).

The results of literature overview show that the use of image-based Web 2.0 tool *CmapTools* for teaching and learning purposes may be guided by assumptions underpinning either *cognitive* or *constructivist* philosophical approaches. Assuming that concept mapping strategy of teaching and learning, created by Novak in the early 1970s, was primarily framed around Ausubel’s (1969) ideas of cognitive learning and his famous *Assimilation Theory*, exploring “how new, specific concepts and propositions are incorporated into the learner’s cognitive structure” (Novak, 1993, p. 8), we can definitely view it from the cognitivist perspective. The distinctive feature of cognitive learning, in the opinion of Ausubel (1969), is that it deals with meaningful as contrasted to rote learning process. Meaningful learning implies that symbolically expressed ideas are associated in a nonverbatim manner to what learners already know. The examples may include images and other symbols, meaningful to them, as well as concepts and propositions [if put in ESP context, these may be key terms, relevant to a specialized topic or to an authentic text in one or another area of ESP]. However, as noticed by Ausubel (1969), meaningful learning can only exist, if the material the learners have to deal with is conceptually clear and seems meaningful to them. Moreover, the learners themselves have to equally manifest a meaningful learning set and prior knowledge, described by the author as a disposition to relate the new information to elements of already existing individual knowledge structure. Still, Ausubel (1969) highlights that no matter how meaningful this learning set may appear, the process and the outcome of learning will never become fruitful and rewarding, if the learning task is not meaningful *per se*. And on the contrary, no matter how meaningful the learning material may sound, if it is to be memorized in an arbitrary and verbatim mode, both, the process and the outcome of learning automatically will become meaningless. For example, if vocabulary is to be learnt mechanically as mere words or definitions without acquiring or understanding the exact meaning expressed in them, it will definitely become rote.

9 <https://vue.tufts.edu/>

As warned by Ausubel (1969) and Novak (1993), knowledge acquired in such a fashion, tends to only be stored in a short-time warehouse: “hours for nonsense syllables, and days or a few weeks for classroom instructional materials” (Novak, 1993, p. 4). When forgotten or not rehearsed repeatedly, it is likely to become a detriment rather than a benefit to future learning. However, knowledge built through visualization of ideas in concept maps (be them paper-and-pencil based or computer-supported), according to Daley, Cañas and Stark-Schweitzer, (2007), is a perfect example of how the learners shift away from learning in a rote manner and move towards learning in a more meaningful, connected way. Instead of memorizing information mechanically, each learner searches for the relationships among concepts and organizes a structure to the new knowledge that is unique only to him or her. When specifying this searching for the relationships among concepts is, Ausubel (1969) introduces the term “*subsumption*”, to explain the process in which newly acquired concepts and propositions are incorporated by the learners into the framework of their cognitive structure: lower-order concepts and propositions are usually subsumed under higher-order ones. The former are usually identified and learned first, while the latter are subsequently related to them. In this way, the hierarchy of knowledge structures is gradually being built in a pyramid-like formation, whereby the most general concepts at the top of it are progressively differentiated from more specific ones and fragmented into smaller meaningful units. Eventually, during the processes of *integrative reconciliation*, the acquired knowledge is synthesized, whereby the learners try to reconcile and tie the concepts up from the left to the right-hand side of their concept map.

The literature overview also indicates a *constructivist* perspective as a potential philosophical partner to the use of concept mapping and thus of Web 2.0 technology *CmapTools* in education. This finding echoes the reasoning of Pascoe et al. (2018), Mattar (2018), Imathiu (2018), Echeng and Usoro (2016), Foroughi (2015), Crompton (2012), Enonbun (2010), Hicks and Graber, (2010), Gunawardena et al. (2009), Mc Loughlin and Lee (2008), Talandis (2008), Dede (2008), etc. who are convinced that by its very nature Web 2.0 paradigm lends itself towards constructivist epistemology and a learning theory. Built on the ideas of Blumer (1969), Piaget (1970), Vygotsky (1978) or von Glasersfeld (1989), constructivism maintains that cognition and knowledge construction is an active process, which can not be seen as a commodity or a thing handed over by teachers to learners. These are learners who actively construct their own concepts and knowledge of reality by resting on their own unique experiences and by relating elements of these experiences with elements of their current cognitive structure. Teachers within this process assume only the role of facilitators, consultants or guides. The major contribution to the learners' cognitive growth, however, comes from the environment, physical, cultural and social.

In their publication “*Building on New Constructivist Ideas and CmapTools to Create a New Model for Education*” Novak and Cañas (2004) emphasize that *CmapTools* has been designed with the objective of supporting collaboration and sharing. The authors thus suggest that the use of the tool can be investigated from the perspective of Vygotsky's (1978) *socio-cultural theory* of human learning. The theory emerges best from the pages of Vygotsky's (1978) own famous book “*Mind in Society*”. One of the ideas proposed by the author in his essays is that knowledge is initially constructed in a social settings and only then

appropriated by the learners: “every function in the child’s cultural development appears twice: first, on the social level, and later, on the individual level; first, between people (interpsychological), and then inside the child (intrapsychological)” (Vygotsky, 1978, p. 57). This, according to Vygotsky, equally concerns voluntary attention to incoming relevant information, concept formation and memory. Learning in such a way is being awakened gradually: students initially engage in collaborative activities with their peers under the guidance of skillful teacher or in Vygotskian terms, “more knowledgeable adults”, later on start progressively *internalizing* these activities and eventually feel confident acting on their own without regard to the surrounding community.

The essential feature of such social exchange in learning is that it unlocks and enhances learners’ development, which equally in no way can be seen as a linear process. The two seminal development-related notions proposed by Vygotsky (1978) are *actual developmental level* defining the functions, which have already matured in learners, as determined by their ability to solve problems independently and *the zone of proximal development*- the functions which are still in the process of maturation and in “an embryonic state”. In other words, it is “the level of *potential* development as determined through problems of solving under adult guidance or in collaboration with more capable peers” (Vygotsky, 1978, p. 86). *Figure 7* visualizes the zone of proximal development, as the circle within the learners’ developmental process, in which they cannot accomplish the given task unaided, but can accomplish it with guidance:

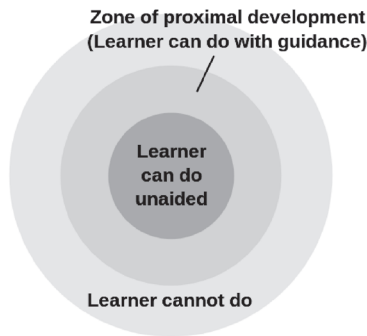


Figure 7. Zone of proximal development explained. Retrieved from https://en.wikipedia.org/wiki/Zone_of_proximal_development

One of the benefits of using *CmapTools* in collaborative activities, as noticed by Novak and Cañas (2004), is that learners are likely to be at about the same zone of proximal development, “hence they can better communicate ideas to each other, and when assisted by “expert skeleton” concept maps, they can progress even further” (Novak & Cañas, 2004, p. 3). “Expert skeleton” concept map is a metaphorical term, proposed by Novak and Cañas (2004) to define a concept map, usually incomplete, lacking “flesh” on its “bones” and produced by an expert in a particular domain [e.g., an ESP teacher]. The authors suggest these

expert skeleton or teacher generated maps may serve a number of important purposes. In the first place, as it is visible from *Figure 8*, they may serve as a take-off point for the learners who are just about to start working on concept maps and perhaps feel a little bit anxious seeing the empty canvas on their computer screen. Secondly, they can assist the learners when trying to unite newly acquired concepts and propositions to elements of their current cognitive structure (which, in fact, can be attributed to earlier presented Ausubel's theory of cognitive learning). Third, they can help the learners to avoid misconceptions, which potentially can arise when a completely new discipline [such as ESP] is being studied. And finally, as it was already mentioned, "expert skeleton" maps can serve as an activity through which the learners are provided guided assistance from more knowledgeable others and are able to work within the zone of proximal development. This guided assistance (and indeed any of the four forms of support enumerated above) received from a teacher or a more competent peer is referred to as *scaffolding*. Although the term is inseparable from to Vygotsky's zone of proximal development, in actual fact, it was coined by Wood, Bruner and Ross to define "the process that enables a child or novice to solve a problem, carry out a task or achieve a goal which would be beyond his unassisted efforts" (Wood, Bruner and Ross, 1976, p. 90).

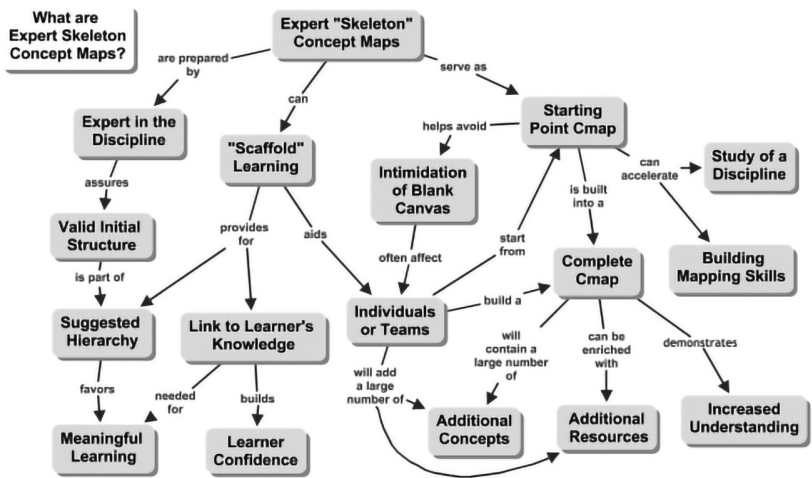


Figure 8. The ideas behind the use of expert "skeleton" concept map illustrated in <http://cmap.ihmc.us/docs/skeletoncmaps.php>

As it is visible, the use of image-based Web 2.0 technology *CmapTools* can be equally supported by both: cognitivist and constructivist philosophical approaches, and oddly enough, the two approaches do not seem to compete. The former appears to be more applicable when the tool is being applied for solitary concept mapping practices and individual knowledge building purposes, while the latter can serve a solid theoretical basis when social interaction, collaboration and communities of practice are involved. The empirical

research on the effectiveness of *CmapTools* in this dissertation is more supported by Vygotsky's socio-cultural theory of human learning, as suggested by Novak and Cañas (2004), although it simultaneously borrows ideas from Ausubel's (1969) theory of cognitive learning, as suggested by Novak (1970). We will see how relevant these theoretical approaches were in the empirical part of the dissertation, exploring what effect (if any) the use of a Web 2.0 technology *CmapTools* in ESP studies in higher education had on students' achievements in ESP vocabulary acquisition and reading comprehension. We will also try to develop understanding on which factors influenced ESP students' acceptance of *CmapTools*. But before this it is first necessary to discuss the concept of technology acceptance, to delve into the realm of existing theoretical approaches on information technology acceptance and to see how the issue of technology acceptance is being dealt with in ESP related research. This brings us to the second domain of this dissertation, i.e., the sphere of technology acceptance in ESP studies in higher education. It is introduced in the following chapter.

CHAPTER 3.

ACCEPTANCE OF WEB 2.0 TECHNOLOGIES IN ESP STUDIES IN HIGHER EDUCATION

This chapter addresses the third objective of this dissertation and aims at developing understanding of the factors that can influence the acceptance of mandatory *Web 2.0* technologies (such as *CmapTools*) among students in blended ESP learning environments in higher education institutions. The first section of this chapter will start with the discussion on the definitions of technology acceptance, will analyse available theoretical approaches on information technology acceptance and will specify the proposed theoretical *Technology Acceptance Model* (TAM) to be used as a theoretical basis of the acceptance part of the dissertation.

3.1. Conceptualization of Technology Acceptance

One of the earliest definitions available was that suggested by Gattiker (1984, 1987) who conceptualized **technology acceptance** as “*a person’s receptive psychological state based on perceived impact on such things as one’s job, skills, and career progress*” (Gattiker, 1984, as cited in Gattiker, 1987, p. 11). Hiltz and Johnson (1989) treated **technology acceptance** as a key indicator of information system success. In their study measuring computer-mediated communication systems (CMCS) and management information systems (MIS) the term was defined to mean “*successful implementation or adoption of a CMCS or MIS*” (Hiltz & Johnson, 1989, p. 387). Moreover, acceptance or as they call it “*success*” of a technology was framed as a multidimensional construct, encompassing *use, satisfaction, and benefits* related to a technology. These two definitions presuppose that acceptance can be related to positive feelings or attitudes towards a technology being currently utilized and positive expectations regarding the benefits the technology may offer in the future. According to Dillon and Morris (1996) **technology acceptance** as is “*the demonstrable willingness within a user group to employ information technology (IT) for the tasks it was designed to support*” (Dillon & Morris, 1996, p. 5). Ausserer and Risser (2005) also provided a very similar definition by framing acceptance as “*a phenomenon that reflects, to what extent potential users are willing to use a certain system*” (Ausserer & Risser, 2005, p. 3).

Despite their huge popularity, these two definitions seem risky enough to be used in contemporary Web 2.0 technology research settings, especially within the sphere of ESP education, assuming that within the period of 1990 – 2005, when the two definitions were coined, acceptance theorists focused on information technologies and early Web systems (Web 1.0). As discussed in *Chapter 1* of this dissertation, Web 1.0 technologies (e.g. CD-ROMS, accompanying foreign language textbooks) provided little interaction, were very passive in nature and were only used by particular users to perform particular tasks. In contrast, the advent of Web 2.0 and contemporary flexible forms of internet application, not only allow users to directly participate in the creation, refinement and distribution of shared content, but also to perform a variety of activities in diverse contexts. Thus, although primarily designed for communication, amusement and entertainment purposes, such Web 2.0 applications as so-

cial networking tools, weblogs, virtual worlds, etc. are successfully utilized by ESP teachers in higher education institutions to meet quite different aims.

The findings of the systematic literature review, exploring recent trends in the usage of Web 2.0 technologies for teaching and learning ESP in formal higher education (see *Chapter 2*), illustrate that, for example, social networking tool *Facebook*, which initially served as a communication tool limited to Harvard students only, is now successfully being utilized for enhancing ESP students' acquisition of specialized vocabulary (Ventura & Martín-Monje, 2016) or developing their business English communication skills (Shih, 2013), while video-sharing website *YouTube* can serve as an effective tool for improving ESP students' motivation and business English listening comprehension (Choi, 2015). Moreover, it can not be excluded that having utilized *Facebook* for years, ESP students may demonstrate willingness to continue using it for original purposes, but reject its educational value due to "a *creepy tree house*" effect, discussed by Stein (2008). On the other hand, they may accept it as a successful ESP learning tool due to its flexibility, but their degree of willingness to utilize it for personal purposes may be low just because they have created *Twitter* accounts or prefer using *Instagram* on a daily basis.

Franken (2007) perceives acceptance as a complicated multidimensional process. She states that although in general acceptance can be defined as "*the positive attitude on the part of a user or decision-maker towards accepting a thing or situation*" (Franken, 2007, p. 3), placed in specific contexts, this definition is insufficient to determine an individual's overall measure of a particular system. Likewise it is insufficient to treat acceptance as the opposite of the term "*refusal*". In her research on the use of navigation systems and consequences for travel behaviour *acceptance* is conceptualized as the general link between individual's internal assessment and a formed expectation, an acquisition or purchase of the product, and a voluntary, above-average degree of use until the end of entire acceptance process. Schwarz and Chin (2007) also believe that a precondition to use a new technology is achieved through an evolutionary procedure and is not confined to such elements as an individual's favourable attitude toward a technology as opposed to its negation or an individual's intention to use a technology extensively. According to them, **technology acceptance** involves "*a holistic conjunction of a user's behavioural interaction with the IT over time and his or her psychological understanding/willingness or resistance/acceptance that develops within a specific social/environmental/organizational setting*" (Schwarz & Chin, 2007, p. 232). Adapted to the context of Web 2.0 acceptance in higher education setting, this current definition seems to fit this current research best. Furthermore, resting on various definitions related to acceptance of technologies, the current study modified the existing term and operationalised "**acceptance of Web 2.0 technologies**" as *user's behavioural interaction with a particular Web 2.0 tool over time within a specific educational setting and his or her psychological willingness to use or continue using the tool*. Similarly, "**acceptance of CampTools in ESP studies in higher education**" is operationalized as *user's behavioural interaction with CmapTools over time in ESP studies in higher education and his or her psychological willingness to use or continue using the tool*.

Understandably, in examining ESP learners' acceptance of Web 2.0 technologies, including a selected image-based Web 2.0 tool *CmapTools*, it is important to first to look at theoretical approaches on acceptance of information technologies.

3.2. Theoretical Approaches on Information Technology Acceptance

The literature overview has revealed that there exist number of them. Venkatesh et al. (2003), for example, investigated and compared eight models and theories of individual acceptance, including *Theory of Reasoned Action* (TRA), *Technology Acceptance Model* (TAM) and its extended version TAM 2, *Motivation Model* (MM), *Theory of Planned Behaviour* (TPB), *Combined TAM and TPB* (C-TAM-TPB), *Model of PC Utilization* (MPCU), *Innovation Diffusion Theory* (IDT) and *Social Cognitive Theory* (SCT), to formulate the *Unified Theory of Acceptance and Use of Technology* (UTAUT). As noticed by the authors, however, the basic conceptual framework underlying all the user acceptance models (as depicted in Figure 9) is very much alike: individual reactions to using information technology and services as a rule lead towards intentions to use and eventually move towards actual use of them.

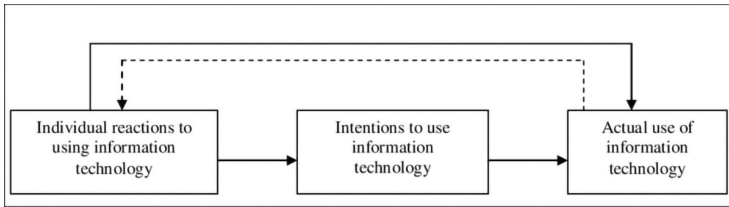


Figure 9. Basic concept underlying user acceptance model. Retrieved from Venkatesh et al (2003, p. 427)

3.3. Technology Acceptance Model (TAM)

This second part of the dissertation employed *Technology Acceptance Model* (TAM), developed by Davis, Bagozzi and Warshaw (1989), which is considered as “one of the most influential and commonly applied theory for describing individual user acceptance of information systems” (Lee, Kozar & Larsen, 2003). Based on the *Theory of Reasoned Action* (TRA) (Fishbein & Ajzen, 1975) it was proposed for the first time by Davis in 1985 in order to do research in the field of social psychology (Ramazani et al, 2015) and is still being widely used by researchers in many fields of research to analyse and interpret the chronological sequence of events leading to the acceptance of certain technologies. Two specific beliefs, mainly, *perceived usefulness* and *perceived ease of use* have been identified by Davis (1985) as important user acceptance criteria in the original version of TAM. These two determinants are believed to further jointly exert influence on the formation of users’ overall *attitudes* towards using a system or a technology and eventually lead towards the *actual use* of the system or a technology. The main two determinants of *perceived usefulness* and *perceived ease of use* are also influenced by numerous external variables. In 1989 Davis, Bagozzi and Warshaw introduced a slightly modified version of original TAM, supplemented with an additional a construct of *behavioral intention of use*. Figure 10 displays the relationships between the constructs in this modified version of TAM:

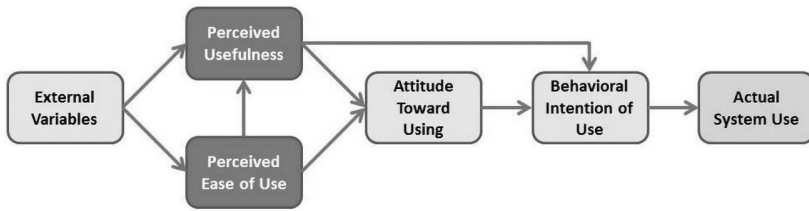


Figure 10. *Technology Acceptance Model (TAM) developed by Davis, Bagozzi and Warshaw (1989). Retrieved from <http://easybusinessanalytics.com/2012/11/>*

Perceived usefulness is defined by Davis (1985) as “the degree to which an individual believes that using a particular system would enhance his or her job performance” (Davis, 1985, p. 82).

Perceived ease of use is operationalized as “the degree to which an individual believes that using a particular system would be free of physical and mental effort” (Davis, 1985, p. 82).

Attitude towards using refers to “the degree of evaluative effect that an individual associates with using the target system in his or her job” (Davis, 1985, p. 25).

Behavioural intention of use is defined by Warshaw and Davis (1985) as “the degree to which a person has formulated conscious plans to perform or not perform some specified future behavior” (Warshaw & Davis, 1985, p. 214).

Actual system use refers to an individual’s actual direct usage of the given system in the context of his or her job (Davis, 1985, p. 25)

Thanks to its simplicity and ease of understanding, the TAM model has been widely applied to explain technology acceptance behaviour within the field of higher education (Liu, 2013, p. 22). The majority of research related to TAM, as noticed by Liu (2013) “focuses on predicting and determining the factors influencing the acceptance of e-learning by users, especially by students and faculty involved in e-learning classes” (Liu, 2013, p. 21). Quite a number of publications by foreign authors are available on the application of Web 2.0 for teaching and learning foreign languages with regard to TAM (Tarhini et al., 2015; Yea-Ru Tsai, 2015; Cakir & Solak, 2014; Yu-Li, 2014; Ramazani et al., 2013), however, to the best of my knowledge, in Lithuania TAM has been researched mainly within the spheres of marketing or electronic commerce (Šturo, 2016; Bivainienė, 2013; Bartoševič, 2012; Šliažaitė, 2012; Šliažaitė & Pabedinskaitė, 2012; Jurevičiūtė, 2011; Dirvonskas, 2009). No TAM-related studies are available within the sphere of teaching and learning ESP in higher education in Lithuanian context.

3.4. The Use of Technology Acceptance Model in Web 2.0-Supported ESP Studies. Literature Review

In order to provide comprehensive picture of the TAM utilized within the sphere of ESP, existing ESP research works utilizing TAM and published within the period of 2010 – 2017 were retrieved using the search string *English for Specific Purposes (ESP), Technology Acceptance Model (TAM), Web 2.0* technologies. This literature analysis only involved the scope of research works focused on the acceptance of Web 2.0 technologies by students, ignoring teachers' acceptance, as this was beyond the scope of this research. While numerous studies have examined EFL learner attitudes toward Web 2.0 technologies using TAM, fewer studies have used TAM in ESP learning contexts, with students used as research participants. To this end, only 7 studies were retrieved and analysed to gain insights about potential factors that may exert influence on ESP students' behavioural intentions to use one or another Web 2.0 technology. Findings of the research studies are summarized in Table 14. The abbreviations of *PU, PEOU, A, BI, ASU* and *AW* are used to represent the variables of *perceived usefulness, perceived ease of use, attitude towards using, behavioural intention, actual system use* and *awareness*.

Table 14. Research studies utilizing TAM to investigate ESP students' acceptance of Web 2.0 tools in ESP studies in higher education

| Author (s) | Research Setting | Web 2.0 category According to Bower (2015) | ESP Area | Suggested Additional Constructs to TAM | Research Results |
|-----------------|--|--|---|---|---|
| Gamble, 2017 | Learner perceptions and acceptance of Google Sites (GS) as a Course Management System (CMS) in a blended learning EFL context were investigated. Participants were students (n=35) from a private university in Japan. | Website creation | Commerce and International Studies, Law, Literature, Sociology, Business, Humanities, Economics and Education | – | Positive and significant relationship were established between: 1) <i>PU</i> and <i>BI</i> to use <i>GS</i> in a Japanese EFL classroom 2) <i>PEOU</i> and <i>BI</i> to use <i>GS</i> in a Japanese EFL classroom 3) <i>PU</i> and <i>A</i> of <i>GS</i> in a Japanese EFL classroom 4) <i>PEOU</i> and <i>PU</i> of <i>GS</i> in a Japanese EFL classroom 5) It was determined that the respondents had moderately positive views for <i>PU, PEOU, A,</i> and <i>BI</i> towards <i>GS</i> as a <i>CMS</i> . No inter-relationships between demographic moderators and internal <i>TAM</i> variables were analysed. |

| <i>Author (s)</i> | <i>Research Setting</i> | <i>Web 2.0 category According to Bower (2015)</i> | <i>ESP Area</i> | <i>Suggested Additional Constructs to TAM</i> | <i>Research Results</i> |
|--|---|---|--------------------------|--|---|
| Madini & Alshaikhi (2017) | The study examined the views and attitudes of female postgraduates (n=20) after using <i>Virtual Reality (VR)</i> headsets to learn ESP vocabulary at a Saudi-Arabia university. Factors affecting their perception were also explored. The study applied a mix method approach: a focus group and a questionnaire combining <i>TAM</i> and <i>TTF</i> constructs. | 3D modelling | Counselling and Guidance | 1) interaction 2) imagination 3) immersion | The results of focus groups concluded that students: 1) were enthusiastic about using <i>VR</i> as an instruction tool in their ESP classrooms. 2) suggested integrating <i>VR</i> in other courses. Causal relationships between <i>TAM</i> variables were not analysed. Only descriptive statistics for each construct of <i>TAM</i> was provided. |
| Van de Bogard & Wichadee (2015) | The study investigated how undergraduate students accepted <i>LINE</i> in terms of using it for classroom-related activities and explored the factors that might have affected their intention to use it. Data were collected from undergraduate students (n=144) enrolled in an ESP course that utilized <i>LINE</i> app using a questionnaire developed from <i>TAM</i> . | Text-based | Communication Arts | The number of social network sites students were using | 1) students' intention to use <i>LINE</i> for academic purposes was explained by <i>PU</i> and <i>A</i> ; 2) <i>PEOU</i> was found to be related to <i>PU</i> ; 3) The number of social network sites students were using was not related to <i>BI</i> and <i>A</i> . 4) <i>PEOU</i> was not found to have a relationship with <i>A</i> . 5) <i>PU</i> was not found to have a relationship with <i>A</i> either. |

| <i>Author (s)</i> | <i>Research Setting</i> | <i>Web 2.0 category</i> <i>According to Bower (2015)</i> | <i>ESP Area</i> | <i>Suggested Additional Constructs to TAM</i> | <i>Research Results</i> |
|-------------------------------|---|---|--------------------------|---|---|
| <i>Yu-Li (2014)</i> | This research explored the effectiveness of <i>Virtual Reality (VR)</i> while studying ESP through student self-efficacy and technological acceptance in an online learning environment. Participants were students (n=1540) from the Department of Applied Foreign Languages at a Science and Technology University in Taiwan. | 3D modelling | Science and Technology | Self-efficiency (SE) | 1) External variables: frequency of Internet usage, students' mobile phone Internet capability and home Internet usage frequency were related to <i>PEOU</i> . 2) The academic year and prior English language competency level did not interfere with the courseware. Relationship between core constructs of <i>TAM</i> were analysed and conformed, but not commented. |
| <i>Afshari et al. (2013)</i> | The study examined students' attitudes towards use of computer-assisted language learning (<i>CALL</i>). Respondents were students (n=100) at Faculty of Languages and Linguistics in University of Malaya using a questionnaire. | Not defined | Language and Linguistics | Subjective norm (SN) | Study results indicated that <i>PU</i> , <i>PEOU</i> and subjective norms were significant predictors of students' attitudes towards <i>CALL</i> . |
| <i>Tajuddin et al. (2012)</i> | The purpose of this study was to investigate if there was a significant difference between high ICT literacy students with low ICT literacy students on blog acceptance. Participants were students (n=79) enrolled in IT in Business subject at the university in Malaysia. | Website creation | IT in Business | Perceived playfulness (<i>PP</i>) | No significant difference between both groups regarding their attitude toward blogs was determined, however, the extended <i>TAM</i> model was confirmed in the case of blog adoption. Positive and significant relationship were established between: 1) <i>A</i> and <i>PP</i> of blogs 2) <i>PEOU</i> and <i>PU</i> of blogs 3) <i>A</i> and <i>BI</i> to use blogs |

| Author (s) | Research Setting | Web 2.0 category | | Suggested Additional Constructs to TAM | Research Results |
|----------------------|--|---|---|--|--|
| | | According to Bower (2015) | ESP Area | | |
| Arshad et al. (2012) | This study investigated students' awareness, behavioural intentions and factors that influence the learning of English through the use of Web 2.0 technologies such as Facebook, YouTube, Twitter, Wiki, LiveMocha and Flickr at a local university in Malaysia. | Social networking systems and video tools | Malay Language, English Language, foreign language for communication. | Awareness (AW) | <ol style="list-style-type: none"> 1) ASU was affected by PU 2) ASU was affected by PEOU 3) No significant relationships were found between BI with AW, PU, PEOU, A and ASU 4) External factors of gender, age, ethnicity, frequency of using Web 2.0 technologies and study programme did not have any relationship with the six constructs of the proposed model of TAM. |

Despite the fact that relatively few research studies relying on TAM in predicting the acceptance of Web 2.0 tools in ESP studies were retrieved, the examination of selected research articles relinquished the following results:

First, we can conclude that *Technology acceptance model* has been applied to determine the acceptance of Web 2.0 technologies utilized within different fields of teaching and learning ESP, including law, literature, sociology, business, humanities, commerce and international studies, economics and education, counselling and guidance, science and technology, etc. Moreover, TAM has theoretically been validated and justified for a variety of Web 2.0 tools utilized in ESP studies in higher education. Resting on the three-dimensional model of educational Web 2.0 technologies produced by Orehovački, Bubaš, and Kovačić (2012) and Web 2.0 typology suggested by Bower (2015) (both presented in *Chapter 1*), we can generalize that research has already been conducted to explore the acceptance of 3D modelling tool *Virtual Reality* (Madini & Alshaikhi, 2017; Yu-Li, 2014), website creation tools, i.e. *blogs* (Tajuddin et al., 2017), *wikis* (Arshad et al., 2012) and *Google sites* (Gamble, 2017), social networking systems, i.e. *Facebook*, *Twitter*, *Flickr*, *Live mocha* (Arshad et al., 2012), video tool *YouTube* (Arshad et al., 2012) and text-based tool *LINE* (Van de Bogard and Wichadee, 2015). However, there is still insufficient empirical evidence to determine how ESP students accept audio-based tools, multimodal production tools, digital story telling tools, knowledge and organization tools, data analysis and synchronous collaboration tools. No research studies were detected to predict the acceptance of image-based Web 2.0 tools, including the selected concept mapping tool *CmapTools* either.

Second, the literature analysis showed that authors of the reviewed studies unanimously base their choice of TAM on its robust and parsimonious nature and its high validity. Correspondingly, the majority of ESP related studies confirm positive and significant relationships between core constructs of TAM in Web 2.0 enhanced ESP courses. To illustrate, the two most important determinants of acceptance, namely *perceived ease of use* and *perceived*

usefulness of Web 2.0 technologies were found to be interrelated in the studies conducted by Gamble, 2017; Van de Bogard and Wichadee, 2015; Yu-Li, 2014 and Tajuddin et al., 2012. Significant relationships between these two basic predictors and *behavioural intention* were confirmed by Gamble, 2017 and Yu-Li, 2014. Moreover, *perceived ease of use* was also found to be related to *attitude towards usage* by Afshari et al. (2013), whereas Gamble (2017), Yu-Li (2014) and Afshari et al. (2013) provided strong evidence, that *attitude towards usage* was affected by *perceived usefulness*. However, discrepancies in research findings may be observed as other authors, namely, Van de Bogard and Wichadee (2015) and Arshad et al. (2012) found no evidence that these two most important variables had any relationship with *attitude towards usage*. On the other hand, Arshad et al. (2012) discovered that *perceived usefulness* and *perceived ease of use* appeared to exert influence on *actual usage* of the Web 2.0 technologies. These differences in research results call for additional consideration regarding TAM in ESP studies.

Third, despite of the fact that TAM has been used in the reviewed literature due to its high validity, Bagozzi (2007) suggests that it would be “unreasonable to expect that one model and one so simple, would explain decisions and behaviour fully across a wide range of technologies, adoption situations, and differences in decision making and decision makers” (Bagozzi, 2007, p. 244). Majority of the authors agree that the model can be extended by adding complimentary variables, depending on a technology researched, for more clarity. For instance, Madini and Alshaikhi (2017) incorporated three additional external variables, i.e. *interaction*, *imagination* and *immersion* to predict the acceptance of *Virtual Reality (VR)* headsets to learn ESP vocabulary, while Yu-Li (2014) added *self-efficiency* as a moderating factor in researching the same technology. However, in both studies it is unclear whether the suggested additional constructs exerted any influence on students’ acceptance of this Web 2.0 technology. *Perceived playfulness* as a new determinant was introduced by Tajuddin et al. (2012) to explain the acceptance of blogs, while Arshad et al. (2012) modified TAM by including the construct of *awareness* to explain the acceptance of a number of video-based and social networking tools. Some extensions of TAM in ESP research contain very unusual elements. For example, in the study conducted by Van de Bogard and Wichadee (2015) *the number of social network sites students were using* was incorporated as an additional factor that might have affected students’ intention to use text-based tool *LINE*.

Fourth, TAM theorizes that the influence of external moderators (e.g. users’ individual or contextual characteristics) on *behavioural intention* to use technologies are mediated by the factors of *perceived ease of use* and *perceived usefulness*. However, individual and contextual factors or characteristics in studies relying on technology acceptance theories are for some reason neglected. For example, in early studies using TAM, Davis, Bagozzi and Warshaw (1989) admitted that the absence of such characteristics was one of their work’s limitations. Almost two decades later Sun and Zhang (2006) stated that researchers should pay particular attention to the inclusion of individual and contextual moderators when using technology adoption models to predict user acceptance of technologies. The literature analysis showed, however, that only two ESP related studies out of seven reviewed paid attention to and explored the effect of individual moderators on the acceptance of Web

2.0 tools in ESP settings. To illustrate, in the study conducted by Yu-Li (2014) *frequency of Internet usage, students' mobile phone, Internet capability and home Internet usage frequency* were found to be related to the construct of *perceived ease of use*. It was discovered, however, that *the academic year* and *prior English language competency level* of the participants did not interfere with the courseware. In another research conducted by Arshad et al. (2012) five external individual and contextual factors including *gender, age, ethnicity, frequency of using Web 2.0 technologies* and *study programme* were explored, however, it appeared that none of them had any relationship with the constructs of their proposed model of TAM. I failed to detect any TAM related empirical evidence supporting or denying the influence of the four contextual factors discussed by Arshad et al. (2012), namely users' *age, ethnicity, frequency of using Web 2.0 technologies* and *study programme* on their bibehavioral decision to use one or another technology. However, it seems that the authors' findings regarding gender related issues are relatively inconsistent with previously established discoveries. For example using TAM as the theoretical framework, Venkatesh and Morris (2000) found that, compared to women, men placed a greater emphasis on the factor of *perceived usefulness* in determining *behavioural intention*. Women, on the other hand weighted *perceived ease of use* more strongly in determining *behavioural intention* than men did at earlier time frame. Similarly, Venkatesh et al. (2003) found gender to exert influence on the relationship between performance expectancy, in other words *perceived usefulness* and *behavioural intention*, with the relationship significantly stronger for men compared to women. Their findings are conforming with the literature on social psychology, which emphasizes that men are more pragmatic compared to women and highly task-oriented (Minton et al., 1980).

Thus we feel confident to conclude, that most of ESP studies, utilizing TAM pay little attention to moderating effects of individual and contextual factors and support the call of Venkatesh (2000), who stated that researchers and practitioners typically "have restricted their attention to system design characteristics (e.g., Davis et al., 1989) or training (e.g. Venkatesh, 1999) when trying to enhance user perceptions of the ease of use of a system, thereby overlooking other controllable variables such as individual difference variables and variables that are a result of a system-user interaction" (Venkatesh, 2000, p. 343). Similarly, Sun and Zhang (2006) stated that more research attention has to be paid "to individual and contextual factors that are often neglected in technology acceptance studies but can be critical in applying theoretical models to specific situations in organizations" (Sun & Zhang, 2006, p. 54).

Fifth, another limitation of the previous ESP studies related to TAM is that some of them (e.g. Madini & Alshaiki, 2017) use only descriptive statistics without explicit hypotheses as a tool to analyse the data or investigate causal relationship between external and internal variables of TAM. It should be noted that no studies related to acceptance of image-based Web 2.0 technology *CmapTools* within the sphere of teaching or learning ESP in higher education were obtained, thus the present research will hopefully add not only to the existing body of knowledge about the effectiveness of the tool on the learning achievements of ESP students, but will also explore and predict factors influencing their bibehavioral intentions to use or not to use it in the future. If the reasoning proves successful in explaining user

acceptance, it will provide valuable information to ESP teachers planning to implement *CmapTools* in their ESP courses and will reduce the risk of potential unsuccessful practices.

The results obtained from the literature analyses on both technology acceptance and the effective use of Web 2.0 technologies in ESP studies in higher education (see *Chapter 2*) not only provided a very clear picture on the two issues as reported by ESP researchers and practitioners, but also appeared to be helpful when planning the methodology part of this dissertation. For example, the results obtained from a systematic literature review on the effectiveness of Web 2.0 technologies were very much in line with Jenkinson (2009), who noticed that when researchers set out to measure the effect of a technology upon learning, more often than not they are attempting to compare the benefits of a technological innovation with traditional pedagogy. We will see that the empirical part of this dissertation is not an exception, as it employs an experimental design involving ESP students from two different study programmes at two higher education institutions in Lithuania, who were either assigned to experimental groups, exposed to *CmapTools*-supported activities in a blended/hybrid classroom course, or to control groups, taught the “traditional” way.

The results achieved by the literature analysis on technology acceptance indicated that a quantitative approach, a survey research and a questionnaire, employed as a data collection method, are as a rule used by the researchers (Gamble, 2017; Madini & Alshaikhi, 2017; Van de Bogard & Wichadee, 2015; Yu-Li, 2014; Tajuddin et al, 2012; Arshad et al., 2012; Venkatesh, Morris, Davis & Davis, 2003, etc.) to measure user acceptance of one or another technology, Web 2.0 technologies included. *Dörnyei (2014) notices that* survey research and questionnaires are in one of the most common methods of data collection in second language (L2) research too. The popularity of questionnaires, according to the author, “is due to the fact that they are easy to construct, extremely versatile, and uniquely capable of gathering a large amount of information quickly in a form that is readily processable. Indeed, the frequency of use of self-completed questionnaires as a research tool in the L2 field is surpassed only by that of language proficiency tests” (Dörnyei, 2014, p. 1). Namely testing and a TAM-based questionnaire were selected as data collection instruments measuring the effectiveness and acceptance of the selected Web 2.0 technology in this dissertation. The following chapter will present the methodology of the parent empirical research, will describe its setting and participants involved, will outline selection procedure for sample collection and will discuss the above mentioned research instruments in detail. However, it will start with a brief representation, results and a discussion of an external pilot study, which served as ESP students’ needs analysis tool and tested the adequacy of the TAM-based questionnaire before constructing its final form to be properly used in the parent study of this dissertation.

CHAPTER 4. RESEARCH METHODOLOGY

4.1. Pilot Study “University Students’ Attitudes towards the Usage of Web 2.0 Tools for Learning ESP”

Aim of the pilot study. The external pilot study was conducted in autumn semester of academic year 2014 – 2015 at Mykolas Romeris University (Lithuania), using a quantitative approach and a questionnaire survey method as a data collection strategy. A structured self-administered pencil-and-paper-based questionnaire “*University Students’ Attitudes towards the Usage of Web 2.0 Tools for Learning ESP*”/ „*Universiteto studentų nuomonė apie antrosios kartos saityno technologijų naudojimą profesinės anglų kalbos studijose*” (please refer to *Annex 1*) was employed to fulfil two important functions.

First, remembering Hutchinson and Waters’ (1991) definition that ESP is „an approach to language teaching in which all decisions as to content and methods are based on the learner’s reason for learning” (Hutchinson & Waters, 1991, p. 19), it primarily served as ESP students’ needs analysis tool. Many scholars (Chambers, 1980; Hutchinson & Waters, 1991; Johns, 1991; West, 1994; Dudley-Evans & St. John, 1998; etc.) acknowledge that needs analysis is a key stage in developing any ESP course to provide a reasoned basis for all consecutive course design activities. A variety of approaches to ESP learners’ needs analysis can be detected across ESP-related literature, including *target situation analysis* (Chambers, 1980; Hutchinson & Waters, 1991; Dudley-Evans & St. John, 1998), *present situation analysis* (Robinson, 1991; Hutchinson & Waters, 1991; Dudley-Evans & St. John, 1998), *language situation analysis* (Dudley-Evans & St. John, 1998), *pedagogic needs analysis* (West, 1994), etc. In this questionnaire we applied elements of *present situation analysis*, which, “*estimates strengths and weaknesses in language, skills, learning experiences*” (Dudley-Evans & St. John, 1998, p. 125) to collect objective and subjective information about the audience in every way similar to the target population.

Second, resting on Baker’s (1994) suggestion that a pilot study can also be the pre-testing or “trying out” of a particular research instrument (Baker, 1994, p. 182), it estimated the adequacy of the theoretical part of the technology acceptance questionnaire before constructing its final form to be properly used in the subsequent parent study in the spring semester of academic year 2017 – 2018. Such testing, according to Creswell (2009), “is important to establish the content validity of an instrument and to improve questions, format, and scales. Indicate the number of people who will test the instrument and the plans to incorporate their comments into final instrument revisions” (Creswell, 2009, p. 150).

Data Collection Instrument. The current questionnaire consisted of three content sections with a total of 30 questions. The opening section introduced the respondents to the topic, briefly described the concept of Web 2.0 technologies, and provided specific instructions explaining how they should go about answering the questions as well as assurances of anonymity and confidentiality.

The second section included 11 close-ended questions on the respondents' *present situation* data, including factual questions about their gender, faculty, study programme, self-reported English language proficiency, self-reported familiarity, frequency of use and experience of using Web 2.0 tools, the most problematic and least interesting ESP classroom activity, preferences, regarding potential Web 2.0 technologies to be used for learning ESP, etc.

The third section, adapted from Arshad, Tan and Hashim's (2012) study "*Tertiary Students' Application of Web 2.0 for English Language Learning*", incorporated 19 close-ended attitudinal items related to the *Technology Acceptance Model (TAM)* in terms of *perceived usefulness*, *perceived ease of use*, *attitude*, *behavioural intention*, *actual usage* and an additional construct of *awareness* to assess ESP students' attitudes towards Web 2.0 technologies applied in their ESP classrooms. It should be mentioned that a decision was made to complement the original construct of *perceived usefulness*, measuring students' perceptions regarding the usefulness of Web 2.0 technologies for learning ESP with 3 additional statement items. This slight but necessary adjustment was made, because statement items in this particular construct in the original instrument basically investigated the usefulness of Web 2.0 technologies for enhancing tertiary students' English vocabulary and practising English writing. Bearing in mind that ESP course units at MRU organically integrate the development of all dominant foreign language learning (reading, writing, speaking, and listening), three supplementary statement items: *Web 2.0 technologies is a useful tool for me to practice reading in English* (item 4), *Web 2.0 technologies is a useful tool for me to practice speaking in English* (item 6) and *Web 2.0 technologies is a useful tool for me to practice listening in English* (item 7) were added to address the target situation. It is noteworthy that the wording of these additional 3 items was developed by strictly following the language and style of the original text. A 5-point *Likert scale* response format (strongly agree, agree, neutral, disagree and strongly disagree) was employed in this part of the questionnaire.

Following the suggestion of Mackey and Gass (2005) that whenever possible, questionnaires should be administered in the learners' native language (Mackey & Gass, 2005, p. 16), the language employed in our instrument was Lithuanian, which is the sole official state language of the Republic of Lithuania. The Lithuanian version of the theoretical part of the questionnaire was produced by the dissertation holder and by her academic supervisor professor dr. N. Burkšaitienė. To ensure semantic and conceptual equivalence, we tried to avoid literal translation and strove to keep the vocabulary as simple and concise as possible when translating statement items in each construct.

Sampling and participants. Fraenkel, Wallen and Hyun (2012) state, that "in the vast majority of studies that have been done in education, random samples have not been used" (Fraenkel, Wallen & Hyun, 2012, p. 104). In second language research, as noticed by Dörnyei (2014), convenience sample is the most commonly used sample type, whereby members of the target population are selected for the purpose of the study if they meet some pre-established criteria, such as geographical proximity, availability at a certain time, easy accessibility, or the willingness to volunteer. In this pilot study the questionnaire was distributed to all available first year full-time undergraduate students (n=226) enrolled in a compulsory 6 ECTS credit "*English Language for Specific Purposes*" course (face-to-face

delivery mode) taught in autumn semester of academic year 2014 – 2015 at MRU. A total of 101 questionnaires (45%) were completed and returned. *Table 6* provides a detailed distribution of research participants (n=101) by faculty, study programme and gender:

Table 6. Demographic data of the pilot study participants (n=101)

| Faculty of | Study Programme | Students | | Male | | Female | |
|----------------------------------|---------------------------------------|----------|-----|------|-----|--------|-----|
| | | (%) | (n) | (%) | (n) | (%) | (n) |
| Law | Law | 22.8 | 23 | | | | |
| | Law and Management | 16.8 | 17 | | | | |
| Politics and Management | Organizational Management | 9.9 | 10 | | | | |
| | Public Administration | 23.8 | 24 | 35.6 | 36 | 64.4 | 65 |
| Economics and Finance Management | Financial Accounting | 13.9 | 14 | | | | |
| Social Technologies | Communication and Creative Industries | 12.9 | 13 | | | | |

Although Baker (1994) proposes that appropriate sample size for a pilot study should be of 10 – 20% of a sample projected for the larger parent study, this external pilot study did not aim to estimate the most relevant sample. Although a total of valid 101 questionnaires (45%) were completed and returned, the sample almost twice outnumbered the number of participants of the main study.

Reliability. Reliability refers to the degree of consistency or dependability of an instrument including stability, internal consistency, and equivalence (Neuman, 2014). To evaluate the internal consistency of the 20 statement items that made up the theoretical part of this external pilot study’s questionnaire, *Cronbach’s alpha* reliability coefficient was computed. According to rules of thumb provided by Nunnally (1967), Pukénas (2009) and George and Mallery (2003), a *Cronbach alpha* of 0.7 is considered an accepted standard for reliability. The data in *Table 7* demonstrate that each of the six TAM-related constructs produced high or good values, exceeding the value of 0.7, thus indicating a strong instrument internal consistency.

Table 7. Cronbach Alpha (α) reliability coefficient of the questionnaire items related to TAM

| TAM-Related Construct | Number of Items | Cronbach Alpha value | Internal Consistency |
|------------------------|-----------------|----------------------|----------------------|
| Awareness (additional) | 3 | 0.850 | High |
| Perceived Usefulness | 5 | 0.852 | High |
| Perceived Ease of Use | 4 | 0.874 | High |
| Attitude | 3 | 0.878 | High |

| <i>TAM-Related Construct</i> | <i>Number of Items</i> | <i>Cronbach Alpha value</i> | <i>Internal Consistency</i> |
|------------------------------|------------------------|-----------------------------|-----------------------------|
| <i>Behavioral Intention</i> | 2 | 0.765 | Good |
| <i>Actual System Usage</i> | 2 | 0.745 | Good |

Data and Result Analysis. Statistical Package for Social Sciences (SPSS) software, version 22.0 (SPSS, 2014) was used to analyse the collected data from this episode of research. Both descriptive and inferential statistical tests were conducted by this study. The findings of this external pilot study first of all provided valuable insights into the world of typical representatives of the so called digital natives’ generation, i.e. people who were born in the last decades of the 20th century and who “have spent their entire lives surrounded by and using computers, videogames, digital music players, video cams, cell phones, and all the other toys and tools of the digital age” (Premsky, 2009, p. 1). As it is natural to all the speakers of “the digital language”, the respondents (n=101) exhibited experience with and exposure to different types of Web 2.0 technologies: the majority of them identified themselves as independent (58.4%, n=59) or even proficient (12.9%, n=13) users of Web 2.0 technologies, while 28.7% (n=29) considered themselves as basic users of Web 2.0 technologies.

When asked to evaluate their general English language proficiency level according to *The Common European Framework of Reference for Languages: Learning, Teaching and Assessment*¹⁰, the majority of the respondents (61.4%, n=62) identified themselves as independent users, 16.8% (n=17) – as proficient users and 21.8% (n=22) – as basic users. However, when asked to indicate foreign language learning activities they considered the most difficult and least interesting in their ESP classrooms, 33.7% (n=34) of the participants, as *Figure 11* suggests, reported they did not favour learning ESP vocabulary, 19.8% (n=20) did not like writing activities, 19.8% (n=20) did not like listening, 14.9% (n=15) did not like reading, and 10.9% (n=11) did not favour speaking activities:

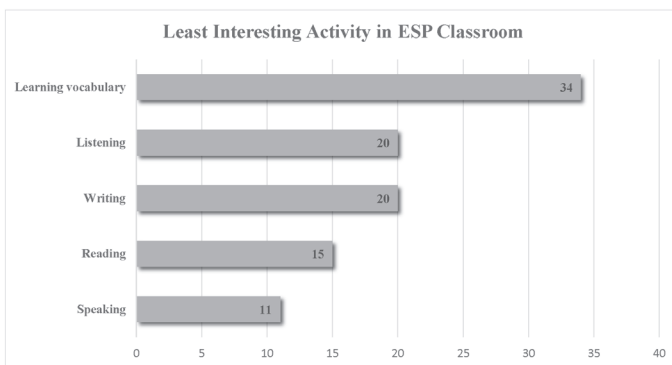


Figure 11. *The most difficult and least interesting ESP classroom activities as nominated by pilot study participants (n=101)*

¹⁰ <https://rm.coe.int/1680459f97>

The finding that learning ESP vocabulary was the major linguistic obstacle or as Hutchinson and Waters (1991) call, “lack” to ESP students became the first necessary starting point when planning the pedagogical treatment. Supported by a considerable amount of literature in the field (Weisi & Ashrafabadi, 2018; Esfandiari & Hezari, 2017; Madini & Alshaikhi, 2017; Tskhvitava, 2016; Khalili et al., 2015; Khoshshima et al., 2015; Pérez-Sabater & Montero-Fleta, 2015; Wanpen et al., 2013; Sinadinović, 2013; Mukoroli, 2011; Xhaferi, 2008, Stoica, 2006, etc.) it provided justified reasons to consider this specific knowledge area of ESP a major focus of attention in the subsequent parent empirical study.

When asked to specify which Web 2.0 applications could potentially be used for learning ESP, four Web 2.0 technologies that have most potential to be applied for learning ESP were identified, including *video sharing (YouTube)* (47.5%, n=48), *social networking* (20.8%, n=21) *wikis and collaborative editing tools* (10.9%, n=11) and, interestingly, *blogging* (9.9%, n=10), although this particular technology was ranked as the least popular among general students’ online activities. *photo sharing, podcasting* and *RSS*, typical examples of the canon of Web 2.0 technologies appeared on the bottom line of the list of potentially useful Web 2.0 applications for learning ESP. Only a tiny percent of the respondents reported these Web 2.0 technologies as suitable for applying in ESP courses. In this investigation *social networking* tool together with *video sharing, wikis* and *blogging* were ranked as having most potential to be applied for learning ESP, especially for learning professional terminology.

Speaking about target needs of ESP students Hutchinson and Waters (1992) introduce the terms: *necessities* (what ESP learners need to do in order to learn), *lacks* (the gap between the existing ESP learners’ knowledge and the necessities they have) and *wants* (what ESP learners feel they need). Sometimes, the authors notice, a conflict may arise between learners’ necessities and their wants, or it is likely that the learners’ attitudes will contrast sharply with the views of other involved forces, such as researchers, course designers or teachers. Thus it is important to find some kind of a compromise between these conflicting parties and design a course which is both appropriate and attractive for the target learners. The results of this pilot study indicate that the conflict between ESP students’ needs (learning ESP vocabulary in an interesting and efficient way), their wants (using *social networking, video sharing, wikis* or *blogging* in ESP classes) and the researchers’ views (*social networking tools, wikis* and *blogs* are the types of Web 2.0 technologies which are over investigated in ESP related research; other types of Web 2.0 technologies can be used to foster ESP vocabulary) definitely exists, and that the issue could be explored further.

The investigation was based on the assumption that four independent individual factors, namely ESP students’ gender, their study programme, an average of hours they spend online daily and their self-reported ability to use Web 2.0 technologies may have had an impact on their acceptance of Web 2.0 tools for learning ESP. However, the findings of correlation analysis revealed that only students’ self-reported ability to use Web 2.0 had positive statistically significant relationships with their awareness of, attitude towards, intention to use and actual system usage of Web 2.0 technologies meant for learning ESP at the university. Still coming up to a conclusion that students’ ability to use Web 2.0 technologies is the sole individual factor affecting their acceptance of these technologies in ESP studies would be hurried and off-the-cuff. In fact this finding has prompted an inevitable

question about which other individual and contextual factors may influence the acceptance of a concrete Web 2.0 technology (in our case a Web 2.0 technology *CmapTools*) used in ESP classrooms, especially if this technology is not used by the students on a daily basis. The results of this external pilot study were reported in a publication: Selevičienė, E. and Burkšaitienė, N. (2015). University Students' Attitudes towards the Usage of Web 2.0 Tools for Learning ESP. A Preliminary Investigation. In: *Socialinių mokslų studijos: mokslo darbai/ Societal studies*. 7 (2), pp. 270 – 292.

The following chapter will present the methodology of the parent empirical research, will describe its setting and participants involved, will outline selection procedure for sample collection and will discuss research instruments used and procedures conducted.

4.2. Educational Experiment „Effectiveness and Acceptance of a Web 2.0 Technology *CmapTools* in ESP Studies in Higher Education”

There are three main approaches to research methodology: quantitative, qualitative and mixed methods research (Creswell, 2009; Fraenkel, Wallen & Hyun, 2012). This dissertation employed a quantitative research approach and an experimental strategy of inquiry. Experimental research, according to Fraenkel, Wallen and Hyun (2012), is the most precise of scientific methods. In their seminal book “*Experimental and Quasi-Experimental Designs for Research*” Campbell and Stanley (1963) address this type of research as “the only way of verifying educational improvements, and as the only way of establishing a cumulative tradition in which improvements can be introduced without the danger of a faddish discard of old wisdom in favor of inferior novelties” (Campbell & Stanley, 1963, p. 2).

The basic idea underlying any experimental research is that researcher measures the effect of a treatment (independent variable) on a certain outcome (dependent variable) controlling for all other factors that might influence that outcome. Fraenkel, Wallen and Hyun (2012) notice that independent variables commonly manipulated in educational research may involve methods of instruction, types of assignment or learning materials, while dependent variables usually include, motivation and attitudes towards the course, attention span or *learning achievements*, etc. The latter, as Darwesh and Al-Jarah, (1997) define, represent *the individual progress towards the instructional objectives of a specific study*.

With regard to the level of experimental control provided, three categories of experimental research designs can be distinguished, including true experimental, quasi-experimental and pre-experimental designs (Martella et al., 2013; Campbell & Stanley, 1963). True experimental designs, which are considered to be the strongest out of the three, always involve random selection and assignment of participants, include the control group and guarantee the equivalence of the experimental and control groups. Quasi-experiments designs are very similar to true experimental designs, except that the groups are not built through random assignment, whereas pre-experimental designs may lack either multiple measurements or multiple groups. Campbell and Stanley (1963) distinguish 3 possible types of true experimental research designs, including *the pretest-posttest control group design*, *the Solomon four-group design* and *the posttest-only control group design*; 10 types of quasi-experimental designs, including *the time-series experiment*, *the equivalent time-sam-*

ples and the equivalent materials design, the nonequivalent separate-sample pretest-posttest control group design, the multiple time-series design, the recurrent institutional cycle design: a “patched-up” design and regression-discontinuity analysis; and finally 3 types of pre-experimental design involving the one-shot case study, the one shot pretest posttest design and the static group comparison design.

This current experimental research incorporated a **static-group comparison design** (Campbell & Stanley, 1963; Martella et al., 2013) also known as *posttest only design with nonequivalent groups* (Cook & Campbell 1979). This type of pre-experimental design, according to Campbell and Stanley (1963), entails a comparison of two nonrandomized groups on certain outcome. In this design, as it is visible in *Figure 12*, experimental group, which has received X, representing exposure to some intervention or treatment, is compared to control group, which has not received it, for the purpose of establishing the effect of X. No pretest measures prior to the treatment are employed; however, both groups are post tested at the end of the treatment or manipulation:



Figure 12. Design notation for a static-group comparison provided by Campbell and Stanley, 1963.

Cook and Campbell (1979) state that the most important characteristics in this type of design is the absence of pretest measures, which may imply that any posttest differences between the groups may be ascribed either to a treatment effect or to selection differences between the groups. Bitinas (2013) on the other hand, pays attention to the fact that within educational research “experimental groups (e.g. classes in high schools) are usually naturally assembled and include students from diverse backgrounds, therefore such samples can be treated as probability samples and thus statistical criteria can be applied to analyse their learning outcomes” (Bitinas, 2013, p. 125). The true representativeness of educational contexts, according to Bitinas (2013), may only be compromised in situations when groups of individuals are selected subjectively, when students are manipulated by teacher individuality or when learning outcomes are affected by social and specific environments. Furthermore, in educational research, as stated by Campbell and Stanley (1963), “we must frequently experiment with methods for the initial introduction of an entirely new subject matter, for which pretests in the ordinary sense are impossible, just as pretests on believed guilt or innocence would be inappropriate in a study of the effects of lawyers’ briefs upon a jury” (Campbell & Stanley, 1963, p. 25).

This is a very possible case with ESP research establishing the effect of some treatment and involving freshmen at tertiary level who are just about to start learning ESP, an entirely new subject matter to them. In contrast to ESP learners already in employment, at this starting point a big gap is always present between tertiary students’ current knowledge of general English and their content knowledge in ESP, especially having in mind vocabulary related differences between the two dimensions of the English language. It is thus logical to assume that pretest measures in such cases may be considered not feasible and unnecessary.

Cook and Campbell (1979) suggest that the lack of pretest observation data and thus the possibility of *selection bias* (the threat that research participants will not compose equivalent experimental and control groups) may be overcome by “seeking out pretest measures which correlate with the posttest within the experimental groups but are not measured on the same scale as posttest” (Cook & Campbell, 1979, p. 99). The authors propose that more easily retrieved measures, e.g. participants’ age, gender, their social class, residence, etc. may substitute the absence of pretests and thus increase the **internal validity**, which “seeks to demonstrate that the explanation of a particular event, issue or set of data which a piece of research provides can actually be sustained by the data” (Cohen, Manion & Morrison, 2007, p. 135). In this current research the absence of pretest was substituted by a placement test, administered to all the participants before the introduction of the treatment to check their initial equivalence in general English proficiency and to assure that all of them belong to the same population. This measure of control was employed to confirm that any posttest differences between the groups can be attributed to the effect of treatment.

Other potential biases or threats jeopardizing the internal validity in various types of experimental designs, as reported by Campbell and Stanley (1963), Cook and Campbell (1979), Kardelis (2005), Neuman (2006), Cohen, Manion and Morrison (2007), Fraenkel, Wallen and Hyun (2012) and Martella et al. (2013) are **history, maturation, testing, instrumentation, statistical regression, mortality, diffusion of treatment** and **experimenter expectancy**.

The static-group comparison design, according to Martella et al. (2013), controls for four of the threats that may result in changes in performance of the experimental group. These are **history** (the specific events occurring between the first and second measurement in addition to the experimental variable), **testing** (the effects of taking a test upon the scores of a second testing), **instrumentation** (changes in the calibration of a measuring instrument) and **statistical regression** (operating where groups have been selected on the basis of their extreme scores). Still possible concerns to the internal validity of this type of design are represented by **maturation, mortality, diffusion of treatment** and **experimenter expectancy**.

The threat of **maturation** arises “when the participants in one group are growing more experienced, more tired, and more bored than the respondents in another group” (Neuman, 2006, p. 104). According to Neuman (2006) and Fraenkel, Wallen and Hyun (2012), it is a serious threat in studies that span a number of years or use pre-post data of observation for the treatment groups. Bearing in mind that the current empirical research lasted only for one semester and involved the control group, the likelihood of having this effect was considered low.

Mortality is the threat which occurs when some research participants do not continue throughout the whole experimental research. Campbell and Stanley (1963) warn that even if in a *static-group comparison design* experimental and control groups were identical prior to the treatment, they might differ at the end of it not due to changes on the part of individual members, but due to the external reasons. Fraenkel, Wallen and Hyun (2012) notice that “there are no clear guidelines as to how many subjects can be lost before representativeness is seriously impaired. Any researchers who lose over 10 percent of the originally

selected sample would be well advised to acknowledge this limitation and qualify their conclusions accordingly” (Fraenkel, Wallen & Hyun, 2012, p. 104). They also state that of all the threats to internal validity, mortality may be the most difficult to control. This danger was taken into consideration by clearly reporting the number of participants in each group during all the tests and assignments administered throughout the research.

Diffusion of treatments is the danger whereby the participants within experimental groups may exchange information and communicate certain aspects of experimental stimulus to their counterparts in control groups. Neuman (2014) suggests this threat can be minimized by keeping the experimental and control groups isolated or keeping the control group unaware about the experimental stimuli. Unfortunately, it was impossible to keep the two groups in the same higher education institution separate during the experiment, as they were in very close proximity with one another: both of them were combined of students matching on such demographic characteristics as age, year and mode of studies, study programme, syllabus, English language proficiency level, even the study calendar. Moreover, as *CmapTools* is free software, it was available and had a potential to be used by anyone, including participants of control groups for a variety of purposes. However, this threat was partially minimized by having the *CmapTools* software installed on classroom computers of experimental groups only, thus restricting access to the tool for the members in control groups, at least during ESP classes at both higher education institutions.

Experimenter expectancy is a phenomenon which occurs when the expectations of the researcher related to the probable result of the experiment cause him or her to unintentionally affect the participants of an experiment. To prevent the threat researchers frequently choose not to interact with the participants and not to let them know about his or her visions and perspectives, regarding the possible research outcomes. Total isolation from research participants was impossible in this current educational experiment, as the researcher was also acting as an ESP teacher in the experimental group at MRU. It should be noted, however, that she had no contact with other participants in any of the institutions; therefore this threat was considered partially controlled.

If internal validity, as noticed by Cohen, Manion and Morrison (2007), is concerned with the question whether the experimental treatments make a difference in the specific experiments under scrutiny, **external validity**, “refers to the degree to which the results can be generalized to the wider population, cases or situations” (Cohen, Manion & Morrison, 2007, p. 136). The most common factors jeopardizing external validity or representativeness, discussed Campbell and Stanley (1963) are **the reactive or interaction effect of testing**, **the interaction effects of selection biases** and **the experimental variable**, **reactive effects of experimental arrangements** and **multiple-treatment interference**. Due to the absence of pretest measures, the static-group comparison design definitely controls for **the reactive effect of testing** “in which a pretest might increase or decrease the respondent’s sensitivity or responsiveness to the experimental variable and thus make the results obtained for a pretested population unrepresentative of the effects of the experimental variable for the unpretested universe from which the experimental respondents were selected” (Campbell & Stanley, 1963, p. 5). The effect of **multiple-treatment interference**, which may occur whenever multiple treatments are applied to the same participants, was also considered

low, as it is more likely to appear with one group quasi-experimental designs: the equivalent time-samples design and the equivalent materials design (Campbell & Stanley, 1963).

The most outstanding source of unrepresentativeness in educational research, according to Campbell and Stanley (1963), “is the patent artificiality of the experimental setting and the student’s knowledge that he is participating in an experiment” (Campbell & Stanley, 1963, p. 20), both referred to as *reactive effects of experimental arrangements*. They are difficult to control, having in mind that any aspect of the experimental procedure may be of such a nature. Pretesting procedures, randomization and assigning students to experimental and control groups, presenting of the treatment as an out-of-ordinary event, even post testing sensitization may produce such reactive effects. In this current research the effect of reactive arrangements was if not eliminated, then minimized through the use of so called unobtrusive measures of observation. All the treatment instruments (ESP vocabulary achievement posttests and ESP reading assignments) were composite elements of students’ cumulative assessment, thus were perceived as elements of the naturally occurring course of events. Fraenkel, Wallen and Hyun (2012) state that by applying such unobtrusive measures, students can be easily convinced that the treatment is just an ordinary part of instruction, and not part of an experiment. The authors even advice that in certain cases it is even needless to disclose that an experiment is being conducted at all.

Dissertations in the field of education, employing a *static-group comparison design* (Campbell & Stanley, 1963) or in Cook and Campbell’s (1979) terminology, *posttest only design with nonequivalent groups*, are not very abundant (Wang, 2018; Bowman, 2018; Benoit, 2017; LeMay, 2016; Saunders, 2014; Robbins, 2012; Poplin, 2010; Silva, 2007, etc.) however, these specific designs are being used in cases when randomization of samples is not possible or pretesting observation data are not available. To illustrate, the aim of Benoit’s (2017) dissertation “*The Effect of Game-Based Learning on Vocabulary Acquisition for Middle School English Language Learners*” was to examine whether a traditional method of learning academic vocabulary or game-based learning was more effective with English language learners in a middle school settings as well as to establish if there was any statistical difference in scores based on participants’ gender. To meet the aim the researcher chose a quasi-experimental *posttest only design with nonequivalent groups*, as whole classes of students were selected for the control and experimental groups. As these were naturally occurring groups in the population, random allocation was simply not possible. In another dissertation “*A Quasi-Experimental Evaluation of Reading and Special Education Outcomes for English Language Learners in Instructional Consultation Team Schools*” Silva (2007) applied hierarchical linear modeling to investigate whether the Instructional Consultation Team model differentially influenced fourth and fifth grade state reading achievement test scores as well as EFL student scores in particular. She employed a quasi-experimental research design involving an untreated control group with dependent proxy-pretest and posttest to investigate reading achievements of the participants. Archival records of the participants’ scores in history, mathematics and other subjects in prior year were used as a proxy pretest for prior achievement. However, for the research questions investigating special education placement, prior year placement data were inaccessible. Therefore, a quasi-experimental posttest only design with nonequivalent groups was adopted.

This current experimental research will hopefully add to the existing body of research incorporating a specific static-group comparison design, especially to ESP related research in higher education, where randomization of samples and pretest measures are physically not viable.

4.3. Research Setting

This section will present the components of the experimental method plan and the setting in which the research was conducted: research participants, research sample description, treatment procedures, research instruments and data collection procedures.

4.3.1. Research Participants

The provision of Article 6 of *Republic of Lithuania Law on Higher Education and Research*¹¹ determines two types of higher education institutions in Lithuania: universities and colleges. Universities offer university level degree granting studies and award Bachelor's, Master's, Doctoral degrees. Colleges offer college level degree granting studies and award Professional Bachelor's degrees. The empirical research was conducted in two higher education institutions in Lithuania, *Mykolas Romeris University (MRU)* and *Vilniaus kolegija/ University of Applied Sciences* (henceforth VIKO), representing both of the types described. According to information provided by Ministry of Education, Science and Sport of the Republic of Lithuania, "MRU is one of the top universities in Lithuania"¹² and is a leading university in *social sciences* and interdisciplinary research in Lithuania. MRU reports that it currently enrolls 7500 students including 600 international students and employs over 400 academic staff. The university offers Doctoral, Master's and Bachelor's Degree study programmes. Over 80% of them have international accreditation. The most prevalent study programmes are *law, management, public administration, psychology, social work, public security*, etc. VIKO is presented as "a leading and the largest accredited public higher professional education institution in Lithuania with around 7000 students and 460 qualified educators. High enrolment rates and top places on the rankings reflect the prestige of the institution. VIKO graduates are highly sought after by employers. VIKO provides 44 study 1st cycle Professional Bachelor programmes in 7 faculties in the sectors of *tourism, business, information technologies, electronics, education, economics and finance, health care, agriculture* and *arts*. 8 study programmes are offered both in Lithuanian and English. Studies at VIKO are orientated to practical application of knowledge. Therefore, compared to university studies, more attention is paid to practical training, closer contacts with the real work"¹³.

The choice of research settings in two different types of higher education institutions was guided by several reasons. It should be mentioned in the first place that the author

11 <https://e-seimas.lrs.lt/portal/legalActPrint/lt?jfwid=rp9xf47k7&documentId=548a2a30ead611e59b76f36d7fa634f8&category=TAD>

12 <https://studyin.lt/universities/mykolasromerisuniversity/>

13 <https://studyin.lt/universities/vilniuscollege/>

of this dissertation has a full-time contract at MRU, where she has been teaching ESP since 2007. She and another teacher specializing in ESP were due to start delivering an ESP course designed for the freshmen of *Law and Customs Activities Bachelor's Degree Programme* in the spring semester in 2017, which gave her an instant access to potential participants to the empirical research of this dissertation. This study programme (just like the majority of the programmes delivered at MRU) falls under the area of *social sciences*. To enhance the richness of the data it was considered necessary to include another higher education institution to investigate whether the selected Web 2.0 technology was effective when used in a study programme representing a completely different area of studies and automatically a completely different area of ESP. Several higher education institutions providing study programmes in *technological* or *engineering sciences* were targeted, however, course units of ESP in this area of study delivered namely at VIKO appeared to exhibit the highest degree of homogeneity with those delivered at MRU. A set of homogeneous characteristics included the cycle and year of study, mode of delivery and number of ECTS credits allocated, but most importantly – very similar strategies of continuous cumulative assessment implemented to observe interim learning outcomes of the students, enrolled in ESP courses. Composite elements involved multiple achievement tests, presentations and home reading assignments. It is interesting to mention that there is a tendency with some higher education institutions in Lithuania to exclude the element of home reading in their schemes of cumulative assessment, while others envisage only one achievement test to be written during the ESP course, therefore, finding a perfect match was if not impossible then complicated enough.

Thus the participants to this current empirical research were 107 undergraduate full-time students enrolled in two study programmes very heterogeneous in their fields: *Law and Customs Activities Bachelor's Degree Programme* (national code 6121KX006) at the Faculty of Law at MRU (n=61) and *Computer Systems Professional Bachelor's Degree Programme* (national code 6531EX028) at the faculty of Electronics and Informatics at VIKO (n=46). The students, all possessing a number of common characteristics (see paragraph 4.3.2 *Research Sample*), met for 1 hour 30 minute sessions in ESP twice a week for a period of 15 weeks and were taught by the researcher and three other full time ESP teachers who kindly agreed to take part in the research.

According to Windham (1990) and Lockheed and Hanushek (1994), teacher characteristics (together with such variables as pedagogical practices, organizational structure of educational institutions, their administrative capacity, etc., all falling under the category of *non-material inputs*) can serve as important input indicators of both, educational and educational technology effectiveness. Back in 1990 Windham (1990) noticed that namely the teacher characteristics (such as their formal educational attainment, experience, specialization, ethnicity or nationality, subject mastery, verbal ability, availability, etc.) used to be most commonly studied *input* variables in educational effectiveness research. The teacher used to be treated as the locus of classroom instructional activity, “a part of the tradition of almost all cultures and has been institutionalized in most curricula and forms of classroom organization” (Windham, 1990, p.23). However, considering mediated roles of both teachers and learners within Web 2.0 enabled educational process, discussed in *Chapter 1* as well

as a marginal number ($n=4$) of ESP teachers involved, this current empirical research did not consider teacher characteristics (especially those, related to their nationality, gender, age or verbal ability) of high importance. Still, resting on Gibson's (2001) assumption that a great deal of responsibility for effective integration of a technology inevitably falls upon individual teachers and that a very important prerequisite here is their preparedness and skill level, it is necessary to mention that all the participating teachers in this current experiment had more than 20 years' experience in teaching ESP within various fields and in Windham's (1990) terms, definitely possessed "the academic and teacher training attainment appropriate to the assigned level and type of teaching" (Windham, 1990, p. 25). The two teachers working with students in experimental groups received sufficient training on using the technology (please refer to paragraphs 2.2. *Image-based Web 2.0 Technology CmapTools* and 4.3.3. *Treatment Procedures*).

Research Ethics. Permission to pursue this research was granted by director of the Institute of Humanities at MRU and dean of the faculty of Electronics and Informatics at VIKO (see *Annex 2*). All the student participants were given consent forms (see *Annex 3*) and were required to return them to be considered participants in the study. This gave the researcher permission to analyze students' production: their tests results, survey data and concept maps (cmaps) they have created.

4.3.2. Research Sample

Since this current research was conducted in the university setting, it was not possible to randomly assign subjects to the treatment condition; therefore it utilized a *convenience* sampling strategy. According to Dörnyei (2014), convenience or opportunity sample is the most commonly used sample type in second language research. Here the most important criterion of sample selection is the convenience for the researcher. Members of the target population, as noted by Dörnyei (2014), are selected for research purposes if they possess certain practical characteristics or meet certain criteria, such as geographical proximity, availability at a certain time or easy accessibility. As information concerning the statistics on the first year full-time bachelor degree students studying ESP at formal higher education institutions in Lithuania in 2017 was unavailable in the databases of Department of Statistics to the Government of the Republic of Lithuania, nor was it provided by individual higher education institutions, the sample size of this research was calculated, using the equation for unknown populations $n = \frac{z^2 \cdot s^2}{\Delta^2}$ as proposed by Kardelis (2005), where n refers to the sample size, z refers to the value, obtained from the standard normal distribution for the selected confidence level (e.g., for a 95% confidence level, $p=0.05$, $z=1.96$), s refers to the population standard normal deviation, while Δ is the precision or acceptable margin of error (Kardelis, 2005, p. 312). In this current case $s=1.752$, while $\Delta=0.35$. The Δ value=0.35 was selected, as previous teaching experience with identical populations gave the mean score of 7 for placement tests. A 5 percent margin of error was applied, hence $\Delta=7 \times 0.05=0.35$. The value of n was calculated using the following parameters: $(1.96^2 \times 1.752^2) / 0.35^2 = 92.78$. Thus, the sample size of 107 subjects in this current research was considered adequate, sufficient and representative.

Students in each aforementioned higher education institution were assigned to 2 experimental and 2 control groups. Experimental groups were exposed to a treatment using the selected Web 2.0 technology *CmapTools* throughout the whole semester, whereas control groups received no treatment and were taught the “conventional” way.

As this educational experiment incorporated a *static-group comparison design*, no pre-test measures prior to the treatment were employed, however, both groups were post tested to compare the effect of the treatment, as suggested by Campbell and Stanley (1963), Cook and Campbell (1979) and Martella et al. (2013). It should be noted, however, that the participating ESP teachers had no control over how many students would be assigned to their groups, as these were naturally assembled or *intact* groups. To minimize selection bias, potential with intact groups, the principles of homogeneity related to participants’ age, the similarity of their learning environments and level of their English language proficiency were taken into account. The age range of the participants was between 18 and 20 years old. All the participants were first year full-time undergraduate students enrolled in a compulsory 6 ECTS credit ESP course (under the title of *Foreign Language for Specific Purposes (English)* at MRU and *English* at VIKO) (face-to-face delivery mode). They were assumed to be computer-literate, however, none of them claimed to be familiar with the *CmapTools* application. The general language level of the participants theoretically was B2 based on *Common European Framework of Reference for Languages: Learning, Teaching, Assessment (CEFR)*¹⁴ as required by their course syllabi. Considering the fact that 100% of participants (n=46) within naturally assembled groups at VIKO were male, whereas the sample at MRU (n=61) was gender-mixed with female predominance, as indicated in *Table 8*, any outcomes analyses related to gender differences within this current segment of research were deliberately avoided.

Table 8. Demographic data of the participants at the beginning of empirical research

| Higher Education Institution | Number of Students per Institution (n) | Number of Students in Experimental Group (n) | Number of Students in Control Group (n) | Gender | |
|------------------------------|--|--|---|----------|------------|
| | | | | Male (n) | Female (n) |
| MRU | 61 | 33 | 28 | 21 | 40 |
| VIKO | 46 | 27 | 19 | 46 | 0 |
| Both Institutions | 107 | 60 | 47 | 67 | 40 |

¹⁴ <https://rm.coe.int/1680459f97>

4.3.3. Treatment Procedures

Treatments or interventions are the specific components of any experimental research that distinguish this particular design from other research methods. The term “*treatment*” was preferred over “*intervention*” in this dissertation, resting on Sampson’s (2017) notification that the former is closely identified with quantitative experimental research designs, whereas the latter is more frequently encountered in qualitative research designs. The treatment in this current quasi-experiment was conducted during the second semester of academic year 2016 – 2017 (February – June) in two *blended (hybrid) classroom courses*, specified by Mayadas, Miller and Sener (2015) as settings, in which online activities intermingle with classroom sessions and replace a significant percentage (about 20-79%) but not all required face-to-face instructional activities. The online activities of applying image-based Web 2.0 technology *CmapTools* with the students assigned to experimental groups at MRU and VIKO were considered **independent variable**, whereas ESP learning achievements defined as the average scores on the participants’ ESP vocabulary achievement tests (post-tests) and ESP reading assignments (posttests) were used as **dependent variables** of the study. The treatment was accomplished in five successive phases: *initiation phase, pre-treatment phase, training phase, treatment phase* and *post-treatment phase*. All the phases and their formats are elaborated on in the following paragraphs.

I. Initiation phase (teacher briefing and training). The initiation phase started at the beginning of January, 2017, in fact much earlier than the actual treatment commenced. Having received the approval of administrations in both institutions to conduct the research, the first meeting with ESP teachers, involved in the treatment, was organized. It aimed at delivering the idea of the current empirical research, communicating its purpose, objectives and design *without* disclosing the research hypotheses. It was also aimed at discussing the roles and potential contribution of teachers in experimental and control groups. The latter agreed to be teaching their regular way, while relying completely on the study syllabus, instructional materials and evaluation strategies with the exception of the placement test which was not originally included in the course syllabi. The dates for administering the placement test in all the groups and method of communication between researchers and participating teachers were also agreed upon. “Developers of technology applications and researchers studying their effects often indicate that teachers need to receive adequate training to use the applications properly” (Agodini, Dynarski, Honey and Levin, 2003, p. 7). Thus, on the very same day the teacher working with experimental groups at VIKO has received initial training, whereby she was introduced to Novakian concept mapping strategy as well as to an image-based Web 2.0 technology *CmapTools*. She stated she was pretty familiar with graphic organizers and concept mapping strategy, however admitted to have never used Web 2.0-supported concept mapping techniques before. Having successfully downloaded the software onto her personal computer, she received explanations on its various features and functions. Consequently, she tried constructing her own cmap. According to Bates (2015), a total of two hours explicit and well organized step-by-step guidance should be sufficient for the novice teachers on how to use any particular tool; the

harder part is always figuring out how best to use the tool educationally. For this reason the second meeting with the teacher was organized in one week's time. Meanwhile she was encouraged to individually study the help files provided at *CmapTools* on their official page¹⁵, the tutorials on working with the tool provided on the *YouTube*¹⁶, as well as several research publications on *CmapTools* and knowledge visualization¹⁷. The second meeting was devoted for reflecting on her experiences and concerns that arouse while brushing skills on working with the tool, studying the course syllabi and deciding which topics or texts may be complemented with *CmapTools* activities. At the close of the initiation phase, the software was installed onto classroom computers intended for the experimental groups upon the approval of administration of both institutions.

II. Pre-treatment phase (administration of placement test) (Week 1). As it was previously mentioned, the general language level of the participants theoretically was B2 based on CEFR as required by their course syllabi, however, scholars within the field (Poedjastutie, 2017; Alhawiti, 2017; Kavaliauskienė & Ashkinazi, 2014; Sinadinović, 2013; Maasum et al., 2012; Martinović & Poljaković, 2010) almost unanimously assert that in real ESP teaching and learning settings in higher education groups of first year university students often exhibit considerable inhomogeneity with regard to their proficiency level. Therefore, to make sure all of the participants (n=107) involved in this current empirical research were literally at the same level of general English proficiency, a placement test was administered among all of them at the very first meeting, after the teachers in each institution and group got acquainted with their students, familiarized them with the objectives and the requirements for the course, presented the evaluation strategy and other necessary information. All the data collection instruments, including the aforementioned placement test, as well as the statistical analyses are described in detail in the *section 4.4* of this chapter.

III. Training phase (Week 1). Novak (1993) cautions that concept mapping, whether in paper-and-pencil or computer-supported formats should begin only after a training process and that teachers need to consider the time and instruction needed to teach students how to concept map. Bates (2014), however, turns our attention, that the use of technology in teaching is a means, not an end. Therefore it is important that students and teachers do not have to spend a great deal of time on learning how to use educational technologies, or on making the technologies work (Bates, 2014, p. 319). Resting on their suggestion that time frame could be one class period, one session was devoted for introducing the participants in experimental groups (n=60) to a Novakian concept mapping strategy with the explanations on when and how it can be used. The students tried to construct their paper-and-pencil concept maps and were given a chance to reflect upon the concept mapping idea and to ask questions. Most important of all, they were taught how to utilize the *CmapTools* software, previously installed onto their classroom computers, addressing the basic functions of the tool, such as:

15 <https://cmap.ihmc.us/docs/cmaptools-help>

16 https://www.youtube.com/watch?v=TMNq_oCFyi8

17 <https://cmap.ihmc.us/publications/research-publications.php>

- creating a new cmap (Figure 13):

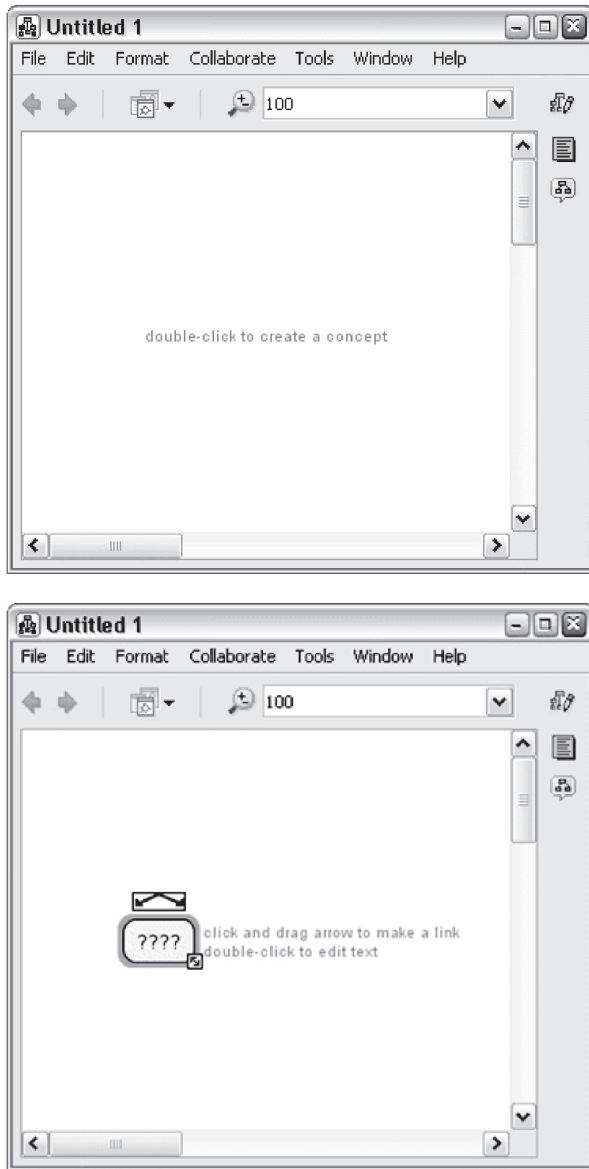


Figure 13. CmapTools working windows. Creating a new cmap.
Retrieved from <https://cmap.ihmc.us/docs/cmaptools-help>

- adding concepts, propositions and inserting linking words to tie the two concepts together (Figure 14)

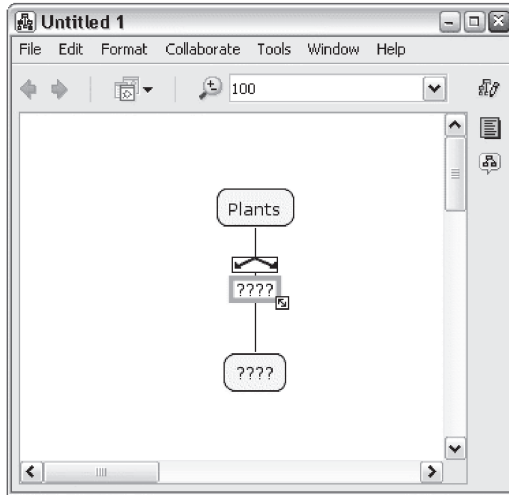


Figure 14. CmapTools working window. Adding concepts, propositions linking words.
Retrieved from <https://cmap.ihmc.us/docs/cmaptools-help>

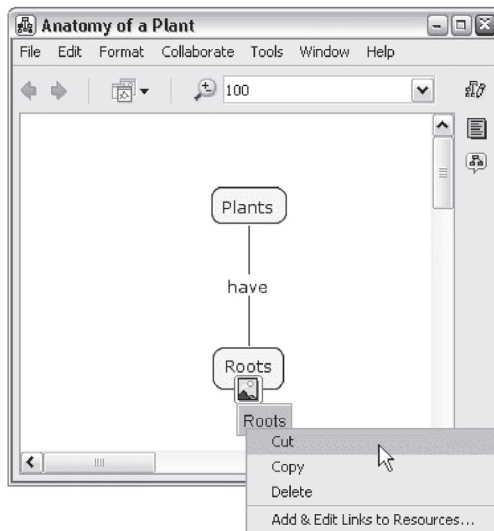


Figure 15. CmapTools working window. Adding resources.
Retrieved from <https://cmap.ihmc.us/docs/cmaptools-help>

- adding resources (images, videos, texts) (*Figure 15*)
- establishing links,
- saving a file,
- creating a new folder,
- exporting the cmap and
- assessing it online, etc.

According to Ellis (2004), when teachers first start using graphics, the learning curve of their students as well as of the teachers themselves is steep. Most of students are not only learning the content depicted on the graphic, they are also learning how to read the graphic itself. To become more familiar with the software, the students were also invited to additionally download it onto their personal computers and to practice it individually before they start their regular sessions. They were also encouraged to study earlier mentioned help files and tutorials on working with *CmapTools*. After assuring that all of the participants in experimental groups brushed up on their skills required for working with the tool, the treatment phase and regular sessions commenced.

IV. The treatment phase (Weeks 2 – 8 and 9 – 15). The treatment was conducted in two formats, involving *in-class* and *out-of-class* activities and an array of techniques with the equivalent amount of work to do both in experimental and control groups.

In-Class Treatment

In majority of *in-class* sessions (if these were not devoted to other syllabus activities, e.g. delivering presentations, accounting for home reading assignments, writing tests, etc.), the students in experimental and control groups would normally be introduced to a new topic or subtopic as indicated in the syllabus and exposed to an appropriate text preceded by a vocabulary list and prereading tasks. After analyzing the vocabulary list, they would usually skim the text and do follow-up activities, aimed at developing their writing, listening, speaking and vocabulary skills, as required by the textbook or Moodle materials. However, the activities in experimental groups additionally involved two concept map building techniques, supported with *CmapTools*:

- The “*fill-in-a-cmap*” technique involved elements of *scaffolding*, by using an expert “skeleton” (teacher-generated) concept maps (see *Chapter 2, Figure 8*), in which certain concepts or some linking words related to previously covered topics/subtopics would be deliberately omitted. As it was already mentioned, purposes behind using teacher-generated maps are numerous. Novak and Cañas are convinced that when learners “put “conceptual meat” on the bones of the skeleton, they are more likely to build a solid, valid body of knowledge”¹⁸. Such maps, according to Moore et al. (2015), “are believed to help students form conceptual understanding by giving cues

¹⁸ <http://cmap.ihmc.us/docs/skeletoncmaps.php>

to the learner on how to meaningfully connect the new information to existing prior knowledge” (Moore et al., 2015, p. 3). Ellis (2004) suggests that the usage of any type of graphic organizers at the beginning of a unit or even a specific lesson can facilitate students’ activation of background knowledge and to create anticipation for future learning. When working on a scaffolded “*fill-in-a-cmaps*” students would be requested to add the missing concepts by either generating them themselves or by selecting them from a teacher provided list, consisting of around 10 text-related concepts and/or several linking words. Usually two or more students would work on the same concept map at the same time in synchronous collaboration, so they could share their knowledge and then compare their product to the expert-generated map, following Gibson’s (2001) suggestion that “in classrooms focusing upon the construction of knowledge, activity and freedom of physical and intellectual movement are shared by all inhabitants of the learning space. Action becomes a requirement for all learners regardless of their status” (Gibson, 2001, p. 43).

Below is an example illustrating a typical scaffolded “*fill-in-a-map*” activity (Figure 16) leveraging a teacher-generated concept map, representing the content of a textbook chapter on classification of law branches intended for students of *Law and Customs Activities* study programme at MRU. After skimming the text they are required to study the teacher-generated “skeleton” map and complete it with missing terms provided in the word bank:

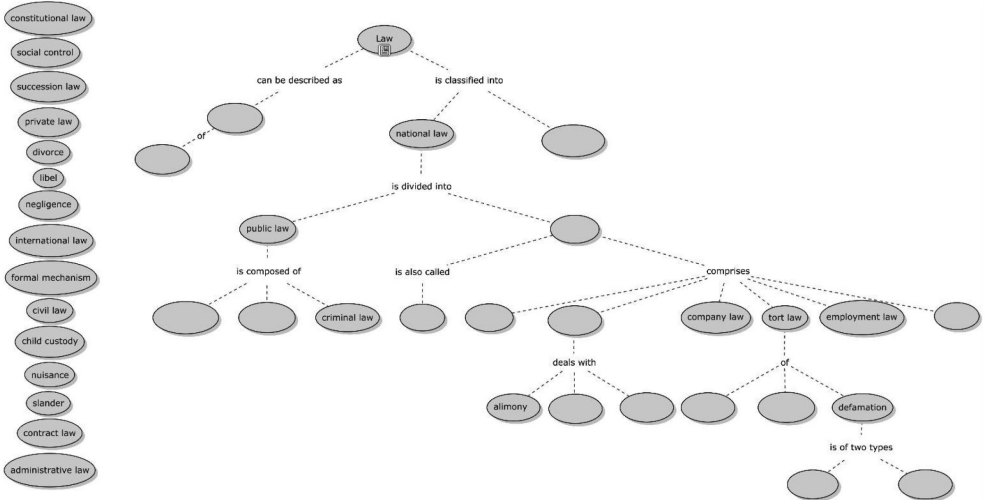


Figure 16. A teacher-generated concept map on the text “Classification of Law branches” to be filled with missing terms by students in experimental groups at MRU.

- The “*create-a-cmap*” technique was basically used to facilitate review of previously taught materials, as suggested by Ellis (2004, p. 5). It used a student-generated concept map, whereby students would be invited to create their own concept map with a unique structure and linking words based on the concepts and terms related to

a previously covered text. Again, they would either generate it by using their own knowledge and understanding of the topic-related text or would make use of a teacher provided word suggester. The students would be also encouraged to complement their maps with associated resources about a particular topic through drag-and-drop operations. The resources would typically include definitions of key concepts, their audio pronunciation provided at *Howjsay* (a free web-based talking dictionary of English pronunciation)¹⁹, in fact any Internet resources that would add to their understanding and knowledge of the topic in question and would facilitate their ESP vocabulary development and retention. When using the “*create-a-map*” technique, students would be invited to make use of the *Spelling Checker* function, designed to find and correct any cumbersome spelling mistakes in cmaps with texts written in English. To produce concept maps which are both readable and aesthetically pleasing, students would use a number of editing and formatting options for the text, objects, lines, font or the whole cmap.

(Week 8). Once half of the topics within the syllabi were covered, the first ESP vocabulary achievement test (previously designed by the teachers at VIKO and MRU) was administered to each student in experimental and control groups; the differences between test achievement scores were analysed and compared between groups in each institution.

(Weeks 9-14). Subsequently, in the following regular *in-class* sessions experimental groups were again exposed to *CmapTools*-supported activities, whereas control group received routine classroom instructions. However, expecting that by this time the learners in experimental groups would have *internalized* the processes of working with the software, this period of treatment applied only the “*create-a-cmap*” technique, whereby after skimming the text, the students would be invited to find the main concepts, subsume them, relate the subconcepts to the main ones, find the cross-links between concepts and individually generate their own concept maps. At the end of the semester (week 14) the second ESP vocabulary achievement test was administered to all the participants of the study and the differences between test achievement scores were again analysed and compared between participating groups.

Out-of-class treatment

Out-of-class activities for ESP students assigned to experimental and control groups were meant for developing their independent reading and vocabulary building skills through the use of so called “home reading” assignments in independent settings. It is a fairly common practice in teaching and learning ESP, as “reading has traditionally been treated as an individual responsibility: a task conducted outside of class” (Swaffar, Arens & Byrnes, 1991, p. 117). Students would be exposed to two teacher selected authentic articles (retrieved from the Internet) related to their study programme and recently studied topics. They would be given an agreed period of time (one month approximately) to read the text

¹⁹ <https://howjsay.com/>

individually at home. On an agreed day (*week 5*) they would make their first oral presentation on the article in class. The presentation would include the information referring to the title and author of the article (if indicated), a summary of the article (retelling), students' evaluation about whether the article was clear and thorough, as well as a glossary of 10 key article related concepts with their definitions and translations in Lithuanian. The only difference in the assignment between the participating groups was that the students in experimental groups were requested to present the essential points, arguments, and findings of the article in the form of a student-generated concept map through the use of *CmapTools* (see some examples of student-generated concept maps in *Annex 7*). Gibson (2006) notices that in technology-enhanced classrooms, “where the emphasis is upon individualized learning in a situated context dealing with authentic problems, it becomes much more difficult for teachers to maintain control of what actually occurs. Here, the teacher does not “teach” or deliver knowledge. The teacher’s role is to assist students to become independent learners” (Gibson, 2001, p. 42). Thus, when working on the first assignment the students received elements of scaffolding through teacher-provided article-related concepts to be included in their map. Working on the second text (due to be accounted on *week 11*), however, was entirely individual, again expecting that by this time the students would have reached mastery on working with *CmapTools* and matured to the degree when they seemed capable to work on their own. Both home reading assignments were assessed and the differences between the scores were analysed and compared between participating groups in each institution. Below are the examples of teacher and student-generated concept maps (*Figures 17 and 18*) visually representing the contents of an authentic text discussing serious security threats encountered by Internet users, read by the students at VIKO:

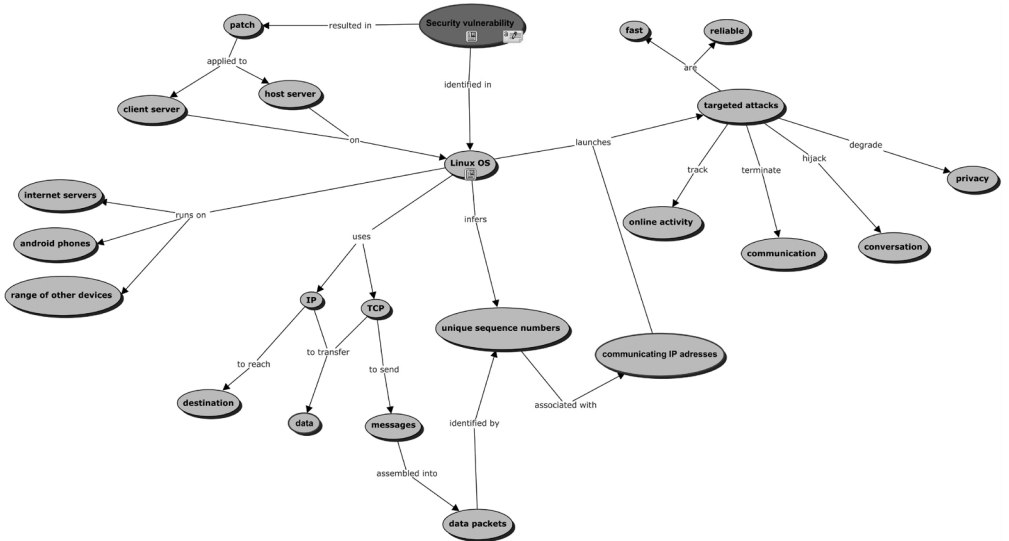


Figure 17. Teacher-generated cmap visualizing the contents of an authentic text 1 at VIKO.

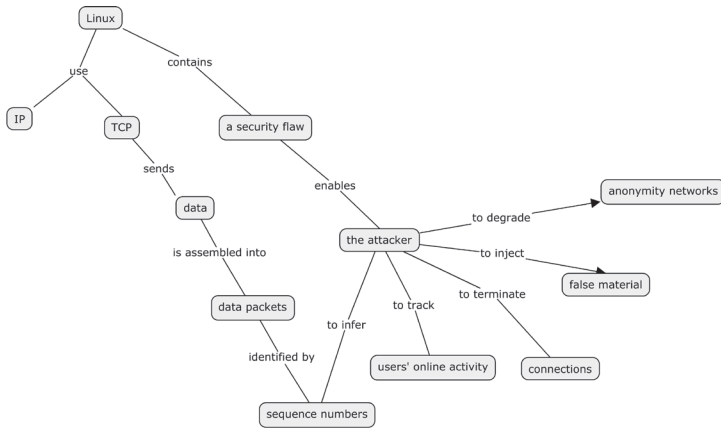


Figure 18. Student-generated cmap visualizing the contents of an authentic text 1 at VIKO.

V. Post-treatment phase (administration of an attitudinal questionnaire) (week 15).

At the end of the semester the participants assigned to experimental groups were administered a structured questionnaire based on the Technology Acceptance Model (Davis, Bagozzi & Warshaw, 1989), to determine what their attitudes and behavioral intentions related to the mandatory Web 2.0 technology *CmapTools* were.

4.4. Research Instruments and Materials of Educational Measurement

Instruments of educational measurement are the means by which quantitative aspects of human behaviour are observed with greater accuracy (Cook, 1951, p. 3). As it was previously mentioned the quantitative data for this current empirical research were collected through the use of the following instruments:

- a placement test (administered to all the research participants);
- two ESP vocabulary achievement tests (posttests) (administered to research participants at MRU);
- two ESP vocabulary achievement tests (posttests) (administered to research participants at VIKO);
- two ESP reading assignments (posttests) (administered to research participants at MRU);
- two ESP reading assignments (posttests) (administered to research participants at VIKO);
- an attitudinal questionnaire (administered to research participants assigned to experimental groups only).

The following sections will discuss each of them in detail.

4.5. Placement Test

Placement tests, according to Alderson (2006), are the instruments designed “to group learners in homogeneous groups in order to have suitable basis for further teaching and learning” (Alderson, 2006, p. 5). Such tests used in language classrooms are usually norm-referenced, are intended to measure students’ global language abilities (e.g. academic listening ability, reading comprehension, general English language proficiency, etc.) and are not geared to the content of a particular class (Holster & Lake, 2012; Bulajeva, 2007; Brown, 1996).

The purpose of the placement test in this research. To determine, whether all the participants (n=107) of this current research were literally at the same level of general English proficiency prior to treatment, a photocopiable *Open Mind Placement Test* (Macmillan Publishers Limited 2015) (see Annex 4) freely available online was applied. It was taken in controlled classroom settings with the administration time of 40 minutes, as suggested by the designers of the test.

The items of the placement test. Test items or questions are defined by Brown (1996) as smallest units producing distinctive and meaningful information on a test or rating scale (Brown, 1996, p. 49). These fall under two formats, described by Fraenkel and Walen and Hyun (2012) and Brown (1996) as *receptive (selective)* and *productive (supply)* response items. Receptive response items present a set of possible responses and require test takers to choose the most appropriate answer rather than to actually produce one. Items in this format include *true or false*, *multiple choice* and *matching tasks*. Meanwhile, productive response items demand the students to produce responses rather than just select them receptively. Examples of productive response items include *fill-in*, *short-response*, and *task* types, such as translating the term.

Within the time allowed, the students taking this current placement test had to answer 90 questions (k=90) which became progressively difficult. All of questions were provided with multiple choice responses, thus fell under the category of *receptive (selective)* response items. Once the administration of placement tests was finished, the participating teachers collected and handed them to this dissertation holder.

Scoring of the placement test. The tests were scored objectively, i.e. “without the use of the examiner’s personal judgement” (Richards & Schmidt, 2002, p. 371), as they originally came with teacher instructions and an answer key (see Annex 5). However the suggested raw score ranges (0 – 10 to 82 and more) equalling general English proficiency levels (beginner to advanced) were additionally converted into derived marks relying on a standard ten-point-scale scheme to aid in ensuing statistical interpretations planned for this current empirical research. The participants were provided feedback as to what their English proficiency level and score was. However, they were assured that once this score was not a composite element of their cumulative assessment, it would not have any effect on their final results, i.e. on their summative evaluation.

4.6. ESP Vocabulary Achievement Tests

Achievement tests are the instruments primarily designed to measure an individual's knowledge, skill or progress in a given area or subject. They are usually criterion-referenced and are used to help the teachers to make classroom-level decisions (Fraenkel, Wallen & Hyun, 2012; Bulajeva, 2007; Brown, 1996).

The purpose of ESP vocabulary achievement posttests in this research. It should be noted that none of the ESP vocabulary achievement posttests were designed for the purposes of this current empirical research. They were all composite elements of students' cumulative assessment and were previously developed by a team of ESP teachers at MRU and VIKO to measure learners' ESP vocabulary knowledge related to particular material covered in the two syllabi within a particular time frame. As a usual thing they were taken in controlled classroom settings with the administration time of 45 minutes and by no means were considered out-of-ordinary events. Rather they could be called unobtrusive measures of observation, as students assigned to experimental groups did not perceive them as components of an educational experiment.

The items of ESP vocabulary achievement posttests. Brown and Hudson (1998) notice that "tests should be made up of a sufficient number of observations, or bits of information, to increase the chances that they will collectively be reliable" (Brown & Hudson, 1998, p. 670). That is why, according to the authors, language tests should usually be made up of 40 – 50 items. Each test used in this research consisted of 50 items ($k=50$) which fell under both aforementioned response formats: *receptive (selective)* and *productive (supply)*, as characterized by Fraenkel, Walen and Hyun (2012) and Brown (1996). All tests included *true or false, multiple choice, matching, fill-in* and *short-response* items.

True or false items, according to Brown (1996) and Brown and Hudson (1998) are usually presented as written statements requiring test takers to respond to them by selecting one of two choices: true or false. "The primary strength of true-false assessments is that they focus on the students' abilities to select the correct answer from two alternatives. Thus true-false assessments provide simple and direct indications of whether a particular point has been understood" (Brown & Hudson, 1998, p. 658).

Multiple choice items are defined by Brown (1996) as items, which are composed of an item stem at the top and of alternative answers (usually, a., b., c., or d.) at the bottom, including a correct answer and the distractors, i.e. the incorrect choices.

Matching items, as explained by Brown (1996) and Brown and Hudson (1998), present the test takers with two sets of words or phrases from which they must identify the matches between the two sets, "which in language testing usually means measuring passive vocabulary knowledge (i.e., the students' ability to match definitions to vocabulary items) (Brown & Hudson, 1998, p. 659).

Fill-in items are those wherein a word or phrase is replaced by a blank in a sentence or longer text, and the student's job is to fill in that missing word or phrase (Brown, 1996, p. 58).

Short-response items are usually questions that the students can answer in a few phrases or sentences (Brown, 1996:59), such as translating the term into English, writing its synonym or definition.

Instructions on taking ESP vocabulary achievement posttests. The instructions on taking the tests were provided by the teachers in each group and each institution.

Assessment of ESP vocabulary achievement posttests. One of the threats which may arise when scoring tests, according to Fraenkel, Wallen and Hyun (2012) is *data collector bias*. The authors warn that there exists the possibility that “the data collector(s) and/or scorer(s) may unconsciously distort the data in such a way as to make certain outcomes (such as support for the hypothesis) more likely” (Fraenkel Wallen & Hyun, 2012, p. 170). To handle *data collector bias* the researchers are suggested to standardize all procedures and “to ensure that the data collectors lack the information they would need to distort results – also known as planned ignorance” (Fraenkel, Walen & Hyun, 2012, p. 171). When assessing ESP vocabulary achievement tests used in this current research, the participating teachers were aware that the test results would be used in statistical interpretations, however they were unaware about the formulations of the hypothesis. All the tests were assessed using a criterial ten-point-scale scheme currently used as a standard grading system at VIKO²⁰ and MRU²¹, as approved by Order No. ISAK-2194 of the Minister of Education and Science of the Republic of Lithuania of 24 July 2008 “*On the Approval of the Assessment System of Learning Outcomes*”²². Table 9 describes the criteria for assessing and scoring ESP achievement tests:

Table 9. *The criteria for assessing and scoring ESP achievement tests*

| Criteria | Score |
|----------------------------|-------|
| 100% – 95 % correct points | 10 |
| 94% – 85 % correct points | 9 |
| 84% – 75% correct points | 8 |
| 74% – 65% correct points | 7 |
| 64% – 55 % correct points | 6 |
| 54% – 45 % correct points | 5 |
| 44% – 35% correct points | 4 |
| 34% – 25 % correct points | 3 |
| 24% – 15 % correct points | 2 |
| 14% – 5 % correct points | 1 |
| 4% – 0 % correct points | 0 |

²⁰ <https://en.viko.lt/facilities-services/grading-system/>

²¹ https://www.mruni.eu/en/current_students/system_of_assessment/

²² https://www.smm.lt/uploads/documents/mokslas_destytojams/Isak_Vert_skale.pdf

4.7. ESP Reading Assignments

The central idea of constructivist learning approach is that each individual constructs knowledge and meaning upon the foundation of previous experiences and his or her awareness of the real world. This means that in constructivist learning environments students should interact with authentic activities and materials representing the real life. This approach to learning, according to Hoover (1996), contrasts strongly with one in which learning is the passive distribution of content from one individual to another, the approach where reception, not construction, is key. Authentic materials are defined by Ellis and Johnson (1996) as “any kind of material taken from the real world and not specifically created for the purpose of language teaching. It can be text, visuals, or audio materials; it can be realia such as tickets, menus, maps, and timetables; or it can be objects such as products, equipment, components, or models. Authentic materials are also any texts written by native English speakers for native English speakers” (Ellis & Johnson, 1996, p. 157). The syllabi of the two study programmes involved in this current research envisage two authentic texts to be read individually by ESP students in out-of-class settings during the semester. These as a rule are authentic articles, retrieved by the teachers from newspapers, magazines or online resources, as it was the case in this current empirical research. Authentic texts may seem quite an odd choice to be used as a data collection instrument, however, as Fraenkel, Wallen and Hyun (2012) notice, in treatment studies, where data are collected over a period of time, it is common to test subjects, and “by *testing*, we mean the use of any form of instrumentation, not just “tests”” (Fraenkel, Wallen & Hyun, 2012, p. 171).

Finding authentic articles which are relevant both to the study programme, ESP students’ needs and their general English proficiency level is always a challenging task. Nuttall (1996) recommends that when considering the selection of a piece of reading, three important criteria should be taken into account to consider it meaningful to students. These include *suitability of content*, *exploitability* and *readability*.

Suitability of content, according to Nuttall (1996), is used to describe whether the selected text seems relevant to students’ needs and whether it is both interesting and motivating. In the author’s opinion, this criterion is the most important out of three, as an enthralling genuine content may provide the readers with the sense that “the language is used for real-life purposes by real people” (Nuttall 1996, p. 172) and thus may encourage students to get deeper into the topic through further extensive reading.

Exploitability, the second criterion, explained by Nuttall (1996), indicates whether the selected reading material can be applied for teaching purposes or not, and whether it develops students’ reading competence and abilities to extract the content from the language that expresses it.

Readability measures the structural and lexical ease with which readers can understand the reading material. It may either support or hinder their cognitive growth.

In this current research the authentic texts were selected by the teachers working in each institution and each study programme during the initiation phase of the treatment. The students assigned in experimental and control groups in each study programme were exposed to the same authentic texts, retrieved from the Internet. The criteria of *suitability*

of content and exploitability were met by selecting articles, the content of which was closely related to the teaching and learning content of both syllabi, hoping that shared background knowledge of the participants as well as topic familiarity will facilitate their reading. The students from *Law and Customs Activities Bachelor's Degree Programme* study programme at MRU were requested to read an article about keeping guard over UK and France Border at Calais Port, often targeted by illegal migrants as well as a text about smuggling of endangered species, especially baby chimpanzees. Their counterparts at VIKO from *Computer Systems Professional Bachelor's Degree Programme* were exposed to an article about security threats encountered by Internet users as well as to a publication on a tool used for creating websites on any subject, allowing web surfers to relax and watch a virtual space automatically fill up with relevant news stories, blog posts, maps and photos. Table 10 below presents the title of each authentic text, used for the “home reading” assignments 1 and 2 in each higher education institution:

Table 10. Authentic texts used for the reading assignments at MRU and VIKO

| | | |
|------|--------|---|
| MRU | Text 1 | Calais Migrants: How is the UK-France Border Policed? ²³ |
| | Text 2 | The Secret Trade in Baby Chimps ²⁴ (first half of the text) |
| VIKO | Text 1 | Serious Security Threat to Many Internet Users Highlighted. Communications Involving Linux and Android Systems can be Compromised Quickly, Easily and from Anywhere ²⁵ |
| | Text 2 | Create your Favourite Website, Automatically ²⁶ |

To shed more light on the quality and appropriateness of the aforementioned authentic reading materials, related to this current research, their *readability* indexes were calculated. Measuring readability levels of ESP texts is quite a common procedure and has been used by a number of foreign researchers: Handayani (2007), Motalebi Moghaddam et al. (2015), Robison, Roden and Szabo (2015), Mohebbi et al. (2016). In this research *readability* computations were necessary for two reasons. First, the research participants were all non-native learners of English, exposed to authentic texts, thus there was a strong possibility that they would simply have a lack of vocabulary to be able to comprehend the texts. Second, although the research participants were at the same general English proficiency level, they were heterogeneous, as far as their study programmes were concerned. Before comparing the reading achievements between the two study programmes via statistical significance tests the researcher had to make sure that the two populations were as equal as possible, hence all the texts they were exposed to had also to be more or less on the same level of readability. The four selected texts were examined by using freely accessed online read-

²³ <https://www.bbc.com/news/uk-33267137>

²⁴ <https://conservationaction.co.za/recent-news/secret-trade-baby-chimps/>

²⁵ <https://www.sciencedaily.com/releases/2016/08/160809143253.htm>

²⁶ <https://www.newscientist.com/article/dn8820-create-your-favourite-website-automatically/>

ability software *Readability Analyzer*²⁷ which scores any sample of a text using six popular readability formulae: *Flesch Reading Ease Score*, *Gunning’s Fog Scale*, *Flesch-Kincaid Grade Level*, *The SMOG Index* and *Fry Readability Grade Level*. These formulae are most commonly applied to estimate the average grade level, reading age and text difficulty of any sample text. The following paragraphs of this section provide general information on each of the formula and explain the results of the data analysis in detail.

The Flesch Reading Ease Score, which is based on a 0 – 100 scale, is probably one of the easiest and most commonly used methods to determine the grade-level of the reader. A low output score indicates that the text may demand efforts to read and comprehend. The higher the score, the easier the text is to read and understand. The information provided on their official page states that “if we were to draw a conclusion from the *Flesch Reading Ease Formula*, then the best text should contain shorter sentences and words. The score between 60 and 70 is largely considered acceptable” (*The Flesch Reading Ease Readability Formula*, 2017). *The Flesch Reading Ease Score* interpretation (*Table 11*) displayed below presents the criteria to determine the ease of readability in a piece of writing:

Table 11. *The Flesch Reading Ease Score Interpretation Table*²⁸

| | |
|----------|------------------|
| 90 – 100 | Very easy |
| 80 – 89 | Easy |
| 70 – 79 | Fairly Easy |
| 60 – 69 | Standard |
| 50 – 59 | Fairly difficult |
| 30 – 49 | Difficult |
| 0 – 29 | Very confusing |

Gunning’s Fog Scale (or FOG), another widely used formula, “relies on sentence length and the number of polysyllabic words, i.e. words with three or more syllables” (Rezaee, Norouzi, 2011:1006). It suggests that “short sentences written in plain English achieve a better score than long sentences written in complicated language. The ideal score for readability with the *FOG* index is 7 or 8. Anything above 12 is too hard for most people to read. For instance, *The Bible*, Shakespeare and Mark Twain have *Fog Indexes* of around 6. The leading magazines, like *Time*, *Newsweek*, and *the Wall Street Journal* average around 11” (*The Gunning’s Fog Index (or FOG) Readability Formula*, 2017).

Flesch-Kincaid Grade Level originally formulated for U.S. Navy purposes, is considered best suited in the field of education. It calculates the average number of words used per sentence as well as the average number of syllables per word. A score achieved by this formula indicates a U.S. school grade level. For example, “a score of 9.3 means that a ninth grader would be able to read the document. This score makes it easier for teachers, parents, librar-

27 <https://datayze.com/readability-analyzer.php>

28 <http://www.readabilityformulas.com/flesch-reading-ease-readability-formula.php>

ians, and others to judge the readability level of various books and texts for the students” (*The Flesch Grade Level Readability Formula*, 2017).

SMOG Readability Formula estimates the years of education a person needs to understand a written text, i.e., it also outputs a U.S. school grade level; this indicates the average student in that grade level can read the text. For example, a score of 7.4 indicates that the text is understood by an average student in 7th grade.

Dale-Chall is one of the most accurate readability metrics. Rather than rely on syllable counts to identify difficult words, *Dale-Chall* incorporates a list of 3,000 easy words which were understood by 80% of fourth-grade pupils. The readability score is then computed based on how many words present in the passage are not in the list of easy words. A score of 4.9 or lower indicates the passage is easily readable by the average 4th grade. Scores between 9.0 and 9.9 indicate the passage is at a college level of readability (<https://datayze.com/readability-analyzer.php>)

Fry Readability Grade Level was developed by developed by Edward Fry and is often selected for its simplicity and accuracy. The graph has two axes: the average number of syllables (x-axis) and the average number of sentences (y-axis) per hundred words. Passages of text that are at least one hundred words long can be plotted on the graph to find the corresponding grade level. (<https://datayze.com/readability-analyzer.php>)

To measure the readability of the four authentic reading texts used as instruments in this current research, two most commonly used readability formulae were applied. *The Flesch Reading Ease Score* and *Gunning’s Fog Scale* were selected as they “presume the correlation between comprehension difficulty and syntactic complexity” (Lin et al., 2008, p. 2). Placing the selected authentic texts in these formulae has yielded the results which are presented in *Tables 12* and *13* below:

Table 12. *The readability indexes of authentic texts selected for ESP students at MRU*

| <i>Text</i> | <i>Flesch Reading Ease Score</i> | <i>Gunning’s Fog Scale</i> |
|-------------|----------------------------------|----------------------------|
| 1 | 52.30 | 10.70 |
| 2 | 66.07 | 9.4 |

Table 13. *The readability indexes of authentic texts selected for ESP students at VIKO*

| <i>Text</i> | <i>Flesch Reading Ease Score</i> | <i>Gunning’s Fog Scale</i> |
|-------------|----------------------------------|----------------------------|
| 1 | 48.28 | 10.9 |
| 2 | 50.01 | 9.64 |

Comparing the resulted scores with the *Flesch Reading Ease Score* interpretation table, it is obvious that all the texts fall within fairly difficult or standard level of readability which are very much alike in each participating institution. The scores for readability with the *Gunning’s Fog Scale* index, relying on sentence length and the number of polysyllabic words, are also fairly similar.

4.8. Technology Acceptance Questionnaire

The purpose of the questionnaire in this research. Technology acceptance Model (TAM) (Davis, Bagozzi & Warshaw, 1989), discussed in *Chapter 3* was employed to answer the third question of this research **RQ₃**, *what factors influence ESP students' acceptance of a Web 2.0 technology CmapTools in ESP studies in higher education ESP?* through the use of a survey and a structured paper-based attitudinal questionnaire “*Mykolo Romerio universiteto ir Vilniaus kolegijos studentų nuomonė apie profesinės anglų kalbos dalyko studijose taikytą antrosios kartos saityno įrankį CmapTools*”/ “*Students' Attitudes towards the Usage of an Educational Web 2.0 Tool CmapTools for Learning ESP at Mykolas Romeris University and Vilniaus kolegija/ University of Applied Sciences*”. As it was mentioned before, the administration of the questionnaire was considered the fifth and the last phase of the treatment in the educational experiment (week 15). The sections below will introduce its participants, data collection procedures, the design of the questionnaire and the related hypotheses.

4.8.1. Research Sample and Participants

The sample of this survey was made up of 60 ESP students selected from a population of 107 participants of the earlier discussed experimental research, employing a static-group comparison design (Campbell & Stanley, 1963; Cook & Campbell, 1979; Martella et al., 2013), and conducted at two higher education institutions in Lithuania: MRU and VIKO within the period between January 2017 and June 2017. For this fairly narrow, context-specific case a purposive sampling strategy was employed. This is in accord with Babbie (2011) and Cohen, Manion and Morrison (2007). According to Babbie (2011), “it as a type of non-probability sampling in which the units to be observed are selected on the basis of the researcher’s judgment about which ones will be the most useful or representative” (Babbie, 2011, p. 207). Cohen, Manion and Morrison (2007) state that in certain cases “there is little benefit in seeking a random sample when most of the random sample may be largely ignorant of particular issues and unable to comment on matters of interest to the researcher, in which case a purposive sample is vital. Though they may not be representative and their comments may not be generalizable, this is not the primary concern in such sampling; rather the concern is to acquire in-depth information from those who are in a position to give it” (Cohen, Manion & Morrison, 2007, p. 115). Thus only “knowledgeable people”, i.e. only students (n=60) assigned to experimental groups in both higher education institutions, who were assumed to have in-depth knowledge about and experience with an image-based *Web 2.0* tool *CmapTools*, served as participants of the survey and the respondents to a structured paper-based questionnaire, utilized as a data collection instrument.

4.8.2. Research Data Collection Procedure

The questionnaires were presented to the participants through the use of direct administration method. According to Fraenkel, Wallen and Hyun (2012), this method can be used in cases when a researcher has access to all (or the majority) of the members of a

particular group in one place, thus examples would frequently include giving questionnaires to students to complete in their classrooms. The chief advantage of this approach, as noticed by the authors, “is the high rate of response- often close to 100 percent (usually in a single setting). Other advantages include a generally low cost factor, plus the fact that the researcher has an opportunity to explain the study and answer any questions that the respondents may have before they complete the questionnaire” (Fraenkel, Wallen & Hyun, 2012, p. 396).

The questionnaires for this current research were administered to all students assigned to experimental groups in both institutions at the end of the semester and the treatment, during the last seminar of their ESP course. This was physically done by the researcher at Mykolas Romeris University and the ESP teacher at VIKO. As the 9% (n=5) dropout rate in the experimental groups was documented at the end of the semester, 55 questionnaires were administered and received upon completion with a 100% return. Two questionnaires, however, were discarded due to being incomplete; consequently 53 usable data responses were yielded for subsequent statistical analysis.

4.8.3. Research Ethics

Before filling the questionnaire in, participants were briefed by both teachers about the purpose of the survey and were given instructions on completing the form. Relying on the principles of anonymity, confidentiality and privacy explicit assurance was given that the collected data would never be linked back to research participants. The students were also instructed that no highly personal issues or potentially sensitive matters would be explored, and they were free to withdraw from the survey without providing any reasons if at any time they became uncomfortable. Having completed the questionnaires, all the respondents were given thanks and provided contacts of the researcher for pertinent questions about the study.

4.8.4. Design of the Questionnaire

The questionnaire “*Mykolo Romerio universiteto ir Vilniaus kolegijos studentų nuomonė apie profesinės anglų kalbos dalyko studijose taikytą antrosios kartos saityno įrankį CmapTools*”/“*Students’ Attitudes towards the Usage of an Educational Web 2.0 Tool CmapTools for learning ESP at Mykolas Romeris University and Vilniaus kolegija/ University of Applied Sciences*” (see Annex 6) consisted of three main sections and incorporated a total of 27 close-ended items.

Section 1 introduced the purpose of the questionnaire and assisted in gaining the participants’ involvement into the survey. It invited them to express their attitudes towards an image-based Web 2.0 tool *CmapTools* used in their ESP course throughout the semester. Confidentiality issues and instructions on how to fill the questionnaire in were also provided here.

Section 2 aimed at identifying basic individual and contextual attributes of the participants to gain better insights on the target audience. It contained 8 items, including the re-

spondents' *higher education institution, their gender, native language, the language used for online activities, self-reported proficiency in general English, self-reported proficiency in using Web 2.0 technologies, self-reported proficiency in using CmapTools and self-reported attendance rate of ESP classes.* These items can be grouped into four main categories (Table 15):

Table 15. *Individual and contextual attributes of the participants of the survey*

| | |
|----------------------------|---|
| Personality related | 1) Gender |
| Institution related | 2) Higher education institution |
| | 3) Self-reported attendance rate of ESP classes |
| Technology related | 4) Self-reported experience in using Web 2.0 technologies |
| | 5) Self-reported experience in using CmapTools |
| Language related | 6) Native language |
| | 7) The language used for online activities |
| | 8) Self-reported proficiency in general English |

The category and number of items in this section was carefully pre-empted resting on TAM related literature review and served as moderating variables in the analysis of the proposed TAM model. Any personal information beyond the scope of the research was considered irrelevant. The answer format in this section employed both dichotomous and interval scales depending on the nature of the question. (A summary profile of the participants is depicted in Table 16).

Table 16. *A summary profile of the participants to the survey*

| Higher Education Institution | Students (n) | Male Students (n) | Female Students (n) |
|-------------------------------------|---------------------|--------------------------|----------------------------|
| MRU | 32 | | |
| VIKO | 21 | 33 | 20 |
| Both institutions | 53 | | 53 |

Section 3 was based on Technology Acceptance Model (TAM) developed by Davis, Bagozzi and Warshaw (1989). To ensure content validity, a validated scale from previous research was adapted from Arshad, Tan and Hashim's (2012) study "*Tertiary Students' Application of Web 2.0 for English Language Learning*" and included in this section. It is noteworthy that this part of the questionnaire was pretested for relevance, accuracy, completeness and deficiencies in a pilot study "*University students' Attitudes towards the Usage of Web 2.0 Tools for Learning ESP. A Preliminary Investigation*" conducted by the author of the thesis at Mykolas Romeris University in 2014 (see section 4.1 of this current chapter). However, to fit the specific context of *CmapTools* usage in blended ESP studies in two higher education institutions in Lithuania, the necessary wording changes were made by removing

focus from Web 2.0 tools in general to *CmapTools* in particular. Moreover, as *CmapTools* was considered a mandatory tool, rather than optional one, a decision was made to discard TAM construct *Actual Usage*, incorporating 2 items, as it appeared beyond the scope of this research. Consequently the revised scale evolved in its final form incorporating 5 core TAM related constructs and 18 close-ended items aimed at measuring ESP students' attitudes towards an image-based Web 2.0 tool *CmapTools* in accordance with a revised TAM and identifying what their behavioural intentions regarding the tool were:

- Construct 1: *awareness* (as an additional factor) (3 items),
- Construct 2: *perceived usefulness* (6 items),
- Construct 3: *perceived ease of use* (4 items),
- Construct 4: *attitude toward usage* (3 items),
- Construct 5: *behavioural intention to use* (2 items).

The analysis of prior empirical work within the sphere of ESP show that some other authors (e.g. Alharbi and Drew, 2014) use a similar if not identical number of items to measure acceptance of Web 2.0 technologies in language studies. To evaluate the internal consistency of the 18 statement items that made up the theoretical part of this questionnaire, *Cronbach's alpha* reliability coefficient was computed. According to rules of thumb provided by Nunnally (1967), George and Mallery (2003) and Pukėnas (2009), a *Cronbach alpha* of 0.7 is considered an accepted standard for reliability. The data in *Table 17* demonstrate that each of the five TAM-related constructs produced values ranging from good to very high, all exceeding the value of 0.7, and thus indicating a strong instrument internal consistency.

Table 17. *Cronbach Alpha reliability coefficient of the questionnaire items related to TAM*

| TAM-Related Construct | Number of Items (n) | Cronbach Alpha value | Internal Consistency |
|-------------------------------|----------------------------|-----------------------------|-----------------------------|
| <i>Awareness</i> | 3 | 0.802 | High |
| <i>Perceived Usefulness</i> | 6 | 0.704 | Good |
| <i>Perceived Ease of Use</i> | 4 | 0.842 | High |
| <i>Attitude towards Usage</i> | 3 | 0.856 | High |
| <i>Behavioral Intention</i> | 2 | 0.856 | very high |

This part of the questionnaire used a 5-point *Likert* scale response format, where 5=*strongly agree*, 4=*agree*, 3=*neutral*, 2=*disagree* and 1=*strongly disagree*. In the section that follows, each of the TAM construct is operationalized to fit the context of this current research.

4.8.5. Operationalisation of TAM Constructs

According to TAM proposed by Davis, Bagozzi and Warshaw (1989), actual usage of a given technology is determined by potential user's behavioral intention to use it, which in turn is jointly determined by his or her overall attitude towards the technology and perceptions regarding its usefulness. Attitude, in turn, is a function of two major beliefs: perceived usefulness and perceived ease of use. TAM also theorizes that these two major beliefs are affected by external variables. The latter may vary depending on a technology analysed.

In this research context *perceived usefulness* is defined as the degree to which an ESP student believes that using *CmapTools* would enhance his or her ESP learning performance.

Perceived ease of use is referred to as the degree to which an ESP student believes that using *CmapTools* would be free of his or her effort.

Attitude towards using is defined as the degree of evaluative effect that an ESP student associates with using *CmapTools* for learning ESP.

Behavioural intention in this current research setting it is operationalized as the degree to which students have formulated conscious plans to perform or not to perform ESP learning-related activities using *CmapTools*.

Actual system is defined as an ESP student's actual direct usage of *CmapTools* in the context of ESP studies.

Nevertheless, it is important to emphasize that the constructs of behavioural intention and actual system use have to be treated with cautiousness, as both of them can interchangeably be used to define technology acceptance. To illustrate, Keller (2007) and Sun and Zhang (2005) notice that some scholars define technology acceptance as user's behavioral intention to use a technology, while others define it as the actual use of a technology. Literature analysis shows that the difference between the two notions primarily lies in the type of a setting where an innovative technology is being utilized, or as Rogers (1983) suggests an innovation-decision continuum. According to Rogers there are three types of innovation-decisions: 1) *optional*, when decisions to adopt or reject an innovation are made by an individual, 2) *collective*, when choices are made by consensus among the members of system and 3) *authority* when choices to adopt or reject an innovation are made by a relatively few individuals in a system who possess power, status or technical expertise. Keller (2007) states that in research settings where the usage of the information technology is mandatory, i.e. where innovation decisions are authority made, the behavioural intention constitutes the dependent variable. However, when the innovation-decision and the usage of information technology are optional, the actual system use frequently is measured as the dependent variable of the study. Given that in this current research educational Web 2.0 tool *CmapTools* was applied in a mandatory usage context, a decision was made to basically concentrate on the construct of *behavioural intention*, but to eliminate the construct of *actual system use* from the suggested TAM model.

However, TAM model was extended to incorporate an additional factor of *CmapTools awareness*, as suggested by Arshad et al. (2012). The reason to integrate an additional factor stemmed from the need to deepen the understanding of the factors influencing acceptance of Web 2.0 technologies in the context of ESP studies. Moreover, TAM related literature

review in the sphere of ESP studies in higher education also suggests that there exist quite a number of examples of research (Madini & Alshaiki, 2017; Van de Bogard & Wichadee, 2015; Yu-Li, 2014; Afshari et al., 2013; Tajuddin et al., 2012; Arshad et al., 2012; etc.) employing extended versions of TAM to examine technology acceptance in a variety of ESP contexts. It should be noted, however, that only in the study carried out by Arshad et al. (2012) awareness was incorporated into the suggested model of TAM.

4.8.6. Operationalisation of Additional Construct of Awareness

The concept of *awareness* within technology acceptance and adoption literature first emerged in the innovation-diffusion theory developed by Rogers (1983). Rogers (1983) specified the innovation-diffusion process as “an uncertainty reduction process” and suggested that within the process of making a decision to either adopt or to reject a technology, a person has to pass through several stages including first knowledge or awareness about an innovation, attitude formation or persuasion, decision to adopt or reject an innovation, implementation of the new idea and confirmation of this decision. During the knowledge or awareness stage a person is exposed to the innovation’s existence and gains certain understanding of how it functions. “Questions such as “What is the innovation?” “How does it work?” and “Why does it work?” are the main concerns of an individual, once he or she is aware that an innovation exists” (Rogers, 1983, p. 167). According to Rogers (1983), a person cannot have consistent and favourable attitudes and beliefs about ideas that he or she has not previously encountered, therefore awareness acts as an antecedent for attitude formation or persuasion stage within the innovation-diffusion process.

Using the same logic, we can presume that once integrated into the TAM model, *awareness* could equally act as antecedent for the construct of *attitude* towards technology which in turn exerts influence on *behavioural intention* to use it. This hypothetical presumption is supported by the findings of Ntshakala (2016). Having reviewed 9 existing technology diffusion and adoption theories and models, she made a further differentiation between the theories with and without the awareness construct. The findings suggest that only one technology adoption model, namely *the Burkman’s User Orientated Instructional Design model (UOID)* appeared to have neither implicit nor explicit inclusion of *awareness* construct. The two classical models, i.e the above-mentioned Roger’s *Innovation-Diffusion Theory* and *Concerns-Based Adoption Model (CBAM)* were found to explicitly contain the *awareness* construct. Even though *awareness* is absent in the remaining six models, including *the Theory of Reasoned Action (TRA)*, *the Theory of Planned Behaviour (TPB)*, *the Decomposed Theory of Planned Behaviour (DTPB)*, *the Technology Acceptance Model (TAM)*, *the Extended Technology Acceptance Model (TAM 2)* and *the Unified Theory of Acceptance and Use of Technology (UTAUT)*, their constructs may be connected to *awareness* implicitly. Discussing the *Technology acceptance model* (Davis, Bagozzi & Warshaw, 1989), which served as theoretical framework of this current research, Ntshakala (2016) suggests that *actual system use* is the only construct from TAM that does not have any relationship with the *awareness* construct. However, *awareness* is a mediator of *perceived usefulness*, *perceived ease of use* and *behavioural intention* when they have a relationship with other constructs.

Moreover, “*behavioural intention is a consequence of awareness and perceived usefulness is an antecedent of awareness*” (Ntshakala, 2016, p. 25).

Multiple definitions illustrating the concepts of awareness have been found through the literature. For example, Cambridge Dictionary provides the following definition of awareness: “knowledge that something exists, or understanding of a situation or subject at the present time based on information or experience”. Arshad et al., (2012) defined awareness as “the state or ability to perceive, to feel, or to be conscious of events or object” (Arshad et al., 2012, p. 26). Awareness is also defined as the extent to which a target population is conscious of an innovation and formulates a general perception of what it entails. Resting on various definitions of awareness, the current study narrowed the existing definition and operationalized the construct of **awareness** as ESP students’ knowledge and familiarity of *CmapTools* as a learning tool within ESP classroom.

4.8.7. Operationalisation of Individual and Context Specific Variables

Individual differences are usually user factors which include demographic and situational variables that account for differences attributable to circumstances such as experience and training (Agarwal & Prasad, 1999). As it was repeatedly mentioned, these are believed to exert influence on a person’s perceptions regarding the usefulness and ease of use of a given technology. These two major determinants of TAM jointly exert influence on person’s attitude and behavioral intention to use the system. Returning to the analysis of ESP-related research presented in *Chapter 3*, we may observe that there is not enough empirical evidence to which of the variables may influence students’ acceptance of Web 2.0 technologies used in ESP studies in higher education: they were either neglected by the authors, or in most of the cases appeared to have no relationship with any construct of TAM. For example, when exploring ESP learners’ perceptions and acceptance of Google Sites as a course management system in a blended learning EFL context, Gamble (2017) did not discuss any single individual or context specific variable. These variables were equally ignored by Van de Bogard and Wichadee (2015), in their study exploring students’ intention to use LINE for academic purposes. The findings are consistent with the insights of Davis (1985), Venkatesh (2000), Sun and Zhang (2005), Marangunić and Granić (2014), who notice that moderating factors are for some reason neglected in many studies related to technology acceptance.

Several reviewed studies included a number external factors, however most of them proved to have no relationship with any constructs of TAM. The examples can be ESP students’ *gender, age, ethnicity, frequency of using Web 2.0 technologies and study programme*, discussed by Arshad et al. (2012) in their study on the acceptance of different Web 2.0 technologies in EFL course, or the *academic year and prior English language competency*, included by Yu-Li (2014) in his study on the acceptance of Virtual Reality learning environment. It should be noted, however, that *frequency of Internet usage, students’ mobile phone, Internet capability and home Internet usage frequency* were found to be related to the construct of *perceived ease of use* by the same author, still this empirical evidence is clearly insufficient to explain the role of external variables on the acceptance of Web 2.0 technologies within ESP context.

Even if we turn to seminal TAM related literature (Davis, 1985; Davis, Bagozzi & Warshaw, 1989), we may observe that the role of external variables is not explicitly discussed. Venkatesh et al. (2003) incorporated only four in their study using the *Unified Theory of Acceptance and Use of Technology* (UTAUT). These were *experience, voluntariness, gender* and *age*. All of them were thought over as seemingly possible to be included into TAM to be proposed for this current research. However, bearing in mind the mandatory use of *CmapTools* and the fact that the participants were homogeneous concerning their age, for this current empirical research the decision was made to “borrow” the variables of gender and Web 2.0-related experience. As far as experience is concerned, the students had very similar experience and knowledge backgrounds concerning the usage of *CmapTools*, however, their self-evaluations regarding their ability to use Web 2.0 technologies might have differed. Alongside with the two variables “borrowed” from Venkatesh et al.’s study, namely, *gender* and self-evaluations regarding *the experience in using* Web 2.0 tools, five independent moderating individual and contextual factors were utilized in this current analysis, including *higher education institution of the respondents, their native language, the language most frequently used online, self-evaluations of their English language level and the attendance rate of ESP classes*.

In the following section theoretical arguments for the proposed relationships for the extended TAM will be developed and relevant hypotheses will be formulated. It will begin with a discussion of the probable interrelationships between core constructs of TAM, will presuppose the role of additional external determinant of awareness and eventually will move to examining the influence of individual and context specific factors on the acceptance of the tool. The abbreviations of PU, PEOU, A, BI and AW will be used to represent the variables of *perceived usefulness, perceived ease of use, attitude, behavioural intention* and *awareness*.

4.8.8. Hypotheses Related to Interdependency of TAM Variables

The postulated relationship between two (or more) concepts is called a *theoretical hypothesis*. In Technology Acceptance Model (TAM) “perceived ease of use is hypothesized to have a significant direct effect on perceived usefulness” (Davis, 1985, p. 26). In other words, the less complicated a user finds technology-related activities, the more likely he or she will consider a technology to be useful. *Perceived ease of use* has shown a significant causal effect on *perceived usefulness* in primary sources (Davis, 1985; Davis, Bagozzi & Warshaw, 1989; Venkatesh et al., 2003). This positive effect is also confirmed by several ESP related studies (Gamble, 2017; Van de Bogard & Wichadee, 2015; Afshari et al., 2013; Tajuddin et al., 2012), therefore the following hypothesis is proposed:

H₁: perceived ease of use of CmapTools (PEOU) has significant positive effect on perceived usefulness (PU) of CmapTools.

TAM suggests that “prospective user’s overall *attitude* toward using a given system is hypothesized to be a major determinant of whether or not he or she actually uses it. Attitude in turn is a function of two beliefs: *perceived usefulness* and *perceived ease of use* (Davis, 1993, p.

475). In studies relating to Web 2.0-enhanced ESP, several authors (e.g. Afshari et al., 2013) have also found that *perceived ease of use* significantly determines students' *attitude* towards educational technology. In accordance with these arguments, it is proposed that:

H₂: perceived ease of use of CmapTools (PEOU) has a significant positive effect on ESP students' attitudes (A) towards using CmapTools.

Several studies in ESP sphere (Gamble, 2017; Afshari et al., 2013) have found a positive relationship between *perceived usefulness* (PU) and students' *attitudes* (A) towards the new technology. Hence, it is proposed that:

H₃: perceived usefulness of CmapTools (PU) has a significant positive effect on ESP students' attitudes (A) towards using CmapTools.

In general, *perceived usefulness* (PU) remains a significant determinant of *behavioural intention* (BI) over time (Davis et al., 1989; Venkatesh & Davis, 2000; Venkatesh, Morris & Ackerman, 2000; Venkatesh et al., 2003). Previous studies in ESP sphere (Gamble, 2017; Van de Bogard & Wichadee, 2015) have also confirmed a positive relationship between PU and BI. Drawing on past findings and bearing in mind the mandatory nature of *CmapTools* usage within this context of this current research, the following hypothesis was proposed:

H₄: perceived usefulness of CmapTools (PU) has a significant positive effect on ESP students' behavioural intention to use CmapTools (BI).

Several research studies related to acceptance of new technologies in ESP studies in tertiary education (Van de Bogard & Wichadee, 2015; Tajuddin et al., 2012) have confirmed a positive impact of students' *attitude* towards technologies (A) on their *behavioural intention* to use them in the future (BI), therefore it is suggested that:

H₅: ESP students' attitude towards using CmapTools (A) has a significant positive effect on their intention to use CmapTools (BI).

4.8.9. Hypotheses Predicting the Effect of Additional Variable of Awareness

If the abundant empirical evidence suggests the relationships between main constructs of TAM, not much empirical support could be found for an additional construct of *awareness* as a predictor of behavioural intention to use technologies, especially within the field of ESP. In fact, only one study conducted within the sphere ESP (Arshad et al., 2012) was discovered with *awareness* incorporated as an additional factor in TAM model. The findings of this study indicate that no significant relation between the constructs of *awareness* and *behavioural intention* was detected. Nevertheless, the few studies predicting the acceptance of e-governance and e-banking (Alzubi et al., 2017; Charbaji & Mikdashi, 2003) show that such relationships exist. Moreover, they are significant. To illustrate, Charbaji and Mikdashi (2003) empirically

investigated the influencing e-government adoption factors among Lebanese postgraduate MBA students. Factors included in their study were knowledge, awareness, and feelings. Findings of the study indicated that awareness significantly influenced behavioural intention to use e-government. Likewise, in their study based on the TAM model with an attempt to provide prediction on utilizing internet banking in Yemen, Alzubi et al. (2017) discovered that the factor of awareness had a significant positive relationship with behavioural intention to use internet banking. Moreover, the previously discussed analysis of 9 existing technology acceptance theories with and without the construct of awareness, conducted by Ntshakala (2016) also proposes that within TAM “behavioural intention is a consequence of awareness” (Ntshakala, 2016, p. 25). The importance of awareness of a digital technology is echoed by Bates (2015), who proposes that “the more you know about it the better you are likely to use it” (Bates, 2015, p. 452). Based on these insights, we can suggest that:

H₆: there is significant relationship between ESP students’ awareness of CmapTools (AW) and their behavioural intention (BI) to use it.

According to Rogers (1983), for some individuals awareness of the technology is enough to make a decision to adopt it. He calls these individuals “early adopters” and states that they are able to quickly evaluate the technology and decide whether any benefit will be gained from it or not, in other words whether it is worth to accept or not. However, the majority of users take a slower route to accept it as they want to make sure they will be able to learn to use the technology and grasp its benefits, i.e. to perceive its ease of use and its usefulness. As noticed by Rogers (1983), the more knowledge they have about the technology and its aims, the more likely they will form a positive attitude towards the technology. The findings of the previously discussed study conducted by Alzubi et al. (2017) propose that awareness had a relationship with two core predictors of TAM: *perceived usefulness* and *perceived ease of use* which in turn affected *intention to use* internet banking. Likewise, Ntshakala (2016) also suggests that within TAM *awareness* is a mediator of *perceived usefulness* and *perceived ease of use*. Based on this discussion two more hypotheses are proposed:

H₇: ESP students’ awareness of CmapTools (AW) mediates the relationship between perceived ease of use of CmapTools (PEU) and attitude towards CmapTools (A) and

H₈: ESP students’ awareness of CmapTools (AW) mediates the relationship between perceived usefulness of CmapTools (PU) and attitude towards CmapTools (A).

4.8.10. Hypotheses Predicting the Effect of Individual and Context Specific Variables

1) Higher education institution. Orlikowski (2000) suggested that individuals’ usage behaviour is deeply influenced by the institutional context where that behaviour is enacted. Similarly, Lewis et al. (2003) argued that an individual’s beliefs pertaining to the specific technology are formed by the influence emanating from the institutional and social con-

text. As it was repeatedly mentioned before, this current empirical research was carried out with participating first year full-time undergraduate students enrolled in a compulsory ESP course in two different higher education institutions in Lithuania. Efforts were made to keep the research settings as natural as possible and to create equal treatment conditions for the participants in treatment groups within each institution by using the same methodology of utilizing *CmapTools*. However, the mere fact that it was applied in diverse settings (different institutions and different study programs) gave rise to a precondition that the differences in respondents' opinions and evaluations regarding *CmapTools* might arise due to the fact that they came from different academic backgrounds. It should be noted however, that variable of higher education institution should be treated as extraneous. It was incorporated only for the sake of this current narrow context-specific empirical research and findings regarding its moderating effect will not be proposed as applicable for other research settings. It is suggested that:

H_{9A}: the variable of higher education institution has a significant relationship with perceived usefulness of CmapTools (PU)

H_{10A}: the variable of higher education institution has a relationship with perceived ease of use of CmapTools (PEOU).

2) **Gender.** The decision to include the independent variable of gender in the analysis of suggested TAM model is not accidental. Prior research, based on TAM (Venkatesh & Morris, 2000; Venkatesh, Morris & Ackerman, 2000; Wang et al., 2009; Tarhini et al., 2014) provide ground to expect gender differences within the decision-making process regarding the acceptance of a new technology. According to Venkatesh and Morris (2000), for example, women and men differ in terms of information processing, using different socially constructed cognitive structures. In their famous article “*Why Don't Men Ever Stop to Ask for Directions? Gender, Social Influence, and Their Role in Technology Acceptance and Usage Behavior*” these authors discovered that “men considered perceived usefulness to a greater extent than women in making their decisions regarding the use of a new technology” (Venkatesh & Morris, 2000, p. 128). However, discrepancies in prior ESP research findings may be observed as far as the moderating effect of gender is concerned. For example, the findings of Arshad et al. (2012) claim no significant causal effects related to masculinity-femininity. Other available studies (Madini & Alshaiki, 2017; Gamble, 2017; Tajuddin et al., 2017; Van de Bogard & Wichadee, 2015; Yu-Li, 2014; Afshari et al., 2013) tend to overlook the role of gender on accepting a new technology within the sphere of ESP and require more profound investigation. For this reason we can suggest and expect that:

H_{9B}: the variable of gender has a significant relationship with perceived usefulness of CmapTools (PU)

H_{10B}: the variable of gender has a significant relationship with perceived ease of use of CmapTools (PEOU)

3) Native language and 4) language used for online activities. It is noteworthy that, although the participants of this current research were studying in English-language settings, they came from linguistically diverse backgrounds. The majority of them spoke Lithuanian, the sole official state language of the Republic of Lithuania, while the rest were the speakers of two largest official minority languages, namely Polish and Russian. Web 2.0 tool *CmapTools* allows its users to modify the language preference settings and supports multiple languages, including English, Spanish, Italian, Portuguese, French, Greek, Catalan, Turkish, Swedish, Finnish, Estonian, Dutch, German, Chinese, Japanese and Czech. Unfortunately, none of the three languages natively spoken by the participants of the research are available from the *CmapTools* drop down menu. The problem that “Lithuanian language falls far behind the leaders in language technologies (the English language, for instance) and finds itself in the group of less commercially attractive EU languages, such as Latvian, Slovak, Slovenian” is discussed in the *Information Society Development Programme for 2014-2020 “Digital agenda for the Republic of Lithuania”*²⁹. According to the document, “the digital world still lacks publicly available information technologies with Lithuanian written and spoken language interfaces. According to the Information Society Development Committee under the Ministry of Transport and Communications, in 2012, only 17 % of the Lithuanian population used the Lithuanian language-related electronic services”³⁰. For this reason the decision was made to opt for the English version of *CmapTools*, as well *CmapTools* tutorials on the *YouTube* and other supplementary materials, concerning the tool. Prior literature regarding the role of native language in technology acceptance is very scarce and insufficient. To illustrate, *The Flash Eurobarometer survey User language preferences online (Flash No 313)*³¹ was conducted in 2011 to examine Internet users’ attitudes and opinions towards the use of different languages on the Internet. It reports that “although the English language is usually seen in its role as the de facto predominating language of Internet users around the world, 9 in 10 Internet users in the EU state that, when given a choice of languages, they always visited a website in their own language and only a slim majority (53%) would accept using an English version of a website if it was not available in their native language” (*Flash No 313:5*). What is not clear, however, is the role of native language on the acceptance of Web 2.0 technologies, especially in ESP context, therefore we suggest that:

H_{9c}: students’ native language has a relationship with perceived usefulness of CmapTools (PU)

H_{10c}: students’ native language has a relationship with perceived ease of use of CmapTools (PEOU)

H_{9d}: the language students most frequently use for online activities has a relationship with perceived usefulness of CmapTools (PU)

H_{10d}: the language students most frequently use for online activities has a relationship with perceived ease of use of CmapTools (PEOU)

29 <https://e-seimas.lrs.lt/portal/legalAct/lt/TAD/033cccc007c411e687e0fbad81d55a7c?jfwid=-33jzae4dj>

30 *ibid*

31 https://ec.europa.eu/commfrontoffice/publicopinion/flash/fl_313_en.pdf

5) **Self-reported proficiency in general English.** Research on the moderating effect of prior English knowledge of the respondents in TAM is very limited and inconclusive and needs deeper investigation too. In instances that it is studied, results infer its insignificant effect. To illustrate the findings of the study accomplished by Yu-Li (2014) to explore the effectiveness of *Virtual Reality* while studying ESP in an online learning environment indicated that the students' prior English competency did not correlate to any of the TAM factors. Similar results have been established in our pilot study (see *section 4.1* of this chapter), examining university students' attitudes towards a variety of Web 2.0 tools for learning ESP. In fact, the only contextual moderator that did exert influence on the acceptance of Web 2.0 tools in the latter study was the students' ability to use Web 2.0 tools. Therefore the decision was made to shed light on the role of both: students' proficiency in general English and their experience in using Web 2.0 technologies on their acceptance of a specific technology in ESP studies. It is suggested that:

H_{9E}: students' proficiency in general English has a relationship with perceived usefulness of CmapTools (PU)

H_{10E}: students' proficiency in general English has a relationship with perceived ease of use of CmapTools (PEOU)

6) **Self-reported experience in using Web 2.0 technologies.** According to *Macmillan-Dictionary.com*, experience is defined as “*knowledge and skill that is gained through time spent doing a job or activity*”. Different definitions regarding experience in using technologies can be found throughout technology acceptance literature. Back in 1995, Compeau and Higgins called it *computer self-efficacy*, which refers to “*a judgment of one's capability to use a computer*” (Compeau & Higgins, 1995, p. 192). According to them, this judgment is not concerned with what one has done in the past, but rather with one's ability to apply those skills to broader tasks in the future. In their research on university students' acceptance of mobile learning in higher education, Iqbal and Bhatti (2015) referred to *students' readiness*, which encompasses several elements, including *technical skills* and *computer self-efficacy*. Their results confirmed a strong effect of skills readiness on both and perceived ease of use and *perceived usefulness*. Applied to Web 2.0 use, experience in this thesis is defined as ESP students' judgment on their ability to use Web 2.0 tools and is presupposed to have influence on *CmapTools* acceptance via *perceived usefulness* and *perceived ease of use*. Based on these insights it is proposed that:

H_{9F}: students' self-reported experience in using Web 2.0 tools has a relationship with perceived use of CmapTools (PU)

H_{10F}: students self-reported experience in using CmapToolshas a relationship with perceived use of CmapTools (PU)

H_{9G}: students' self-reported experience in using Web 2.0 tools has a relationship with perceived ease of use of CmapTools (PEOU)

H_{10G}: students' self-reported experience in using CmapTools has a relationship with perceived use of CmapTools (PEOU)

7) **Self-reported attendance rate of ESP classes.** Quite a number of existing studies, especially in medical sciences (Levshankova et al., 2018; Lukkarinen et al., 2016; Deane & Murphy, 2013; Stanca, 2006) have found that attendance in higher education institutions is a significant and positive predictor of academic performance and course grades. Similarly, we can presuppose that attendance of technology-enhanced classes could serve as a predictor of their perceptions on the usefulness and perceived ease of use of a technology. Based on these insights it is suggested that:

H_{9H} : self-reported attendance of ESP classes has a relationship with perceived usefulness of CmapTools (PU)

H_{10H} : self-reported attendance of ESP classes has a relationship with perceived ease of use CmapTools (PEOU)

Based on the above-mentioned arguments, the following model, which is an extension of TAM with ESP students' awareness of CmapTools as a new construct, affecting perceived usefulness and perceived ease of use (PEOU) is proposed (Figure 19):

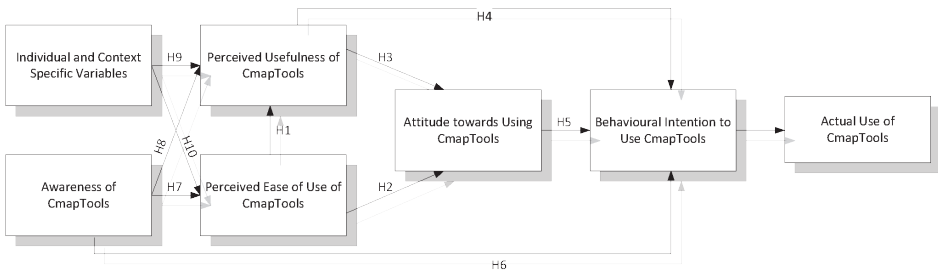


Figure 19. Technology Acceptance Model for predicting the acceptance of Web 2.0 technology CmapTools in ESP studies. Designed by the author of this dissertation

In order to analyse the results of this part of the study, *IBM SPSS Statistics version 22* was utilized. The following methods of descriptive and inferential statistics were applied to characterise the data based on their properties:

- descriptive statistics was used to show frequencies count and percent;
- correlation analysis was employed to assess a possible linear association between two continuous variables;
- *Mann-Whitney U* test was used to assess for statistically significant differences between two independent groups;
- *Kruskal-Wallis* test was employed to assess for statistically significant differences between three or more independent groups.

CHAPTER 5.

RESEARCH FINDINGS ON THE EFFECTIVENESS OF A WEB 2.0 TECHNOLOGY CMAPTOOLS IN ESP STUDIES IN HIGHER EDUCATION

Data Analysis

One of the goals of this current educational experiment was to research the two following questions:

RQ₁: what effect (if any) does the use of a Web 2.0 technology CmapTools in ESP studies in higher education have on students' achievements in ESP vocabulary acquisition?

RQ₂: what effect (if any) does the use of a Web 2.0 technology CmapTools in ESP studies in higher education have on students' achievements in ESP reading comprehension?

In order to analyse the results of this part of the study, *IBM SPSS Statistics version 22* was used. As it was repeatedly mentioned, the treatment of applying image-based Web 2.0 technology *CmapTools* with the students assigned to experimental groups at MRU and VIKO was considered **independent variable**, whereas their achievements in ESP vocabulary acquisition defined as the average scores on ESP vocabulary achievement tests (post-tests) and reading assignments (posttests) were used as **dependent variables** of the study. Namely achievement effects, according to Windham (1990) are one of the most important indicators of effectiveness in educational production, while test scores are the most commonly used measures of achievement effects. The analysis was conducted referring to each institution separately and in terms of the entire research.

According to Campbell and Stainley (1963) and Martella et al. (2013), the data from pre-experimental designs with pretest measures unavailable, are as a rule analysed by conducting a *t*-test to compare the means of the posttest scores of the experimental and control groups. Campbell and Stainley (1963) state that *static group comparison* or *posttest-only control group* designs are perhaps the only settings for which this test is optimal. "Additionally, a nonparametric test such as the *Mann-Whitney U* test should be used if the data violate the assumptions underlying these parametric tests (i.e., homogeneity of variance, normal distribution of data, and interval or ratio scale data" (Martella et al., 2013, p. 150).

Thus, following the recommendations of Campbell and Stainley (1963) and Martella et al. (2013), means of two continuous normally distributed variables in this part of research were compared by conducting *independent samples Student's t* test. Prior to this, the normality of distribution of continuous variables was tested by *one-sample Kolmogorov-Smirnov* test. A nonparametric *Mann-Whitney U* test was used, respectively, to compare means of two groups of variables not normally distributed. A value of $p < 0.05$ was considered significant throughout the research.

5.1. Results of Placement Test

The statistical analysis, however, will start with the scrutiny of placement test results. As it was previously stated, the purpose of administering this test was to find out the research participants' general English proficiency level, or put it more precisely, to make sure that prior to treatment all research participants ($n=107$) were at the same level of general English proficiency. The histogram below (Figure 20) represents the distribution of placement test scores for all research participants ($n=107$):

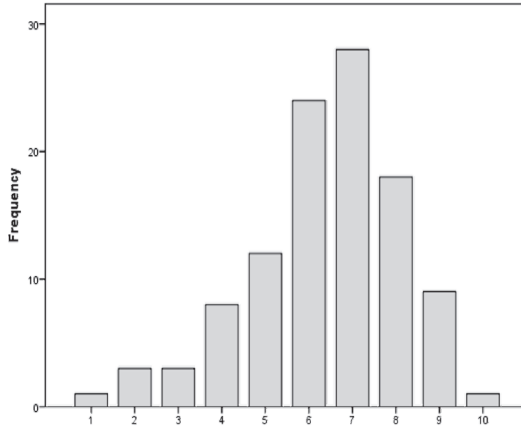


Figure 20. The distribution of placement test scores for all research participants ($n=107$)

As research participants were assigned to either experimental ($n=60$) or control ($n=47$) groups, the homogeneity of the placement test scores was initially tested within both of them. To verify the assumption of normality, *one-sample Kolmogorov-Smirnov* test was performed. It was established, that the data did not follow a normal distribution ($p=0.008$), therefore a nonparametric *Mann-Whitney U* test was applied to examine whether two independent samples were selected from populations having the same continuous distribution.

A null hypothesis H_0 : *the distributions of placement test scores for the two groups before the treatment were equal* was tested. According to Fisher (1971), “the null hypothesis is never proved or established, but is possibly disproved, in the course of experimentation. Every experiment may be said to exist only in order to give the facts a chance of disproving the null hypothesis” (Fisher, 1971, p. 16). The decision rule used throughout the entire research was to reject H_0 if the p -value $< \alpha$, or to retain it if the p -value $\geq \alpha$ (Čekanavičius & Murauskas, 2000).

It was established that there was no statistically significant difference in the placement test evaluations of the research participants in the experimental and control groups ($p=0.283$) ($p > \alpha$). Thus, **we failed to reject the null hypothesis** and can conclude that both groups were homogeneous regarding their general English proficiency prior to introduction of the independent variable, i.e. treatment to the experimental group.

As groups of research participants were assembled from two higher education institutions, the evaluations of the test were compared within each institution too. No statistically significant differences were found in placement test evaluations either: p -values from t statistics assumed in both institutions were $p=0.073(p>\alpha)$ at MRU and $p=0.872(p>\alpha)$ at VIKO respectively, thus we failed to reject the null hypothesis and can safely **conclude that all the research participants were homogeneous regarding their general English proficiency prior to introduction of the independent variable, i.e. treatment to the experimental group.** Table 14 displays descriptive statistics of placement test evaluations in each participating higher education institution and in terms of overall research:

Table 14. Descriptive statistics of placement test evaluations at MRU, VIKO and both institutions prior to treatment

| Higher Education Institution | N | Mean | SD± | Min | Max |
|------------------------------|-----|------|-------|-----|-----|
| MRU | 61 | 5.70 | 1.829 | 1 | 9 |
| VIKO | 46 | 7.28 | 1.148 | 5 | 10 |
| Both Institutions | 107 | 6.38 | 1.752 | 1 | 10 |

5.2. Results of ESP Vocabulary Achievement Tests

One of the goals of this empirical study was to research the following question: *what effect (if any) does the use of a Web 2.0 technology CmapTools in ESP studies in higher education have on students' achievements in ESP vocabulary acquisition?* This was pursued by analysing and comparing mean scores of the two ESP vocabulary achievement tests (posttests). As groups of research participants were recruited from two higher education institutions, posttests results were initially compared within each institution separately. Later on the variability of vocabulary achievement posttests' scores between experimental and control groups in terms of overall research was analysed. The following paragraph describes the posttests' results at Mykolas Romeris University.

Results of ESP Vocabulary Achievement Posttests at MRU

Before comparing the mean scores for ESP vocabulary posttest No 1 at MRU, *one-sample Kolmogorov-Smirnov* test was conducted to verify the assumption of data normality. As it was established that mean scores for *vocabulary achievement posttest No1* in each group at MRU were normally distributed ($p=0.419$), independent samples *Student's t* test was used, and p -value < 0.05 was considered statistically significant. The null hypothesis H_0 : **the mean scores of vocabulary achievement posttest No 1 for the experimental and control groups at MRU are equal** was tested. The decision rule was to reject H_0 if the p -value < α , or to retain it if the p -value $\geq \alpha$.

The analysis of posttest results indicated, the experimental group ($n=32$) (5.19 ± 1.942)

outperformed the control group (n=24) (3.88±2.173) in *vocabulary achievement posttest No 1*. The assumption of homogeneity of variance was tested using *Levene's Test of Equality of Variances*, which is often run before a comparison of means. The decision rule was to reject H_0 if the p -value < α , or to retain it if the p -value $\geq \alpha$. In this particular case p -value=0.021 ($p < \alpha$), which indicates that there is a significant difference between the achievements in *vocabulary achievement posttest No1* of the participants in the experimental group comparing it to the control group. Therefore, based on the results obtained from t -test the null hypothesis H_0 : ***the mean scores of vocabulary achievement posttest No 1 for the experimental and control groups at MRU are equal*** was rejected.

The analysis of *vocabulary achievement posttest No 2* results in each group at MRU reported that the mean scores for experimental group (n=32) and control group (n=25) were 5.38±1.827 and 4.60±1.915 respectively. *One-sample Kolmogorov-Smirnov* test results indicated, that the data did not follow a normal distribution ($p=0.027$), therefore a non-parametric *Mann-Whitney U* test was applied to examine whether the two populations had the same continuous distribution. The null hypothesis H_0 : ***the mean scores of vocabulary achievement posttest No 2 for the experimental and control groups at MRU are equal*** was tested. The decision rule was to reject H_0 if the p -value is less than 0.05 or to retain it if the p -value $\geq \alpha$.

Despite of the fact that students in the control group, who did not receive treatment, scored clearly lower (4.60) than their peers in the experimental group (5.38), no significant difference was determined (p -value=0.078) ($p > \alpha$). Therefore the null hypothesis H_0 : ***that the mean scores for vocabulary test 2 for the experimental and control groups at MRU are equal*** failed to be rejected.

Results of ESP Vocabulary Achievement Posttests at VIKO

Meanwhile, the analysis of mean scores for *ESP vocabulary achievement posttests No1* and *No2* in experimental and control groups at VIKO, following the same procedures of statistical analysis, found significant difference between both vocabulary tests achievements of the participants in the experimental group comparing it to their counterparts' achievements in control group: (p -value=0.012) ($p < \alpha$) and (p -value=0.000) ($p < \alpha$) respectively, therefore the null hypothesis H_0 : ***the mean scores of vocabulary achievement posttests for the experimental and control groups at VIKO are equal*** was rejected.

Variability of Vocabulary Achievement Posttests Scores between Experimental and Control Groups in Terms of Overall Research

The null hypothesis H_0 : ***mean scores of vocabulary achievement posttest No 1 are equal for all experimental and control groups in both participating HE institutions*** was tested. To determine whether sample data were normally distributed, one-sample *Kolmogorov-Smirnov* test was performed. As it was established that mean scores for *vocabulary achievement posttest No1* in both groups of the research were normally distributed ($p=0.247$), independent samples *Student's t* test was run accordingly, and p -value < 0.05 was considered

significant. It was found that the mean score for experimental groups (n=56) was 6.29 ± 2.432 , while for the control groups (n=43) it was only 4.98 ± 2.144 . The reported p -value=0.000 was lower than the critical p -value which means there was a significant difference between the achievements of the participants in the experimental groups comparing it to the control groups. Therefore, based on the results obtained from t -test the null hypothesis was rejected. Thus, it can be safely concluded that the results of *vocabulary achievement posttest No1* were significantly higher within experimental groups than within the control groups. The null hypothesis **H_0 : the mean scores of vocabulary achievement posttest No 1 are equal for the experimental and control groups in both participating HE institutions** was rejected.

The results of *vocabulary achievement posttest No 2* were in turn analysed following the same principles of statistical data analysis. As the data set was not normally distributed ($p=0.010$), *Mann-Whitney U* test was performed. The null hypothesis **H_0 : the distributions of vocabulary achievement posttest 2 scores are equal for experimental and control groups in both participating HE institutions** was tested. The decision rule was designed to reject H_0 if the p -value $< \alpha$, or to retain it if the p -value $\geq \alpha$. The results revealed a statistically significant difference ($p=0.011$) ($p < \alpha$) in favour of the experimental groups. **Thus, the null hypothesis H_0 : the distributions of vocabulary achievement posttest 2 scores are equal for experimental and control groups in both participating HE institutions** is rejected and conclusion can be made that the experimental groups outperformed the control groups in this vocabulary test too. *Figure 21* presents the variability of vocabulary achievement posttests mean scores between experimental and control groups throughout all the research:

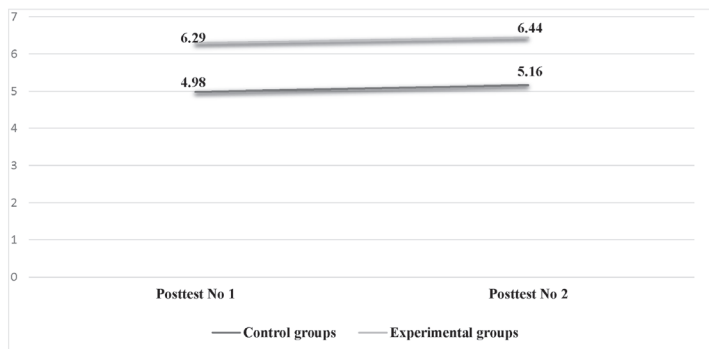


Figure 21. Variability in mean scores of posttests in experimental and control groups of in terms of the whole research

The results of this segment of empirical research were presented by the author in the 9th Austrian UAS Language Instructors' Conference *ESP: A Multidimensional Challenge*, University of Applied Sciences Technikum Wien, (Austria), 25 –26 May 2018.

5.3. Results of ESP Reading Assignments

The data analysis of home reading results was guided by the second research question **RQ₂**, *what effect (if any) does the use of a Web 2.0 technology CmapTools in ESP studies in higher education have on students' achievements in ESP reading comprehension?* This determination was achieved by analysing and comparing mean scores of two ESP reading assignments (posttests) involving the usage of *CmapTools* in experimental groups. The treatment of applying *CmapTools* software with the students assigned to experimental groups at MRU and VIKO was considered **independent variable**, whereas achievements in ESP reading acquisition defined as the scores of all the participants' ESP reading assignments were treated as **dependent variable** of the study. The first home reading assignment was administered to both treatment and control groups at the beginning of the treatment, whereas the second assignment was applied at the end of the course. As groups of research participants were recruited from two higher education institutions, assignment results were initially compared within each institution separately.

Results of ESP Reading Assignments in Experimental and Control groups at MRU

Before comparing the mean scores on ESP reading assignment in both participating groups at Mykolas Romeris University, the *Kolmogorov-Smirnov* test was performed to determine whether the underlying distribution of continuous variables was normal. It was established that mean scores for both reading assignments in each group at Mykolas Romeris university were normally distributed: *ESP reading assignment No 1* ($p=0.239$) and *ESP reading assignment No 2* ($p=0.126$), therefore independent samples *Student's t* test was applied, and p -value < 0.05 was considered significant.

Null hypothesis H_0 : **there will be no statistically significant difference in the mean scores on ESP reading acquisition assessment, as measured by ESP reading assignments between untreated control group and experimental group which received treatment** was tested. The decision rule was to reject H_0 if the p -value < α , or to retain it if the p -value $\geq \alpha$.

The analysis of *ESP reading assignment No 1* assessment indicated that the mean scores for experimental group ($n=27$) and control group ($n=21$) at MRU were 7.78 ± 1.805 and 7.38 ± 1.564 respectively. As a rule, before applying *Student t* test, the assumption of homogeneity of variance was tested using *Levene's Test of Equality of Variances*. The decision rule was to reject H_0 if the p -value < α , or to retain it if the p -value $\geq \alpha$. In this current case p -value = 0.376 ($p > \alpha$), which indicated the population variances were equal, i.e. homogeneity of variances assumption was not violated. Independent samples *t*-test was in turn conducted to determine whether there existed any statistical difference between the mean scores for experimental and control group with respect to evaluations of *ESP reading assignment No 1*. In this current case $p=0.428 > 0.05$ **which indicates that statistically significant difference in the mean scores between the two groups was not detected.**

The results of *ESP reading assignment No 2* were successively analysed following the aforementioned principles of statistical data analysis. It was established that students in

experimental group (n=29) who received treatment and had been required to reconstruct the ESP text using *CmapTools*, slightly outperformed their counterparts in untreated control group (n=22) with means scores 7.34 ± 1.778 and 7.09 ± 1.875 respectively. The results of *t* test analysis revealed no statistically significant difference between the mean scores ($p=0.624 > 0.05$) either.

Conclusion: despite of the fact that the obvious increase in the mean scores of ESP reading assignments No 1 and No 2 can be observed within the experimental group, as contrasted to the control group at Mykolas Romeris University, no statistically significant difference in the mean scores between the two groups was established.

Results of ESP Reading Assignments in Experimental and Control groups at VIKO

Before comparing the mean scores on ESP reading assignment in experimental and control groups at VIKO, the *Kolmogorov-Smirnov* test was traditionally performed to examine whether the sample data were normally distributed. As it was determined that mean values for the assessment of both reading assignments in each group at VIKO were normally distributed ($p=0.129$ and $p=0.076$ respectively), independent samples *Student's t* test was used, and p -value < 0.05 was considered significant.

Null hypothesis H_0 : *there will be no statistically significant difference in the mean scores on ESP reading acquisition assessment assignment as measured by ESP reading assignments between untreated control group and experimental group which received treatment* was tested. The analysis of *ESP reading assignment No 1* results at VIKO revealed, that the mean values were (8.50 ± 1.766) for experimental group (n=22) and (7.60 ± 1.404) for control group (n=15). The assumption of homogeneity of variance was again tested using *Levene's Test of Equality of Variances*. In this particular case p -value = $0.165 > 0.05$, suggesting that the variances of the two groups were equal, i.e., the homogeneity of variances assumption was not violated. Independent samples *t*-test was in turn conducted to determine whether there existed any statistical difference between the mean scores for experimental and control group with respect to evaluations of *ESP reading assignment No 1*. Even though the mean score in control was lower than in experimental group, the analysis yielded no statistically significant differences in the results between the groups ($p=0.108 > 0.05$).

The analysis of mean scores for *ESP reading assignment No 2* in each group at VIKO reported that the mean scores for treatment group (n=23) and control group (n=15) were 8.52 ± 1.855 and 8.13 ± 1.060 respectively. The results were found to be statistically insignificant in this case too ($p=0.418 > 0.05$).

Conclusion: despite of the fact that the obvious increase in the mean scores of ESP reading assignments No 1 and No 2 can be observed within the experimental group, as contrasted to the control group at VIKO, no statistically significant difference in the mean scores between the two groups was established.

Analysis of Variability of ESP Reading Assignment Scores between Experimental and Control Groups in Terms of Overall Research

Before comparing the mean scores on ESP reading assignments in experimental and control groups in terms of overall research, the *Kolmogorov-Smirnov* test was performed to examine whether the sample data were normally distributed. It was established that mean scores of *ESP reading assignment No 1* in both participating groups were normally distributed ($p=0.065$), therefore independent samples *Student's t* test was run accordingly and p -value <0.05 was considered significant. Null hypothesis H_{01} : ***there will be no statistically significant difference in the mean scores on ESP reading assignment No 1 between untreated control groups and experimental groups which received treatment*** was tested.

It was determined that the mean score for experimental groups ($n=49$) which received treatment with *CmapTools* was 8.1 ± 1.806 , while for the untreated control groups ($n=36$) it was only 7.47 ± 1.483 . Even though the mean score in control groups was apparently lower than in experimental groups, no statistically significant difference in the results ($p=0.091>0.05$) was detected by *t* test.

The results of *ESP reading assignment No 2* were consecutively analysed following the same principles of statistical data analysis. As in this case the data set was not normally distributed ($p=0.014$), *Mann-Whitney U* test was performed. The null hypothesis H_{02} : ***there will be no statistically significant difference in the distribution of ESP reading assignment 2 scores between untreated control groups and experimental groups which received treatment*** was tested. The decision rule was designed to reject H_0 if the p -value $<\alpha$, or to retain it if the p -value $\geq \alpha$. It was established that the mean score for experimental groups ($n=52$) was 7.87, whereas for the control groups ($n=37$) it was 7.51. *Figure 22* represents the variability of mean scores in reading assignments 1 and 2 between experimental and control groups throughout the entire research:

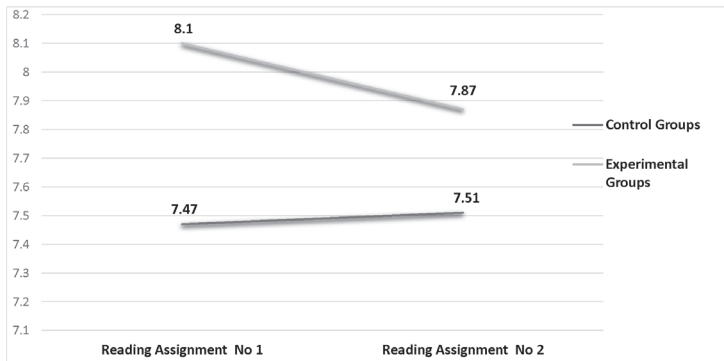


Figure 22. Variability in mean scores of reading assignments in experimental and control groups of in terms of overall research

The results repeatedly revealed that no statistically significant difference emerged between the performances in experimental and control groups ($p=0.305>0.05$). Thus, in this case the null hypothesis failed to be rejected.

Conclusion: The analysis of mean scores for *ESP reading assignments* No 1 and No 2 in experimental and control groups at Mykolas Romeris university and at VIKO did not identify any statistically significant differences in the results between the groups, therefore the initial hypothesis H_{02} : ***there will be no statistically significant difference in the mean scores on ESP reading assignment assessment between untreated control groups and experimental groups which received treatment*** failed to be rejected.

This current chapter reported on the research findings regarding the effect of a Web 2.0 technology *CmapTools* on students' achievements in ESP vocabulary acquisition and in ESP reading comprehension. To compare the effects of the treatment between the participants in experimental and control groups, it analysed the results of two ESP vocabulary achievement tests (posttests) and two ESP reading assignments (posttests) used as data collection instruments. The following chapter will in turn reveal the research findings related to the acceptance of Web 2.0 technology *CmapTools*, i.e. it will discuss the results of a structured attitudinal questionnaire based on the Technology Acceptance Model (Davis, Bagozzi & Warshaw, 1989), administered to the participants assigned to experimental groups at the end of the treatment.

CHAPTER 6.

RESEARCH FINDINGS ON THE ACCEPTANCE OF A WEB 2.0 TECHNOLOGY CMAPTOOLS IN ESP STUDIES IN HIGHER EDUCATION. RESULTS OF THE QUESTIONNAIRE

6.1. Descriptive Statistics

The data obtained from the questionnaires regarding the students' attitudes towards the usage of an educational Web 2.0 technology *CmapTools* for learning ESP at MRU and VIKO were analysed while using descriptive statistics and frequency calculation methods. The analysis showed that out of 53 students involved into this current research 32 came from *Law and Customs activities* study programme at Mykolas Romeris University and 21 studied *Computer systems* at VIKO. It was found that 62.3 % (n=33) of the respondents were male and (37.7%) (n=20) were female. It is important to mention that all the respondents were participants of an experimental research conducted in 2017 in both institutions and were assigned to experimental groups. These groups as opposed to control ones received treatment whereby an image based Web 2.0 tool *CmapTools* was involved in their mandatory ESP course.

One of the items asked the respondents to self-evaluate their English language proficiency level, as suggested by *The Common European Framework of Reference for Languages: Learning, Teaching and Assessment*. Almost half of the respondents (47.2%, n=25) identified themselves as proficient users, 39.6% (n=21) – as independent users and only 13.2% (n=7) as basic users. It is not surprising that considering themselves very good or good speakers of English, the slim majority of the respondents (52.8%, n= 28) reported English to be the most frequently used language for browsing the Internet. 37.7% (n=20) of the students indicated that they use Lithuanian, 7.50% (n=4) reported Russian and only 1.90% (n=1) specified that he or she used the Polish language for this purpose.

The findings on *students' self-evaluations of their ability to use Web 2.0 technologies* revealed that students exhibited experience with and exposure to different Web 2.0 technologies. 47.2% (n=25) reported that they had moderate skills, 24.5% (n=13) – very good skills, 15.1 % (n=8) good skills, 11.3% (n=6) little skills and only 1.90 % (n=1) acknowledged having no skills at all. Very similar (almost identical) results were obtained as regards the respondents' *self-reported experience in using CmapTools*, as a total of 45.3% (n=25) of them reported to have moderate skills, 28.3% (n=15) – little skills, 11.3 % (n=6) – good skills, 7.50 % (n=4) reported to have very good skills and the same percentage 7.50 % (n=4) admitted they had no skills in working with *CmapTools*.

The results show that the ESP course was well attended by the respondents in both higher education institutions, as the major part of them (45.3, n=24) reported to have attended the majority of classes. There were some cases however, when students used to come only for tests or presentations (9.40, n=5), missed a lot of classes (15.1, n=8) or missed the majority of classes (1.90, n=1). A summary of the responses with respect to individual demographic factors of the respondents is presented in *Table 18*:

Table 18. *Individual demographic factors of the respondents*

| <i>Variable</i> | <i>Category</i> | <i>Frequency Counts</i> | <i>%</i> |
|--|--|-------------------------|----------|
| Higher education institution | MRU | 32 | 60.4 |
| | VIKO | 21 | 39.6 |
| Gender | Male | 33 | 62.3 |
| | Female | 20 | 37.7 |
| Native language | Lithuanian | 42 | 79.2 |
| | Russian | 7 | 13.2 |
| | Polish | 4 | 7.50 |
| Language used for online activities | English | 28 | 52.8 |
| | Lithuanian | 20 | 37.7 |
| | Russian | 4 | 7.50 |
| | Polish | 1 | 1.90 |
| Proficiency in general English | Basic user | 7 | 13.2 |
| | Independent user | 21 | 39.6 |
| | Proficient user | 25 | 47.2 |
| Experience in using Web 2.0 tools | No skills | 1 | 1.90 |
| | Little skills | 6 | 11.3 |
| | Moderate skills | 25 | 47.2 |
| | Good skills | 8 | 15.1 |
| | Very good skills | 13 | 24.5 |
| Experience in using CmapTools | No skills | 4 | 7.50 |
| | Little skills | 15 | 28.3 |
| | Moderate skills | 24 | 45.3 |
| | Good skills | 6 | 11.3 |
| | Very good skills | 4 | 7.50 |
| Attendance of ESP classes | Attended all the classes systematically | 15 | 28.3 |
| | Attended the majority of the classes | 24 | 45.3 |
| | Used to come only for tests/ presentations | 5 | 9.40 |
| | Missed a lot of classes | 8 | 15.1 |
| | Missed the majority of classes | 1 | 1.90 |

6.2. Correlation Statistics

In line with the objectives of this segment of current research, correlation analysis was conducted. According to Taylor (1990), it is one of the most commonly used statistical methods in summarizing scientific research data. In this research it was used to empirically test the interrelations between the original constructs of TAM (Davis, Bagozzi & Warshaw, 1989), to explore the effect of an additional construct of *awareness* on the constructs of *perceived usefulness* and *perceived ease of use*, as well as to measure the effect of *individual and context specific factors* on the constructs of proposed TAM.

6.2.1. Interdependency between Core Variables of TAM

1) The hypothesis H_1 : *perceived ease of use of CmapTools (PEOU) has a significant positive effect on perceived usefulness (PU) of CmapTools* was tested. Correlation analysis was conducted and *Spearman's* correlation coefficient (ρ) was used. To interpret the strength of a relationship between the variables, the commonly accepted interpretation guide suggested by Cohen (1992) and Čekanavičius and Murauskas (2001) (Table 19) was relied on throughout the entire research:

Table 19. Rule of thumb for interpreting the size of a correlation coefficient according to Čekanavičius & Murauskas (2001) and Cohen (1992)

| <i>r-value</i> | <i>Interpretation</i> |
|---------------------------|---|
| 0.9 to 1.0 (-0.9 to -1.0) | Very high positive (negative) correlation |
| 0.7 to 0.9 (-0.7 to -0.9) | High positive (negative) correlation |
| 0.5 to 0.7 (-0.5 to -0.7) | Moderate positive (negative) correlation |
| 0.3 to 0.5 (-0.3 to -0.5) | Low positive (negative) correlation |
| 0.0 to 0.3 (0.0 to -0.3) | Very low or negligible correlation |

Table 20 displays significant correlations identified between the two core items of TAM, namely between the constructs of *perceived ease of use (PEOU)* and *perceived usefulness (PU)*:

Table 20. Significant correlations between the constructs of PEOU and PU

| <i>Items of PEOU construct</i> | <i>r-value</i> | <i>p-value</i> | <i>Item PU1</i> |
|---|----------------|----------------|--|
| 1 Learning ESP through the use of <i>CmapTools</i> was easy for me | 0.772** | 0.000 | <i>CmapTools</i> helped me to improve my ESP knowledge |
| 2 It was easy for me to become skilful in using <i>CmapTools</i> | 0.740** | 0.000 | |
| 3 <i>CmapTools</i> was flexible in interacting and collaborating with peers and the teacher | 0.529** | 0.000 | |
| 4 <i>CmapTools</i> was easy to use | 0.658** | 0.000 | |

| | <i>r-value</i> | <i>p-value</i> | <i>Item PU2</i> |
|---|----------------|----------------|--|
| 1 Learning ESP through the use of <i>CmapTools</i> was easy for me | 0.575** | 0.000 | <i>CmapTools</i> helped me to improve ESP reading skills |
| 2 It was easy for me to become skilful in using <i>CmapTools</i> | 0.445** | 0.001 | |
| 3 <i>CmapTools</i> was flexible in interacting and collaborating with peers and the teacher | 0.594** | 0.000 | |
| 4 <i>CmapTools</i> was easy to use | 0.374** | 0.006 | |
| | <i>r-value</i> | <i>p-value</i> | <i>Item PU3</i> |
| 3 <i>CmapTools</i> was flexible in interacting and collaborating with peers and the teacher | 0.404** | 0.003 | <i>CmapTools</i> helped me to improve ESP writing skills |
| | <i>r-value</i> | <i>p-value</i> | <i>Item PU6</i> |
| 1 Learning ESP through the use of <i>CmapTools</i> was easy for me | 0.609** | 0.000 | <i>CmapTools</i> helped me to enhance ESP terminology and concepts |
| 2 It was easy for me to become skilful in using <i>CmapTools</i> | 0.391** | 0.004 | |
| 3 <i>CmapTools</i> was flexible in interacting and collaborating with peers and the teacher | 0.329* | 0.016 | |
| 4 <i>CmapTools</i> was easy to use | 0.412** | 0.002 | |

** Correlation is significant at the 0.01 level (2-tailed);

* Correlation is significant at the 0.05 level (2-tailed).

To sum the findings of correlation analysis as visible in *Table 21*, it can be observed that a moderate positive relationship ($r=0.626$, $p=0.000$) was reported between *perceived ease of use* and *perceived usefulness of CmapTools*. This relationship is statistically significant, therefore, H_1 : ***perceived ease of use of CmapTools (PEOU) has a significant positive effect on perceived usefulness (PU) of CmapTools*** is supported. These results are consistent with previous ESP and EFL research conducted by Gamble, 2017; Van de Bogard ir Wichadee, 2015 and Tajuddin et al. (2012) indicating the similar nature of how learners perceive e-learning and other similar technologies.

Table 21. Spearman's correlation matrix for the constructs of PEOU and PU

| <i>Perceived Ease of Use</i> | <i>r-value</i> | <i>p-value</i> | <i>Perceived Usefulness</i> |
|------------------------------|----------------|----------------|-----------------------------|
| | 0.626** | 0.000 | |

The hypothesis H_2 : ***perceived ease of use of CmapTools (PEOU) has a significant positive effect on ESP students' attitudes (A) towards using CmapTools*** was tested. Correlation analysis was conducted and Spearman's correlation coefficient (ρ) was used. *Table 22* demonstrates significant correlations between items within the constructs of *perceived ease of use (PEOU)* and *attitude (A)*:

Table 22. Significant correlations between PEOU and A constructs

| <i>Items of PEOU construct</i> | <i>r-value</i> | <i>p-value</i> | <i>Item A1</i> |
|---|----------------|----------------|---|
| 1 Learning ESP through the use of <i>CmapTools</i> was easy for me | 0.673** | 0.000 | <i>CmapTools</i> is useful for my studies |
| 2 It was easy for me to become skilful in using <i>CmapTools</i> | 0.499** | 0.000 | |
| 3 <i>CmapTools</i> was flexible in interacting and collaborating with peers and the teacher | 0.517** | 0.000 | |
| 4 <i>CmapTools</i> was easy to use | 0.709** | 0.000 | |
| | <i>r-value</i> | <i>p-value</i> | <i>Item A2</i> |
| 1 Learning ESP through the use of <i>CmapTools</i> was easy for me | 0.529** | 0.000 | The advantage of using <i>CmapTools</i> outweighs the disadvantages of not using it |
| 2 It was easy for me to become skilful in using <i>CmapTools</i> | 0.479** | 0.000 | |
| 3 <i>CmapTools</i> was flexible in interacting and collaborating with peers and the teacher | 0.500** | 0.000 | |
| 4 <i>CmapTools</i> was easy to use | 0.569** | 0.000 | |
| | <i>r-value</i> | <i>p-value</i> | <i>Item A3</i> |
| 1 Learning ESP through the use of <i>CmapTools</i> was easy for me | 0.662** | 0.000 | <i>CmapTools</i> is a good strategy in learning a foreign language |
| 2 It was easy for me to become skilful in using <i>CmapTools</i> | 0.484** | 0.000 | |
| 3 <i>CmapTools</i> was flexible in interacting and collaborating with peers and the teacher | 0.619** | 0.000 | |
| 4 <i>CmapTools</i> was easy to use | 0.507** | 0.000 | |

** Correlation is significant at the 0.01 level (2-tailed);

* Correlation is significant at the 0.05 level (2-tailed).

To conclude the findings of correlation analysis, as illustrated in *Table 23*, it can be observed that there exists a high positive significant correlation ($r=0.754$, $p=0.000$) between the two core constructs of TAM *perceived ease of use* and students' *attitude* towards *CmapTools*. Moreover, as it is visible from *Table 22*, all the items of both constructs are statistically interrelated, therefore we can safely conclude that H_2 : *perceived ease of use of CmapTools (PEOU) has a significant positive effect on ESP students' attitudes (A) towards using CmapTools* is supported.

Table 23. Spearman's correlation matrix for the constructs of PEOU and A

| <i>Perceived Ease of Use</i> | <i>r-value</i> | <i>p-value</i> | <i>Attitude</i> |
|------------------------------|----------------|----------------|-----------------|
| | 0.754** | 0.000 | |

These results are consistent with theoretical arguments previously provided by Davis (1989) and with the results of previous ESP research conducted by Yu-Li Chen (2014) and Afshari et al., 2013. For example, Afshari examined students' attitudes towards use of computer-assisted language learning (*CALL*). Their findings suggest that PU and PEOU had a very strong correlation with students' attitudes towards *CALL*, indicating that as students' perceptions of computer attributes (PU and PEOU) improve, their attitudes will be enhanced as well. Yu-Li Chen (2014) also found a significant correlation between the two constructs in question.

Hypothesis H_3 : *perceived usefulness of CmapTools (PU) has a significant positive effect on ESP students' attitudes towards using CmapTools (A)* was tested. Correlation analysis was conducted and Spearman's correlation coefficient (ρ) was used. Table 24 summarizes the results of correlational analysis and shows significant relationships:

Table 24. Significant correlations between PU and A constructs

| <i>Items of PU construct</i> | <i>r-value</i> | <i>p-value</i> | <i>Item A1</i> |
|--|----------------|----------------|---|
| 1 <i>CmapTools</i> helped me to improve my ESP knowledge | 0.685** | 0.000 | <i>CmapTools</i> is useful for my studies |
| 2 <i>CmapTools</i> helped me to improve ESP reading skills | 0.416** | 0.002 | |
| 6 <i>CmapTools</i> helped me to enhance ESP terminology and concepts | 0.510** | 0.001 | |
| | <i>r-value</i> | <i>p-value</i> | <i>Item A2</i> |
| 1 <i>CmapTools</i> helped me to improve my ESP knowledge | 0.571** | 0.000 | The advantage of using <i>CmapTools</i> outweighs the disadvantages of not using it |
| 2 <i>CmapTools</i> helped me to improve ESP reading skills | 0.447*** | 0.001 | |
| 3 <i>CmapTools</i> helped me to improve ESP writing skills | 0.277* | 0.045 | |
| 6 <i>CmapTools</i> helped me to enhance ESP terminology and concepts | 0.355** | 0.009 | |
| | <i>r-value</i> | <i>p-value</i> | <i>Item A3</i> |
| 1 <i>CmapTools</i> helped me to improve my ESP knowledge | 0.652** | 0.000 | <i>CmapTools</i> is a good strategy in learning a foreign language |
| 2 <i>CmapTools</i> helped me to improve ESP reading skills | 0.757** | 0.000 | |
| 3 <i>CmapTools</i> helped me to improve ESP writing skills | 0.333* | 0.015 | |
| 6 <i>CmapTools</i> helped me to enhance ESP terminology and concepts | 0.599** | 0.000 | |

** Correlation is significant at the 0.01 level (2-tailed);

* Correlation is significant at the 0.05 level (2-tailed).

To sum the results of of correlation analysis as indicated in *Table 25*, it can be observed that there exists a moderate positive relationship ($r=0.626$, $p=0.000$) between the two constructs of TAM: *perceived usefulness* (PU) and *attitude towards usage* (A) moreover, it is statistically significant, therefore H_3 : ***perceived usefulness of CmapTools (PU) has a significant positive effect on ESP students' attitudes towards using CmapTools (A)*** is supported.

Table 25. Spearman's correlation matrix for the constructs of PU and A

| <i>Perceived Usefulness</i> | <i>r-value</i> | <i>p-value</i> | <i>Attitude towards Usage</i> |
|-----------------------------|----------------|----------------|-------------------------------|
| | 0.626** | 0.000 | |

As it was mentioned earlier, these results are in line with the findings of Gamble (2017) and Afshari *et al* (2013), who similarly concluded that the variable of *perceived usefulness* was an important factor that influenced students' *attitude* towards the technology.

Hypothesis H_4 : ***perceived usefulness of CmapTools (PU) has a significant positive effect on ESP students' behavioural intention (BI) to use CmapTools*** was tested. Correlation analysis was conducted and Spearman's correlation coefficient (ρ) was used. *Table 26* shows significant correlations between items in *perceived usefulness* (PU) and *behavioural intention* (BI) constructs.

Table 26. Significant correlations between PU and BI

| <i>Items of PU construct</i> | <i>r-value</i> | <i>p-value</i> | <i>Item BI1</i> |
|--|----------------|----------------|--|
| 1 <i>CmapTools</i> helped me to improve my ESP knowledge | 0.657** | 0.000 | I will add <i>CmapTools</i> as another medium in my future studies |
| 2 <i>CmapTools</i> helped me to improve ESP reading skills | 0.473** | 0.000 | |
| 6 <i>CmapTools</i> helped me to enhance ESP terminology and concepts | 0.433** | 0.001 | |
| | <i>r-value</i> | <i>p-value</i> | <i>Item BI2</i> |
| 1 <i>CmapTools</i> helped me to improve my ESP knowledge | 0.513** | 0.000 | I intend to use <i>CmapTools</i> in the future to improve my English |
| 2 <i>CmapTools</i> helped me to improve ESP reading skills | 0.476** | 0.000 | |
| 6 <i>CmapTools</i> helped me to enhance ESP terminology and concepts | 0.433** | 0.001 | |

** Correlation is significant at the 0.01 level (2-tailed);

* Correlation is significant at the 0.05 level (2-tailed).

To conclude the results of correlation analysis, as manifested in *Table 27*, it can be observed that there exists a weak positive correlation ($r=0.491, p=0.000$) between the two core constructs of TAM: *perceived usefulness* (PU) and *behavioural intention to use CmapTools* (BI). Nevertheless, this relationship is statistically significant, therefore, H_3 : *perceived usefulness of CmapTools has a significant positive effect on ESP students' intention to use CmapTools* can be supported.

Table 27. Spearman's correlation matrix for the constructs of PU and BH

| <i>Perceived Usefulness</i> | <i>r-value</i> | <i>p-value</i> | <i>Behavioural Intention</i> |
|-----------------------------|----------------|----------------|------------------------------|
| | 0.491** | 0.000 | |

The hypothesis H_3 : *ESP students' attitude towards using CmapTools (A) has a significant positive effect on their behavioural intention to use CmapTools (BI)* was tested. Correlation analysis was conducted and Spearman's correlation coefficient (rho) was used. *Table 28* manifests significant correlations identified between items in the constructs of *attitude (A)* and *behavioural intention (BI)*:

Table 28. Significant correlations between A and BI

| <i>Items in A construct</i> | <i>r-value</i> | <i>p-value</i> | <i>Item BI1</i> |
|---|----------------|----------------|--|
| 1 <i>CmapTools</i> is useful for my studies | 0.606** | 0.000 | |
| 2 The advantage of using <i>CmapTools</i> outweighs the disadvantages of not using it | 0.624** | 0.000 | I will add <i>CmapTools</i> as another medium in my future studies |
| 3 <i>CmapTools</i> is a good strategy in learning a foreign language | 0.441** | 0.001 | |
| | <i>r-value</i> | <i>p-value</i> | <i>Item BI2</i> |
| 1 <i>CmapTools</i> is useful for my studies | 0.627** | 0.000 | |
| 2 The advantage of using <i>CmapTools</i> outweighs the disadvantages of not using it | 0.661** | 0.000 | I intend to use <i>CmapTools</i> in the future to improve my English |
| 3 <i>CmapTools</i> is a good strategy in learning a foreign language | 0.502** | 0.000 | |

** Correlation is significant at the 0.01 level (2-tailed);

* Correlation is significant at the 0.05 level (2-tailed).

To sum the results of correlation analysis as suggested in *Table 29*, a statistically significant moderate positive correlation ($r=0.669$, $p=0.000$) can be observed between the two core constructs of TAM *attitude towards CmapTools* and *behavioural intention to use CmapTools*, therefore **H_3 : ESP students' attitude towards using CmapTools (A) has a significant positive effect on positively their behavioural intention to use CmapTools (BH)** is supported.

Table 29. Spearman's correlation matrix for the constructs of A and BH

| <i>Attitude</i> | <i>r-value</i> | <i>p-value</i> | <i>Behavioural Intention</i> |
|-----------------|----------------|----------------|------------------------------|
| | 0.669** | 0.000 | |

6.2.2. The Effect of an Additional Variable of Awareness

The hypothesis **H_6 : ESP students' awareness (AW) of CmapTools has a significant positive effect on their intention to use CmapTools (BI)** was tested. Correlation analysis was conducted and Spearman's correlation coefficient (ρ) was used. *Table 30* shows significant correlations between items in the constructs of *awareness (AW)* and *bihevioural intention (BI)*:

Table 30. Significant correlations between items in AW and BI constructs

| <i>Items in AW construct</i> | <i>r-value</i> | <i>p-value</i> | <i>Item BI1</i> |
|--|----------------|----------------|--|
| 2 I am aware of the usage of <i>CmapTools</i> | 0.287* | 0.037 | I will add <i>CmapTools</i> as another medium in my future studies |
| 3 I am aware that I can learn ESP using <i>CmapTools</i> | 0.393** | 0.004 | |
| | <i>r-value</i> | <i>p-value</i> | <i>Item BI2</i> |
| 2 I am aware of the usage of <i>CmapTools</i> | 0.311* | 0.023 | I intend to use <i>CmapTools</i> in the future to improve my English |
| 3 I am aware that I can learn ESP using <i>CmapTools</i> | 0.360** | 0.008 | |

** Correlation is significant at the 0.01 level (2-tailed);

* Correlation is significant at the 0.05 level (2-tailed).

To conclude the results of correlation analysis as observed in *Table 31*, we can see that there is a positive relationship between *awareness* as the additional construct of TAM and students' *behavioural intention to use CmapTools* (BI). Despite of the fact that the strength of this relation is low ($r=0.375$, $p=0.000$), it is statistically significant, therefore hypothesis **H_6 : ESP students' awareness of CmapTools has a significant positive effect on their intention to use CmapTools (BI)** failed to be rejected.

Table 31. Spearman's correlation matrix for the constructs of AW and BI

| Awareness | r-value | p-value | Behavioural Intention |
|-----------|---------|---------|-----------------------|
| | 0.375** | 0.000 | |

The hypothesis H_2 : ESP students' awareness (AW) of CmapTools has a significant positive effect on perceived ease of use of CmapTools (PEOU) was tested. Correlation analysis was conducted and Spearman's correlation coefficient (rho) was used. Table 32 displays significant correlations between items in the constructs of awareness (AW) and perceived ease of use (PEOU):

Table 32. Significant correlations between items in AW and PEOU constructs

| Items in AW construct | r-value | p-value | Item PEOU1 |
|---|---------|---------|--|
| 1 I am aware of the existence of CmapTools | 0.443** | 0.001 | Learning ESP through the use of CmapTools was easy for me |
| 2 I am aware of the usage of CmapTools | 0.405** | 0.003 | |
| 3 I am aware that I can learn ESP using CmapTools | 0.519** | 0.000 | |
| | r-value | p-value | Item PEOU2 |
| 1 I am aware of the existence of CmapTools | 0.540** | 0.000 | It was easy for me to become skilful in using CmapTools |
| 2 I am aware of the usage of CmapTools | 0.505** | 0.000 | |
| 3 I am aware that I can learn ESP using CmapTools | 0.549** | 0.000 | |
| | r-value | p-value | Item PEOU3 |
| 2 I am aware of the usage of CmapTools | 0.472** | 0.000 | CmapTools was flexible in interacting and collaborating with peers and the teacher |
| 3 I am aware that I can learn ESP using CmapTools | 0.437** | 0.001 | |
| | r-value | p-value | Item PEOU4 |
| 1 I am aware of the existence of CmapTools | 0.592** | 0.000 | CmapTools was easy to use |
| 2 I am aware of the usage of CmapTools | 0.575** | 0.000 | |
| 3 I am aware that I can learn ESP using CmapTools | 0.619** | 0.000 | |

** Correlation is significant at the 0.01 level (2-tailed);

* Correlation is significant at the 0.05 level (2-tailed).

To sum the findings of correlation analysis (Table 33), we can observe that there is a positive correlation ($r=0.689, p=0.000$) between *awareness (AW)* as the additional construct of TAM and *perceived ease of use of CmapTools (PEOU)*. This relationship is statistically significant, therefore hypothesis H_7 : **ESP students' awareness of CmapTools has a significant positive effect on perceived ease of use of CmapTools** is supported.

Table 33. Spearman's correlation matrix for the constructs of awareness and perceived ease of use of CmapTools

| <i>Awareness</i> | <i>r-value</i> | <i>p-value</i> | <i>Perceived Ease of Use</i> |
|------------------|----------------|----------------|------------------------------|
| | 0.689** | 0.000 | |

The hypothesis H_8 : **ESP students' awareness of CmapTools has a significant positive effect on perceived usefulness of CmapTools (PU)** was tested. Correlation analysis was conducted and Spearman's correlation coefficient (ρ) was used. Table 34 summarizes correlations between items in *awareness (AW)* and *perceived usefulness (PU)* constructs:

Table 34. Significant correlations between items in AW and PU constructs

| <i>Items in AW construct</i> | <i>r-value</i> | <i>p-value</i> | <i>Item PU1</i> |
|--|----------------|----------------|--|
| 1 I am aware of the existence of <i>CmapTools</i> | 0.460** | 0.001 | <i>CmapTools</i> helped me to improve my ESP knowledge |
| 2 I am aware of the usage of <i>CmapTools</i> | 0.309* | 0.024 | |
| 3 I am aware that I can learn ESP using <i>CmapTools</i> | 0.543** | 0.000 | |
| | <i>r-value</i> | <i>p-value</i> | <i>Item PU2</i> |
| 2 I am aware of the usage of <i>CmapTools</i> | 0.363** | 0.008 | <i>CmapTools</i> helped me to improve ESP reading skills |
| 3 I am aware that I can learn ESP using <i>CmapTools</i> | 0.348* | 0.011 | |
| | <i>r-value</i> | <i>p-value</i> | <i>Item PU6</i> |
| 1 I am aware of the existence of <i>CmapTools</i> | 0.444** | 0.001 | <i>CmapTools</i> helped me to enhance ESP terminology and concepts |
| 2 I am aware of the usage of <i>CmapTools</i> | 0.390** | 0.004 | |
| 3 I am aware that I can learn ESP using <i>CmapTools</i> | 0.458** | 0.001 | |

** Correlation is significant at the 0.01 level (2-tailed);

* Correlation is significant at the 0.05 level (2-tailed).

To conclude the results of correlation analysis (Table 35), we can observe that there is a positive relationship ($r=0.451$ $p=0.000$), between *awareness (AW)* as the additional construct of TAM and *perceived usefulness of CmapTools*. Although this relationship is weak, it is still statistically significant, for this reason we failed to reject hypothesis H_8 : **ESP students' awareness of CmapTools positively affects perceived usefulness of CmapTools (PU)**. Bearing into consideration that the factor of *awareness* mediates the relationship between ESP students' perceptions regarding the *usefulness* of the tool and their attitude towards it, we may conclude that the more knowledge ESP students have about *CmapTools* and its functions, the more likely they will form a positive attitude towards it.

Table 35. Spearman's correlation matrix for the constructs of awareness and perceived usefulness of CmapTools

| <i>Awareness</i> | <i>r-value</i> | <i>p-value</i> | <i>Perceived Usefulness</i> |
|------------------|----------------|----------------|-----------------------------|
| | 0.451** | 0.000 | |

6.2.3. The Effect of the Respondents' Individual and Context Specific Variables

To test hypotheses H_9 on the relationships between the participants' individual and contextual characteristics (their *higher education institution, gender, native language, language used for online activities, self-reported proficiency in general English, self-reported proficiency in using Web 2.0 tools, self-reported proficiency in using CmapTools* and *attendance of ESP classes*) and the construct of *perceived usefulness of Cmap Tools (PU)*, correlation analysis was conducted and Spearman's correlation coefficient (ρ) was used. Table 36 manifests the significant correlations found.

Table 36. Significant correlations between the individual variables of the respondents and the constructs of PU

| Individual/contextual variables | r-value | p-value | Item PU1 |
|--|----------------|----------------|--|
| 1 Higher education institution | 0.346* | 0.011 | <i>CmapTools</i> helped me to improve my ESP knowledge |
| 6 Self-reported proficiency in using Web 2.0 tools | 0.309* | 0.024 | |
| 7 Self-reported proficiency in using CmapTools | 0.543** | 0.000 | |
| <i>Individual/contextual variables</i> | <i>r-value</i> | <i>p-value</i> | <i>Item PU2</i> |
| 1 Higher education institution | 0.399** | 0.003 | <i>CmapTools</i> helped me to improve ESP reading skills |
| 4 Language used for online activities | -0.451** | 0.001 | |
| 7 Self-reported proficiency in using CmapTools | 0.322* | 0.019 | |

| <i>Individual/contextual variables</i> | <i>r-value</i> | <i>p-value</i> | <i>Item PU6</i> |
|---|----------------|----------------|--|
| 1 Higher education institution | 0.399** | 0.003 | <i>CmapTools</i> helped me to enhance ESP terminology and concepts |
| 2 Gender | -0.298* | 0.030 | |
| 7 Self-reported proficiency in using <i>CmapTools</i> | 0.412** | 0.002 | |
| 8 Attendance | -0.381** | 0.005 | |

** Correlation is significant at the 0.01 level (2-tailed);

* Correlation is significant at the 0.05 level (2-tailed).

The hypothesis H_{9A} : *the variable of higher education institution has a significant relationship with perceived usefulness of CmapTools (PU)* was tested. Correlation analysis was conducted and Spearman's correlation coefficient (ρ) was used to find out low positive significant relationship with three items of the construct *perceived usefulness* (PU): PU1 (*CmapTools helped me to improve my ESP knowledge*) ($r=0.346, p=0.011$), PU2 (*CmapTools helped me to improve ESP reading skills*) ($r=0.399, p=0.003$) and PU6 (*CmapTools helped me to enhance ESP terminology and concepts*) ($r=0.399, p=0.003$). No statistically significant relations, however, were identified with items PU3 (*CmapTools helped me to improve ESP writing*) and PU4 (*CmapTools helped me to improve ESP listening skills*). A Mann-Whitney U test was subsequently used to examine whether statistically significant differences existed between the two institutions regarding their respondents' attitudes towards the aforementioned 3 statements within the construct of *perceived usefulness*: PU1, PU2 and PU6. Answers related to item PU1 (*CmapTools helped me to improve my ESP knowledge*) provided by students from MRU (mean rank=31.05) were found to score statistically significantly higher ($U=26.500, p=0.013$) than answers provided by students from VIKO (mean rank=20.83). Similar results were obtained having analysed the answers related to items PU2 (*CmapTools helped me to improve ESP reading skills*) and PU6 (*CmapTools helped me to enhance ESP terminology and concepts*). The mean ranks for the answers given by MRU students (31.73 and 33.20 respectively) were higher than mean ranks for the answers provided by their counterparts at VIKO (19.79 and 17.55 respectively), suggesting a conclusion that the former had a stronger belief that image based Web 2.0 tool *CmapTools* was useful for learning ESP and for developing their ESP reading skills and enhancing ESP terminology and concepts. Figure 23 shows institution related differences in respondents' opinions regarding the usefulness of image-based Web 2.0 tool *CmapTools*:

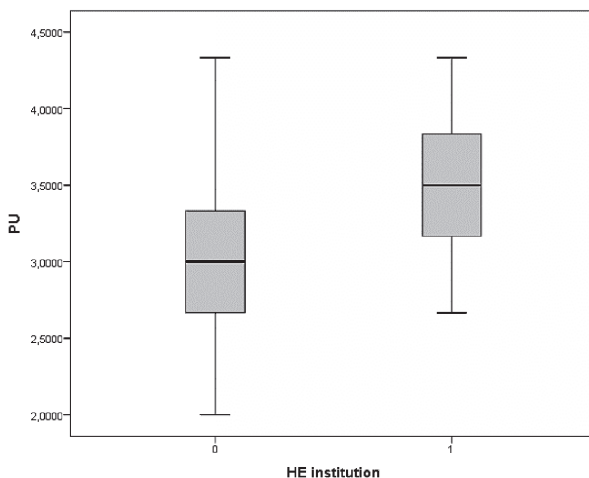


Figure 23. Boxplots of institution related differences in respondents' opinions related to the usefulness of image-based Web 2.0 tool CmapTools

To sum up the results of correlation analysis in Table 37, it can be observed that there is a positive correlation ($r=0.473$, $p=0.000$) between the independent variable *higher education institution* and *perceived usefulness of CmapTools*. Although this correlation is low, we still can support hypothesis H_{9A} : **HE institution has a relationship with perceived use of CmapTools (PEOU)**.

Table 37. Spearman's correlation matrix for the variable of higher education institution and the construct of perceived usefulness of CmapTools

| Higher Education Institution | <i>r-value</i> | <i>p-value</i> | Perceived Usefulness |
|------------------------------|----------------|----------------|----------------------|
| | 0.473** | 0.000 | |

Moreover, the *Mann-Whitney U* test (Table 38) indicated that respondents from MRU were more likely to grasp the usefulness offered by CmapTools than their peers from VIKO (*Mann-Whitney U* $z = -3.414$, $p = 0.001$).

Table 38. Mann-Whitney U matrix for the variable of higher education institution and the construct of perceived usefulness of CmapTools

| HE Institution | Mean Rank | <i>z-value</i> | <i>p-value</i> |
|----------------|-----------|----------------|----------------|
| MRU | 32.83 | -3.414 | 0.001 |
| VIKO | 18.12 | | |

There possible explanation for this outcome perhaps may be the mere fact that this current empirical research was carried out in diverse settings (two different higher education institutions, two different study programs and different ESP teachers). However, as it was previously mentioned, the variable of higher education institution was in fact treated as extraneous and was incorporated only for the sake of this current narrow context-specific empirical research, thus the findings regarding its moderating effect are not be proposed as applicable for other research settings.

The hypothesis H_{9b} : *the variable of gender has a significant relationship with perceived usefulness of CmapTools (PU)* was tested. The findings presented in Table 36 suggest that this demographic variable was significantly negatively correlated only with item $PU6$ (*CmapTools helped me to enhance ESP terminology and concepts*) ($r=-0.298, p=0.030$). Negative correlation describes an inverse relationship between the two variables: if the value of one variable increases, the value of the other one decreases, and vice versa. Campbell and Stainley (1963) warn, however, that “correlation does not necessarily indicate causation, but a causal law of the type producing mean differences in experiments does imply correlation” (Campbell & Stainley, 1963, p. 64). Therefore, to find out whether the perceptions regarding the usefulness of the tool were stronger with male or with female students, a *Mann-Whitney U* test was conducted. It indicated that male respondents were more likely to report that *CmapTools* had been useful for enhancing their ESP terminology and concepts than female respondents, as the mean rank ratings for male respondents (32.60) were higher than those for females (23.61) (*Mann-Whitney U* $z = -2.001, p = 0.0432$). Figure 24 illustrates gender differences regarding the respondents’ attitudes towards perceived usefulness of *CmapTools*:

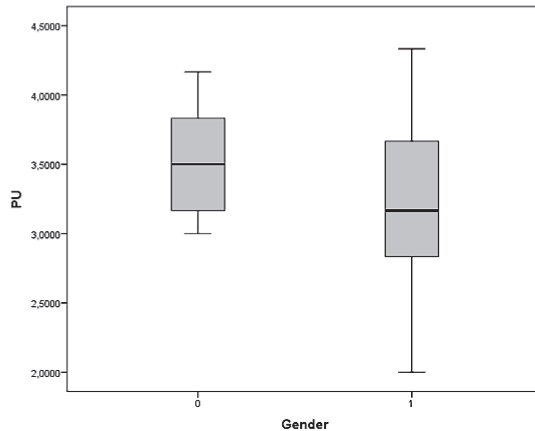


Figure 24. Boxplots of gender differences regarding the respondents’ perceptions of the usefulness of *CmapTools*

To sum up the findings of correlation analysis (Table 39), we can observe a negative correlation between the demographic variable of *gender* and the construct of *perceived usefulness*, which suggests that compared to female participants of this current experiment, male’s decision to use Web 2.0 tool *CmapTools* in the future was more strongly influenced by their perception of usefulness of the tool. The correlation is weak, but still statistically significant, therefore the hypothesis H_{9B} : *the variable of gender has a significant relationship with perceived usefulness of CmapTools (PU)* is supported.

Table 39. Spearman’s correlation matrix for the variable of gender and the construct of PU

| <i>Gender</i> | <i>r-value</i> | <i>p-value</i> | <i>Perceived Usefulness</i> |
|---------------|----------------|----------------|-----------------------------|
| | -0.287** | 0.037 | |

The two hypotheses H_{9C} : *students’ native language has a relationship with perceived use of CmapTools (PU)* and H_{9D} : *the language students most frequently use for online activities has a relationship with perceived use of CmapTools (PU)* were tested. Once I failed to detect any significant correlations between the the demographic variable of *native language* with the construct of *perceived usefulness* of *CmapTools* (PU), hypothesis H_{9C} is rejected. However, *the language students most frequently use for online activities* was found to have a negative relationship with one item of PU, i.e. PU2 (*CmapTools helped me to improve ESP reading skills*) even though this relation is weak ($r=-0.451, p=0.001$). Descriptive statistics indicated that the slim majority of the respondents (52.8%, $n=28$) reported English to be the most frequently used language for browsing the Internet, 37.7% ($n=20$) of the students indicated that they use Lithuanian, 7.50% ($n=1$) reported Russian and only 1.90% ($n=1$) specified that he or she used the Polish language for their routine Web activities. This suggests that the more students tended to use English for their routine activities on the Internet, the easier for them was to grasp the usefulness of *CmapTools* used for their ESP reading assignments, and vice versa. To conclude the results of correlation analysis in Table 40, it can be observed that there exists a negative correlation ($r=-0.350, p=0.010$) between the independent variable *the language students most frequently use for online activities* and TAM construct *perceived usefulness of CmapTools*, which again allows to assume that the more students tended to use their native languages for everyday browsing activities, the less they perceived the usefulness of *CmapTools* for learning ESP. Although this relationship is very weak, we can still support H_{9D} : *the language students most frequently use for online activities has a relationship with perceived use of CmapTools (PU)*.

Table 40. Correlation between independent variable language used for online activities and TAM construct perceived usefulness of CmapTools

| <i>Language used for online activities</i> | <i>r-value</i> | <i>p-value</i> | <i>Perceived usefulness</i> |
|--|----------------|----------------|-----------------------------|
| | -0.350** | 0.010 | |

The two hypotheses H_{9f} : *students' self-reported experience in using Web 2.0 tools has a relationship with perceived usefulness of CmapTools (PU)* and H_{9g} : *students self-reported experience in using CmapTools has a relationship with perceived usefulness of CmapTools (PU)* were tested. Table 36 suggests that the *students' ability to use Web 2.0 tools* ($r=0.309, p=0.024$) and their *ability to use CmapTools* ($r=0.543, p<0.001$) have a moderate positive and low relationship with the first item in PU construct, namely *CmapTools helped me to improve my ESP knowledge*. Logically, we can expect that an ability to use *CmapTools* can be considered one of the most significant factors, making influence on students' perceptions about the usefulness of the tool, especially when we observe significant positive correlations (although moderate or weak) with this variable and three important items in PU construct, namely *PU1 (CmapTools helped me to improve my ESP knowledge)* ($r=0.543, p<0.001$), *PU2 (CmapTools helped me to improve ESP reading skills)* ($r=0.322, p=0.019$) and *PU6 (CmapTools helped me to enhance ESP terminology and concepts)* ($r=0.412, p=0.002$). However, taken together the findings of correlation analysis, no statistically significant relations were identified between the respondents' self-reported proficiency in using Web 2.0 tools (*CmapTools* included) with their *perceived usefulness of CmapTools*, therefore the hypotheses H_{9e} and H_{9f} have to be rejected. This probably points to the user-friendly nature of *CmapTools*, as characterized by its creators Novak and Cañas (2004), and allows us to believe that despite of the differences in self-reported experience in using Web 2.0 tools and in using *CmapTools*, the participants' perceptions regarding the practical value offered by the tool were fairly similar. No statistically significant relationships were identified between the respondents' self-reported attendance of ESP classes and their *perceived usefulness of CmapTools* either, thus the hypothesis H_{9h} : *self-reported attendance of ESP classes has a significant relationship with perceived usefulness of CmapTools (PU)* is rejected too. This result has further strengthened confidence in versatility of the tool for in-class and out-of-class activities.

The hypothesis H_{10} : *the demographic variables have a relationship with perceived ease of using CmapTools (PEOU)* was tested. Correlation analysis was conducted and Spearman's correlation coefficient (ρ) was used. Table 41 displays significant correlations between the demographic variables and items on PEOU construct.

Table 41. Significant correlations between the demographic variables and items on PEOU construct

| Demographic variables | r-value | p-value | Item PEOU1 |
|--|---------|---------|--|
| 1 Higher education institution | 0.367* | 0.007 | Learning ESP through the use of <i>CmapTools</i> was easy for me |
| 6 Self-reported proficiency in using Web 2.0 tools | 0.284* | 0.040 | |
| 7 Self-reported proficiency in using CmapTools | 0.471* | 0.001 | |

| <i>Demographic variables</i> | <i>r-value</i> | <i>p-value</i> | <i>Item PEOU2</i> |
|---|----------------|----------------|--|
| 6 Self-reported proficiency in using Web 2.0 tools | 0.419* | 0.002 | It was easy for me to become skilful in using <i>CmapTools</i> |
| 7 Self-reported proficiency in using <i>CmapTools</i> | 0.522* | 0.001 | |

** Correlation is significant at the 0.01 level (2-tailed);

* Correlation is significant at the 0.05 level (2-tailed).

The results presented in *Table 41* suggests that only three demographic variables, including *higher education institution* ($r=0.367, p=0.007$), *students' self-reported proficiency in using Web 2.0 tools* ($r=0.284, p=0.040$) and their *self-reported proficiency in using CmapTools* ($r=0.471, p<0.001$) had a weak, although statistically significant relationship with item 1 in PEOU construct, namely with *Learning ESP through the use of CmapTools was easy for me*. Students' *self-reported experience in using Web 2.0 tools* ($r=0.419, p=0.002$) and their *self-reported experience in using CmapTools* ($r=0.522, p<0.001$) had a moderate relationship with the second item of the construct, i.e. *It was easy for me to become skilful in using CmapTools*. A conclusion can be made, that the more informed and proficient the students felt in using Web 2.0 technologies and in using *CmapTools*, the easier for them was to brush their skill of working with the tool in their ESP studies. To conclude the results of correlation analysis in *Table 42*, it can be observed that there exists a correlation ($r=-0.284, p=0.039$) between the *students' self-reported proficiency in using Web 2.0 tools* and their perceptions regarding the ease of use of *CmapTools*, therefore hypothesis H_{10F} : ***Students' self-reported experience in using Web 2.0 tools has a relationship with perceived ease of use of CmapTools (PEOU)*** is supported.

Table 42. Spearman's correlation matrix for students' experience in using Web 2.0 tools and PEOU of *CmapTools*

| <i>Experience in using Web 2.0 tools</i> | <i>r-value</i> | <i>p-value</i> | <i>Perceived Ease of Use</i> |
|--|----------------|----------------|------------------------------|
| | 0.284* | 0.039 | |

To sum the results of correlation analysis up as seen in *Table 43*, it appeared that students' perceptions related to the ease of use of *CmapTools* (PEOU) were also influenced by one more demographic factor, i.e. *higher education institution*. For this reason hypothesis H_{10A} : ***HE institution (HEI) has a relationship with perceived ease of use of CmapTools (PEOU)*** is also supported.

Table 43. Spearman's correlation matrix for the HE institution and PEOU of *CmapTools*

| <i>Higher education institution</i> | <i>r-value</i> | <i>p-value</i> | <i>Perceived Ease of Use</i> |
|-------------------------------------|----------------|----------------|------------------------------|
| | -0.350** | 0.010 | |

The *Mann-Whitney U* test (Table 44) additionally indicated that *perceived ease of use of CmapTools* was greater for students from MRU (32,63) than for their counterparts from VIKO (18,43) (*Mann-Whitney U*_z = -3.305, *p* = 0.001).

Table 44. *Mann-Whitney U* matrix for the variable of higher education institution and the construct of perceived ease of use of CmapTools

| <i>HE institution</i> | <i>Mean rank</i> | <i>z-value</i> | <i>p-value</i> |
|-----------------------|------------------|----------------|----------------|
| MRU | 32.63 | -3.305 | 0.001 |
| VIKO | 18.43 | | |

Figure 25 illustrates the differences regarding the respondents' attitudes towards *perceived usefulness* of CmapTools, based on their belonging to one or another participating institution:

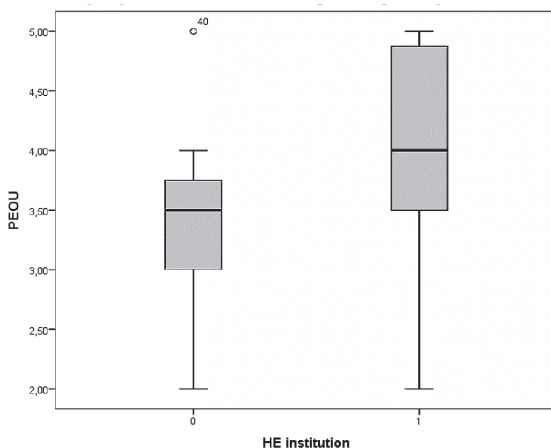


Figure 25. *Boxplots of differences regarding the respondents' attitudes towards Perceived Ease of Use of CmapTools, based on their belonging to one or another participating institution*

I failed to find any significant correlations between the remaining demographic variables of the respondents: their *gender*, *native language*, *language most frequently used for Internet activities*, *self-reported evaluations regarding their level of English*, *self-reported evaluations regarding their ability to use CmapTools*, *attendance of the course* and the construct of *perceived ease of use* (PEOU). Thus, hypotheses H_{10B} , H_{10C} , H_{10D} , H_{10E} , H_{10G} and H_{10H} are rejected. The summary of the results depicted in Table 44 below, however, provides support for all the hypotheses related to original constructs of TAM (H_1 through H_5) to a large extent. It also provides support for the three hypotheses related to additional construct of TAM (awareness) (H_6 through H_8).

Table 44. *The summary of correlation analysis results*

| <i>Interrelations between constructs of TAM</i> | <i>r-value</i> | <i>p-value</i> | <i>Supported</i> |
|--|----------------|----------------|------------------|
| H ₁ : PEOU→PU | 0.626** | 0.000 | Yes |
| H ₂ : PEOU→A | 0.754** | 0.000 | Yes |
| H ₃ : PU→A | 0.627** | 0.000 | Yes |
| H ₄ : PU→BI | 0.491** | 0.000 | Yes |
| H ₅ : A→BI | 0.669** | 0.000 | Yes |
| H ₆ : AW→BI | 0.375** | 0.006 | Yes |
| H ₇ : AW→PEOU | 0.689** | 0.000 | Yes |
| H ₈ : AW→PU | 0.451** | 0.001 | Yes |
| <i>H₉: Individual/ contextual variables→PU</i> | <i>r-value</i> | <i>p-value</i> | <i>Supported</i> |
| H _{9A} : Higher education institution→PU | 0.473** | 0.000 | Yes |
| H _{9B} : Gender→PU | -0.287* | 0.037 | Yes |
| H _{9C} : Native language→PU | - | - | No |
| H _{9D} : Language used online→SN | -0.350* | 0.010 | Yes |
| H _{9E} : Proficiency in GE→PU | - | - | No |
| H _{9F} : Experience with Web 2.0→PU | - | - | No |
| H _{9G} : Experience with CmapTools→PU | - | - | No |
| H _{9H} : Attendance→PU | - | - | No |
| <i>H₁₀: Individual/ contextual variables→PEOU</i> | <i>r-value</i> | <i>p-value</i> | <i>supported</i> |
| H _{10A} : Higher education institution→PEOU | 0.458** | 0.001 | Yes |
| H _{10B} : Gender→PEOU | - | - | No |
| H _{10C} : Native language→PEOU | - | - | No |
| H _{10D} : Language of online activities→PEOU | - | - | No |
| H _{10E} : Proficiency in GE→PEOU | - | - | No |
| H _{10F} : Experience with Web 2.0→PEOU | 0.284* | 0.039 | Yes |
| H _{10G} : Experience with CmapTools→PEOU | - | - | No |
| H _{10H} : Attendance→PEOU | - | - | No |

** Correlation is significant at the 0.01 level (2-tailed);

* Correlation is significant at the 0.05 level (2-tailed).

CHAPTER 7.

DISCUSSION ON THE EFFECTIVENESS AND ACCEPTANCE OF A WEB 2.0 TECHNOLOGY CMAPTOOLS IN ESP STUDIES IN HIGHER EDUCATION

7.1. Discussion on the Effectiveness of Web 2.0 Technology CmapTools

Considering the findings of the Web 2.0 effectiveness domain of this current empirical research, several interesting tendencies can be observed. Although beyond the scope of this research, the discussion part will start with the insights related to the results obtained from the analysis of the placement test, or put it more precisely, their relation to the results of the subsequent ESP achievement tests.

The analysis of placement and ESP vocabulary achievement tests results revealed obvious dynamics in learners' achievements both in experimental and control groups as the result of the learning process. If we initially compare the mean scores of *placement test* (6.62 ± 2.444 for experimental groups ($n=60$) and 6.09 ± 2.321 for control groups) ($n=47$) (in terms of overall research) to those of vocabulary achievement posttest *No 1* (6.29 ± 2.432 and 4.98 ± 2.144 accordingly), we can observe a visible decrease in the results in both groups. However, this decrease is much more evident with control groups, which did not receive any treatment. The potential decline in the results of both groups could have been predicted. The related possible explanation for these findings may be that be the major goal of the placement test was to prove the homogeneity of research participants in the experimental and control groups in terms of their language proficiency prior to introduction of the treatment to experimental groups; moreover, it merely tested students' knowledge of General English (grammar and vocabulary). Meanwhile, *vocabulary achievement posttest No 1* was primarily designed to check the knowledge and retention of specialized, content related and goal-directed terms and concepts discussed and analysed within the first half of the topics envisaged in the syllabi of both study programmes. The decline in the results once again provides additional support to the claim, raised in the previous chapters of this current empirical research, that there exists a rough gap between tertiary students' initial knowledge of general English and actual knowledge of ESP, which may prove quite a challenge both to students and teachers. This concern has repeatedly been addressed by a number of authors within the field both in Lithuania and abroad (Falco, 2017; Poedjiastutie, 2017; Alhawiti, 2017; Kavaliauskienė & Ashkinazi, 2014; Sinadinović, 2013; Pranckevičiūtė & Zajankauskaitė, 2012; Maasum et al., 2012; Martinović & Poljaković 2010). All of them almost unanimously assert that the gap is so wide, that newcomers to a higher education institution may simply "not be ready for the level of instruction incumbent in the ESP program" (Poedjiastutie, 2017, p. 342).

In fact, the tendency may be observed in other areas of ESP taught on the tertiary level. For example, a high percentage of students attending a course in legal translation, as noticed by Falco (2017), "are utterly alien to legal terms, concepts, genres and procedures. The conundrum is, then, how to teach students with hardly any grounding in law to master legal

terms and concepts in order that they can use them consciously in translation” (Falco, 2017, p. 95). In her study dealing with the specific nature of ESP in general and Medical English vocabulary in particular, Sinadinović (2013) emphasizes that “being somewhat different from General English vocabulary, Medical English vocabulary for Academic Purposes is usually considered to be more difficult to learn and use in practice and as a result students tend to have poor results in academic tests” (Sinadinović, 2013, p. 274). In this respect the observations related to the visible decrease in the results of *ESP vocabulary achievement posttest No 1* as compared to the results of *placement test* in this current research confirm to the insights of Sinadinović (2013). Moreover, they suggest several questions in need of further investigation, for example, whether the practice of offering an ESP course in the first year of studies at higher education institution is effective, whether an introductory course to ESP would alleviate the teaching and learning process, and how the gap between the initial situation of the learners in terms of language proficiency and the one which is required in ESP classrooms can possibly be narrowed or closed.

Returning to the first research question (**RQ₁**: *what effect (if any) does the use of a Web 2.0 technology CmapTools in ESP studies in higher education have on students’ achievements in ESP vocabulary acquisition*), the results seem to be encouraging and promising: the analysis of mean scores for *vocabulary achievement posttests No1* and *No2* in experimental and control groups in terms of the whole research, allows us to declare that the strategy of using image-based Web 2.0 technology *CmapTools* was highly effective: the findings demonstrated that experimental groups which practiced learning ESP vocabulary through the use of *CmapTools* procedures in blended settings outperformed the control groups who received conventional instructions. It is fairly apparent that the means of experimental group scores were higher in both posttests, and this difference was statistically significant, thus, the first research question is answered positively.

Still, even with the most favourable findings, there may be certain limitations. For example, resting on the results of their meta-analysis and review of online learning studies, comprising the timeframe 1996-2008, Means et al. (2009) concluded that better results of blended learning, as was the case of this current research, sometimes may be attributed to the fact that such settings often tend to involve “more learning time, additional instructional resources, and course elements that encourage interactions among learners. This confounding leaves open the possibility that one or all of these other practice variables, rather than the blending of online and offline media *per se*, accounts for the particularly positive outcomes for blended learning” (Means et al., 2009, p. 52). There are no doubts that in classrooms (be it ESP or any other sphere of higher education), where any technologies are involved (unless these fall into the category of “hot” ones, used by the learners on daily basis), learners receive additional instructions, and the manipulations of the current experiment were driven by these considerations.

On the other hand, we cannot underestimate the fact that alongside with these extra instructions, a heavier workload and cognitive load is always imposed on students, exposed to technologies, than on those in control conditions. Along with the subject matter to learn, the students assigned to experimental groups in this current research not only had to master their technical skills of working with image-based Web 2.0 technology *Cmap-*

Tools, but also had to develop concept mapping skills and to learn how to read graphics. Many students assigned to experimental groups claimed to have never used graphic organizers before. Thus, if “*fill-in-a-cmap*” activity, for example, leveraged a teacher-generated concept map as an element of scaffolding, the “*create-a-cmap*” technique required individual efforts, and was rather challenging for the students, especially at the beginning of the treatment.

Moreover, by stating that their counterparts in control groups received “traditional” or “conventional” instructions, we may underestimate the experience and efforts of their ESP teachers, delivering the very same content using their preferred teaching methods, styles and techniques. Having contrasted the results of *vocabulary achievement posttest No 1* and *vocabulary achievement posttest No 2*, a favourable change in the mean scores can be witnessed in both groups as a result of the learning process. As it is visible in *Figure 21*, the mean score of the experimental groups has increased from 6.29 to 6.44 ± 2.279 , while in control groups it improved from 4.98 to 5.16 ± 1.812 . Still, the significant difference between the gained mean scores in both vocabulary achievement posttests for two groups confirms the outperformance of experimental groups and allows us to state that there definitely exists causal relationship between the use of an image-based tool *CmapTools* in ESP studies in higher education and students’ achievements in ESP vocabulary. This finding is in line with the insights of Ellis (2004), who is convinced that the use of any type of graphic organizers, be it paper-and-pencil based or computer supported, can contribute to the improvement of both classroom and achievement test scores, and the results of this current research confirmed this to be the case. The author believes that classroom test scores in many cases increase for several reasons. First, he suggests, “the graphics help students understand and learn the subject. Second, they help students focus their energies on studying the essential information. Third, they serve as effective devices for helping students focus on the relationships between main ideas and details, main ideas and other main ideas, and so forth” (Ellis, 2004, p. 3). He warns, however, that “the degree to which test scores are impacted by graphic organizers is relative to the degree to which they are effectively used and become an integral part of the on-going instruction” (Ellis, 2004, p. 3).

Having in mind that this current research can be considered one of the first to investigate the effectiveness of *CmapTools* concept mapping software for ESP vocabulary acquisition both in Lithuania and elsewhere, it was difficult to discover research on the same topic supporting or contradicting the results obtained. As far as the author’s knowledge is concerned, the single study which produced relatively similar results was that of Balula, Martins, & Marques (2014). The authors explored whether implementing a teaching and learning strategy based on the use of concept mapping supported by *CmapTools* can help to improve ESP students’ business English competences at a university in Portugal. Among the findings reported was enhanced development of the participants’ linguistic competences including the use of business English terminology, as well as communication and collaboration competences.

This segment of empirical research was also guided by the second research question **RQ₂**, *what effect (if any) does the use of a Web 2.0 technology CmapTools in ESP studies in higher education have on students’ achievements in ESP reading comprehension?* To address

the question mean scores of two ESP reading assignments were analysed and compared in each institution separately as well as in terms of overall research. The reading assignments for control groups involved summarizing techniques, while in experimental groups- the usage of *CmapTools*-supported concept-map construction strategies both on-scaffold and by self.

The first thing that strikes our attention about the findings of this part of empirical research is that the mean scores of the two ESP reading assignments in both participating institutions are obviously higher in experimental groups which received treatment with *CmapTools* and were required to apply the strategy of using *CmapTools* than in untreated control groups, which were obliged to use summarizing techniques (*Figure 22*). We can again assume that this difference in the results favouring the experimental group is related to the fact that imaged-based Web 2.0 technology *CmapTools*, as any other type of graphic organizers be it paper-and-pencil based or computer supported, in Ellis' (2004) words, allowed teachers to deliver more than fixed ESP content. For this part, while analysing authentic texts through the lens of *CmapTools*, students in experimental groups were simultaneously enabled to develop their "information processing skills, patterns for organizing information, analytical and critical thinking skills" (Ellis, 2004, p. 5).

In this regard the findings of this empirical research bear a close resemblance to the results of previous studies in the field, which are more abundant, in comparison to those investigating the impact of the tool on students' ESP vocabulary achievements. Two studies, conducted by Roy (2017) and Soleimani and Rostami abu Saeedi (2016), investigating the effects of applying *CmapTools*-supported concept mapping strategies on ESP learners' reading achievements, can serve as close examples. In both studies university students in upper-intermediate level of English, randomly selected and assigned into control and experimental groups, were exposed to task-based classroom reading activities. The students in control group were taught by using a conventional paper-and-pencil based concept mapping strategy, while those in experimental group were instructed by using a *CmapTools*-supported concept mapping strategy. The analysis of reading posttest results in both studies indicated that students in experimental group outperformed their counterparts in control group. Furthermore, independent samples *t*-tests detected that there was a significant difference in the scores of the two groups, therefore a conclusion was made that *CmapTools*-assisted language learning had a significant effect on learners' ESP reading achievements in both cases. However, contrary to the results of these two previous studies as well as to the hypotheses raised, the analysis of mean scores for both ESP reading posttests in this current thesis did not identify any statistically significant differences in the results between experimental and control groups (regardless of the previously mentioned fact that the mean scores of both assignments in both participating institutions were obviously higher in experimental groups).

Another unexpected finding was obtained having compared the dynamics of mean scores for *ESP reading assignment 1* to those for successive *ESP reading assignment 2* between experimental and control groups in terms of overall research. Improved achievement scores in reading assignments were anticipated from participants in experimental groups assuming at the end of the course they would have already mastered the principles of using

of graphics to structure, comprehend and represent the information obtained from authentic texts. In other words, it was expected that the functions of independently analysing authentic texts through the use of *CmapTools* had already matured in them. However, as one can appreciate from *Figure 22*, a slight improvement can only be observed within the performance of the untreated control groups which were required to summarize authentic texts. The mean score in their case has marginally increased from 7.47 to reach 7.51. By contrast, the participants in experimental groups ended up showing no improvement at all. In fact, their mean scores although still higher than in control group decreased from 8.1 to 7.87. Findings in this respect again do not appear to corroborate previous empirical research in this area. To illustrate, in the research conducted by Omar (2015) investigating the effect of employing a *CmapTools*-based concept mapping technique on a group of pre-medical students' ESP reading comprehension in a seven-week-long experiment, data collected through a test checking students' initial reading comprehension and an alternate reading posttest version were compared to determine whether there existed any significant differences in the level of participants' performance which could be attributed to *CmapTools* treatment. It was estimated that the students' mean score in reading comprehension tests has increased from 11.04 (out of 20) to reach 15.64. Moreover, the *t*-test results revealed a significant difference between the levels of performance in both tests, thus verifying the efficacy of this technique.

Although the analysis of data in this current research reveals opposite to what was obtained by Omar (2015), it suggests three meaningful insights into the effectiveness of *CmapTools*-based concept mapping strategies used for developing ESP reading skills.

First, they turn our attention to the importance of teacher and student collaboration and to the necessity of scaffolding instruction in *CmapTools*-supported ESP reading activities, emphasized by several authors within the field (Soleimani, & Rostami abu Saeedi, 2016; Balula, Martins, & Marques, 2014). In fact, as noticed by Strangman et al. (2004), any graphic types and formats of graphic organizers "can be effective learning and evaluation tools when implemented within a substantive instructional context, particularly an interactive/collaborative approach involving teacher modeling, student-teacher discussion, and practice with feedback" (Strangman et al., 2004, p. 14). As it was previously mentioned, both ESP reading assignments in this research were considered totally individual. For *ESP reading assignment 1* students in experimental group were required to reconstruct a teacher selected authentic text by generating their own cmap. Still, the task was slightly alleviated by providing them with teacher suggested concepts to rely on when working on the assignment. For *ESP reading assignment 2*, however, teacher assistance and surveillance was deliberately withdrawn, presupposing that students' interpersonal *CmapTools*-supported concept mapping skills had already transformed into intrapersonal ones. To put it short, it was expected that these skills had reached mastery and consistency and matured to the degree when they seemed capable to work on their own. However, it seems that at the end of the semester students' abilities of reconstructing an authentic ESP text using *CmapTools* in Vygotsky's (1978) terms were still within the state of "buds" or "flowers" rather than the "fruits" of their development. In other words, they still were in a state of formation at the *zone of proximal development*. It is thus possible that namely the lack of teacher's guidance

and scaffolding can account for the decrease in the results in *ESP reading assignment 2* with experimental groups.

Second, considering Vygotsky's (1978) assertion that internalization or "the transformation of an interpersonal process into an intrapersonal one is the result of a long series of developmental events" (Vygotsky, 1978, p. 57), it can be assumed that one semester was simply too short a period for the mastery to develop, as developing reading skills is a much more complicated process than vocabulary acquisition. This is in good agreement with Jiang and Grabe, (2007), who emphasize that "a considerable amount of practice is needed before the best way is found to represent the ideas of a text in graphic organizers and to arrange them in such a way that they illustrate the text interrelationships and patterns of organization in a clear, simple, and effective manner" (Jiang & Grabe, 2007, p. 43). However as it was detected by was systematic literature review in *Chapter 2*, short period of ESP studies can be considered limitations with almost all ESP courses, and this particular empirical research is not an exception.

The third possible explanation regarding the present results could be the challenge and risk caused by introducing authentic materials and concept mapping and tasks in ESP studies. We cannot argue the necessity and value of authenticity in ESP classrooms, simply because "the language presented to students in textbooks is a poor representation of the real thing" (Gilmore, 2008, p. 23). Berardo (2006) calls the language of non-authentic texts "artificial" and "unvaried", suitable for teaching structures, but not beneficial for developing reading skills "for the simple fact that they read unnaturally" (Berardo, 2006, p. 62). Authentic reading materials, as noticed by the author, give the learners opportunity to interact with the real language and content rather than the form. However, we have to take into consideration that ESP students, exposed to these types of texts are always non-native learners of English, thus there is always a strong possibility that they would simply have a lack of knowledge to be able to fully comprehend the texts. Readability computations of authentic reading materials used in this research indicated that all the selected four articles fell within a fairly difficult or standard level of readability (see *Chapter 4*). It is very likely that visualizing the content and representing the ideas of such convoluted reading materials through the use of *CmapTools* (despite of its very user-friendly nature) was a complicated task for ESP students, especially when it lacked continuous expert surveillance and guidance (as was the case with ESP reading assignment 2).

If improved learning achievements are indicators of the effectiveness of an educational technology (Gibson, 2001; Agodini, Dynarski, Honey & Levin, 2003), then the conclusions regarding the effectiveness of *CampTools* on ESP students' achievements in this current empirical research are definitely mixed. The technology proved to be highly effective for developing the participants' ESP vocabulary acquisition: the experimental groups who were learning through the use of *CmapTools* procedures, improved their results at the end of the treatment. Moreover, they outperformed the control groups who received conventional instructions. However, when using the technology for developing their ESP reading comprehension, the students in experimental groups ended up showing no improvement at all. What then were their perceptions regarding the functionality of the technology at the end of the treatment? Positive or negative? Did they accept a Web 2.0 technology *Cmap-*

Tools as user-friendly or complicated? Useful or not? Would anyone be willing to continue interacting with the technology once the treatment is over and the use of the technology shifts from mandatory to optional? What factors exert influence on this decision? These multitude questions are discussed in the second section of this chapter.

7.2. Discussion on the Acceptance of Web 2.0 Technology CmapTools

The empirical part of this research also aimed at developing understanding of the factors that can exhibit significant influence on the acceptance of Web 2.0 technologies in blended ESP learning environments in higher education institutions from ESP students' perspective. It was guided by the third research question **RQ3**: *what factors influence ESP students' acceptance of a Web 2.0 technology CmapTools in ESP studies in higher education ESP?* To seek answers to this last research question, Technology Acceptance Model (TAM) (Davis, Bagozzi & Warshaw, 1989) was employed as a theoretical framework, whereas the structured paper-based attitudinal questionnaire was applied as an instrument for data collection. The administration of the questionnaire was considered the fifth and the final phase of the treatment in the quasi-experiment, discussed in *Chapter 4*. It is important to mention that only the students assigned to experimental groups of the quasi-experiment in both higher education institutions and assumed to have in-depth knowledge about and experience with *CmapTools*, served as the respondents to the questionnaire.

According to Technology Acceptance Model proposed by Davis, Bagozzi and Warshaw (1989), *actual usage* of a given technology [which is generally considered to be the last stage within technology acceptance process], is determined by potential user's *behavioral intention* to use it, which is successively determined by his or her overall *attitude* towards the technology. *Attitude*, in turn, is a function of two major beliefs: *perceived usefulness* and *perceived ease of use* of the given technology. *Perceived ease of use* is also assumed to have an effect on *perceived usefulness*. Rogers (1983) posits, however, that a person cannot have consistent and favourable attitudes and beliefs about ideas that he or she has not previously encountered, therefore he suggests that *awareness* should act as an antecedent for *attitude* formation within the process of technology acceptance. Ntshakala (2016) clarifies that *awareness* should act as a mediator of *perceived usefulness*, *perceived ease of use* and *behavioural intention* once they have a relationship with other constructs. Resting on these opinions, an additional construct of *awareness* was introduced and incorporated into TAM to relate it to this particular research. On the other hand, the original construct of *actual usage* was discarded bearing in mind the mandatory use of *CmapTools* in ESP context.

TAM also theorizes that the two major beliefs (*perceived usefulness* and *perceived ease of use*) are as a rule affected by *external variables*. The latter may vary depending on the characteristics of participants involved, affordances of technology analyzed as well as on the type of a setting where the technology is being utilized. This research incorporated eight independent moderating individual and contextual factors as external variables, including *higher education institution* of the respondents, their *gender*, *native language*, *the language most frequently used online* and *self-evaluations regarding their English language level*, their *experience in using Web 2.0 tools* and *experience in using CmapTools* as well their *attendance rate of ESP classes*.

The discussion will start with the insights on the *interdependency between the original constructs of TAM*, i.e. between *perceived usefulness* and *perceived ease of use* as well as their relationships with *attitude* and *behavioural intention*. It should be acknowledged in the first place that no earth-shattering discoveries were made regarding the interrelations of these constructs of TAM. However, although on first impression the discoveries seem rather unremarkable, they indeed confirm the applicability of TAM within ESP context in higher education. Findings indicated that all the hypotheses related to the original constructs of TAM (H_1 through H_3) were largely supported by the data. The following paragraphs will discuss them in more detail.

It seems that participants of educational experiment perceived an image-based Web 2.0 technology *CmapTools* as a user-friendly software, just as it was intended by its designers Novak and Cañas. If we turn to the findings of descriptive analysis for the construct of *Perceived Ease of Use* (PEOU) within the third section of the questionnaire, we will see that they revealed results, which are positive to a large degree. To illustrate, the majority of the respondents (71.7%) agreed (43.4%) or strongly agreed (28.3%) with the statement that *it was easy for them to become skillful in using CmapTools*. A very similar percentage of them (69.8%) declared that they either agreed (37.7%) or strongly agreed (32.1%) with the item that *CmapTools was easy for them to use*. The analysis also indicated that approximately two-thirds of the respondents (64.2 %) agreed (34.0%) or strongly agreed (30.2%) with the statement that *learning ESP through the use of CmapTools was easy for them*. Almost half of the respondents (47.2%) agreed (28.3%) or strongly agreed (18.9%) that *CmapTools was flexible in interacting and collaborating with peers and the teacher*. These perceptions on the *ease of use* of the tool (PEOU) were found to exert direct influence on their perceptions regarding the *usefulness* of it (PU) ($r=0.626, p<0.05$), hence supporting hypothesis H_1 . This finding once again reinforces the generally accepted axiom that the less complicated a user finds technology-related activities, the more likely he or she will consider a technology to be useful, as confirmed repeatedly both in primary sources (Davis, 1985; Davis, Bagozzi & Warshaw, 1989; Venkatesh et al., 2003) and in research conducted within the sphere of ESP (Gamble, 2017; Van de Bogard & Wichadee, 2015; Afshari et al., 2013; Tajuddin et al., 2012).

Just as postulated by TAM, the evidence found through correlational analysis points to the conclusion that both aforementioned dominant factors (*perceived usefulness* and *perceived ease of use of CmapTools*) did jointly exert positive significant influence on ESP students' overall *attitudes* (A) towards using the software, thus supporting hypotheses H_2 ($r=0.754, p<0.05$) and H_3 ($r=0.626, p<0.05$). These results correlate fairly well with theoretical arguments provided earlier by Davis (1989) as well as with the findings of previous ESP research reported by Yu-Li Chen (2014) and Afshari et al (2013), although related to different Web 2.0 technologies. This evidence further support the idea that once users' perceptions regarding the attributes (*perceived ease of use* and *usefulness*) of any technology improve, their attitudes towards that technology inevitably improve as well.

As it was both expected and hypothesised, *perceived usefulness of CmapTools* (PU) was also found to be a significant determinant in influencing ESP students' *behavioural intention* to use the tool in the future (BI) ($r=0.491, p<0.05$). Previous studies, those not related to ESP (Davis et al, 1989; Venkatesh & Davis, 2000; Venkatesh, Morris & Ackerman, 2000;

Venkatesh et al., 2003) and those related (Gamble, 2017; Van de Bogard & Wichadee, 2015) have also confirmed a positive relationship between *perceived usefulness* of technologies and users' *behavioural intention* to use them. Hence the hypothesis H_4 is supported. It is clear that students *intend* to use *CmapTools* in the future to improve their English or plan to add it as another medium in their future studies. What is not clear, which subjects they intend to learn through the use of *CmapTools* in the future? This leaves scope for the future researchers to explore where and how the students are using mandatory educational Web 2.0 technologies once these technologies become optional (and whether they are using them at all).

We can also confirm that *behavioural intention* to use a technology (BI) is determined not only by potential users' perceptions regarding its *usefulness* (PU), but also by their positive *attitude* (A) towards it, as a significant positive correlation was found between the variables of *attitude towards CmapTools* (A) and *behavioural intention* to use *CmapTools* (BI) ($r=0.669, p<0.05$). Therefore the hypothesis H_5 is supported. The finding that the more positive an individual's attitude towards a technology is, the stronger his or her intentions to use the technology are, corroborates well with results reported in several TAM-related studies within the area of ESP (Van de Bogard & Wichadee, 2015; Tajuddin et al, 2012).

With respect to the role of *awareness* (AW) (a variable, additionally incorporated into TAM), it appeared to be an important factor directly influencing students' *behavioural intention* to use the tool (BI) ($r=0.375, p<0.05$), allowing us to support H_6 . These findings are in a good agreement with Bates (2015), who stated that the more users know about the functions and attributes of the proposed technology (in our case- an image-based Web 2.0 tool *CmapTools*), the more they are likely to use it in the future. They also substantiate previous findings in TAM-related literature. For example, having empirically investigated factors influencing Lebanese postgraduate MBA students' acceptance of e-government, Charbaji and Mikdashy (2003) similarly indicated that namely their students' awareness about e-government significantly influenced their behavioural intention to use it. The findings are also in line with Yemen, Alzubi et al. (2017) who discovered that the factor of awareness had a significant positive relationship with users' behavioural intention to use e-banking.

It was also hypothesised that *awareness* of *CmapTools* (AW) acts as a mediator of both *perceived usefulness* (PU) and *perceived ease of use* (PEOU) which then in turn jointly affect students' attitude towards the tool. Indeed, students' familiarity regarding the tool was found to have positive significant correlations between *perceived ease of use of CmapTools* (PEOU) ($r=0.689, p<0.05$) and *perceived usefulness of CmapTools* (PU) ($r=0.451, p<0.05$), hence hypotheses H_7 and H_8 were supported. We should probably elaborate more on the relationship between *awareness* (AW) and *perceived usefulness of CmapTools* (PU) or to be more exact, on items in PU construct, which significantly correlated with the items in *awareness* construct. These were *CmapTools helped me to improve my ESP knowledge* (PU1), *CmapTools helped me to improve ESP reading skills* (PU2) and *CmapTools helped me to enhance ESP terminology and concepts* (PU6). However, awareness of the tool seemed to have no relations with ESP students' *perceived usefulness* of the tool for *developing ESP writing* (PU3), *speaking* (PU4) and *listening* (PU5) skills. It is logical enough, having in mind that since the very beginning of the semester the participants of this current treatment were

clearly informed and thus were aware they would be using concept-mapping strategies and would be utilising concept-mapping software for learning ESP vocabulary in-class as well as for home reading assignments out-of-class. Or presumably they learned from hands-on experience that the tool was not really useful for developing their listening or speaking skills. Even though the students were constantly being invited to make use of the Spelling Checker function, offered by *CmapTools* designers, to find and correct any cumbersome spelling mistakes in concept maps they were creating, they probably perceived the tool as not particularly beneficial for developing their writing skills either. These findings suggest that it is vital to acquaint the potential users of technology with the goals of utilising the new technology and potential practical value it may offer.

Correlation analysis also tried to explore which of *individual and contextual characteristics* could possibly have influenced the two major constructs of belief (*perceived usefulness* (PU) and *perceived ease of use* (PEOU)), which in turn determine their decision to continue using the tool. If positive and significant relationships were confirmed between core constructs of TAM, as well as between an additional construct of *awareness* (AW) and PEOU, PU and BI, it appeared that out of 8 aforementioned individual and contextual factors, only 3 did really exert influence on users' personal perceptions regarding the attributes of the tool.

To illustrate, *gender* of the respondents was found to have very low although still significant negative correlation with the construct of *perceived usefulness* (PU) ($r=-0.287, p<0.05$). The findings of *Mann-Whitney U* test clarified that these were male students, whose perceptions regarding the *usefulness* of *CmapTools* were stronger, compared to their female counterparts. Hence, hypothesis H_{9b} was supported. These results do not seem to corroborate with any previous research results within the area of ESP. In fact, only Arshad et al. (2012) included the variable of *gender* into their study on the acceptance of different Web 2.0 technologies in EFL course to find no significant causal effects related to masculinity-femininity. Nevertheless, our results correlate fairly well with those reported in previous primary sources. As it was mentioned earlier, Venkatesh and Morris (2000) discovered that men, more than women, were more strongly influenced by their perceptions regarding usefulness of the technology. On the contrary, women's technology usage decisions were more strongly influenced by perceptions regarding the ease of use of the technology.

Another external factor which proved to have a moderating effect on *perceived usefulness* (PU) of *CmapTools* was the *language students most frequently used for online activities*. A negative correlation between these two variables was detected, allowing us to assume that the more ESP students tended to use their native languages for everyday browsing activities, the less they perceived the usefulness of *CmapTools* for learning ESP. As English was reported to be the most frequently used language for Internet activities, we may twist the conclusion by stating that the more students tended to use English for their routine activities on the Internet, the easier for them was to grasp the usefulness of *CmapTools* used for their ESP activities. Although this relationship is very weak ($r=-0.350, p<0.05$), we can still support hypothesis H_{9p} . These results do not seem to substantiate any previous findings in the literature, however they definitely highlight the significance of English as the dominant language of the Internet and Web 2.0 technologies.

The analysis did not provide any evidence that ESP students' *native language*, their *self-evaluations regarding their English language level*, their *experience in using Web 2.0 tools* and *in using CmapTools* or their *attendance rate of ESP classes* affected their perceptions regarding the *usefulness* of the software (PU). Hence the hypotheses H_{9C} , H_{9E} , H_{9F} and H_{9H} are to be rejected.

With respect to TAM construct of *perceived ease of use* (PEOU), it can be observed that this construct is significantly influenced only by students' *self-reported proficiency in using Web 2.0 tools*. A low positive but still significant correlation ($r=0.284$, $p<0.05$) between the two variables was detected, therefore hypothesis H_{10F} was supported. This finding is in line with the results of the pilot study (see *Chapter 4*), which indicated that namely students' ability to use Web 2.0 technologies was a significant factor influencing the acceptance of these technologies in ESP studies at the university. The findings of the study exploring ESP students' acceptance of Smartphones, conducted by Iqbal and Bhatti (2015) also show that students who have required technical skills can engage themselves better in the use of a new technology than those who did not have those skills.

No significant correlations, however, were detected between the remaining demographic variables of the respondents, namely between their *gender*, *native language*, *language most frequently used for Internet activities*, *self-reported evaluations regarding their level of English*, *self-reported evaluations regarding their ability to use CmapTools*, *attendance of the course* and the construct of *perceived ease of use* (PEOU). Thus, hypotheses H_{10B} , H_{10C} , H_{10D} , H_{10E} , H_{10G} and H_{10H} were rejected. The findings presuppose, however that any users, no matter whether these were males or females, whether their English language record was good or poor, no matter which language was their mother tongue and which was used for the Internet activities, all of them had similar perceptions regarding the ease of use of *CmapTools*.

It should be mentioned, however, that there was one contextual variable, which did exhibit significant influence on both constructs of belief: *perceived usefulness* (PU) ($r=0.473$, $p<0.05$) and *perceived ease of use* (PEOU). It was the variable of *higher education institution*. It was also detected that perceptions regarding both *ease of use* and *usefulness* of the tool were stronger with the students coming from MRU as compared to their peers at VIKO. Perhaps this difference may account to the fact that the treatment was conducted in diverse settings, and although preventive measures were taken to have them as homogeneous as possible, certain differences inevitably remained. Moreover, in contrast to the teacher at VIKO, ESP teacher at MRU was also simultaneously playing the role of the experimenter. Again, although precautions were taken to avoid the problem of unconscious influence, also known as *experimenter expectancy* (Campbell & Stanley, 1963; Cook & Campbell, 1979; Kardelis, 2005; Neuman, 2006; Cohen, Manion & Morrison, 2007; Fraenkel, Wallen & Hyun, 2012; Martella et al., 2013) or *experimenter bias* effect (Rosenthal & Fode, 1963), the ESP students at MRU may still have subtly been influenced by the researcher. This in fact can be admitted as one of the limitations of this research, which will further be elaborated in the last section of this chapter. There is one concluding remark: it was the teacher at VIKO, who was pleasantly surprised by her ESP student at the end of the semester and treatment. The surprise came in the form of a beautifully arranged and methodologically sound concept map summarizing the material of all the semester (please refer to Annex 7).

As the teacher recalled, the student developed it for no reward at all, however it was the the highest reward for her.

Limitations and directions for future research. It is plausible that certain limitations might have influenced the results obtained. First, the research questions of this dissertation were addressed by taking advantage of a quasi-experiment, incorporating a *static-group comparison design* also known as *posttest only design*. As it is noticed by Cook and Campbell (1979), the most important feature (and flaw) in this type of design is the absence of pretest measures, which may imply that any posttest differences between the groups could have been ascribed either to a treatment effect or to selection differences between the groups. In fact, sample size and sample selection could be admitted as the second limitation of this research, as participants of the aforementioned quasi-experiment were only 107 students from two higher education institutions in Lithuania. Moreover, they were selected using non-random sampling techniques, as it is the case with vast majority of ESP related studies. Therefore, future research should try employing stronger experimental designs with an increased sample size and if possible, involve random sampling techniques. Third, future studies should also look towards more longitudinal research to further explore the effectiveness of *CmapTools* on ESP learners' achievements. Fourth, as it was previously mentioned, this dissertation holder simultaneously played the role of both: an ESP teacher of the experimenter, which means that the problem of unconscious influence could have arisen. For this reason future researchers should try to avoid these double roles to reduce the risk of experimenter expectancy. And finally, the acceptancy part of this research employed *Technology Acceptance model* and analysed the interdependency of its internal, external and additional constructs through the use of correlation analysis. According to Taylor (1990), correlation analysis (as is true with almost all statistical methods and procedures), measures relationship and association, however, it does not define thorough explanation on the outcome. To dig deeper and gain insights and understanding on underlying reasons regarding the acceptance of *CmapTools*, future research should preferably involve qualitative data collection methods, such as interviews, focus groups or observations.

RECOMMENDATIONS

Before integrating *CmapTools* (an in fact any educational technology) into your ESP course, several important issues should be considered:

- ask yourself, what you and your students need and what you want to accomplish. If your course is focused on developing ESP listening or speaking skills, the tool may be considered not feasible. Go for it if you want to help your students build better understanding of the content they are going to learn and the texts they are going to read.
- *CmapTools* is definitely a user-friendly Web 2.0 technology. Still, its functions and possibilities are endless, so be advised to carefully study the help files provided by *CmapTools* on their official page and the tutorials on working with the tool available on the *YouTube*.
- be ready that your students may not be familiar with concept mapping method and techniques before they start using the software. Make sure you devote enough time for the introductory sessions to help them get familiar with the basics of concept mapping. You may initially opt to start with paper-and-pencil format. You will see that determining key concepts and establishing relations between them may be both complicated and time consuming at least for some of the learners.
- as a novice teacher will probably find that designing *CmapTools* supported classroom activities requires a significant amount of time and efforts. It is obviously time consuming at the beginning, especially when you get involved in arranging “bones” on expert “skeleton” maps. Finally you will master the technique and this investment will pay off in the long run.

CONCLUSIONS

Seven objectives were set to achieve the main aim of this dissertation:

1. To highlight the significance of Web 2.0 and its technologies within the sphere of higher education;
2. To explore the peculiarities of using Web 2.0 technologies in ESP studies in higher education;
3. To explore the drivers of accepting Web 2.0 technologies by ESP students in higher education;
4. To analyze the affordances of a Web 2.0 technology *CmapTools* and integrate it into two mandatory ESP courses in two higher education institutions in Lithuania;
5. To measure the effect of using a Web 2.0 technology *CmapTools* in two mandatory ESP courses in two higher education institutions on students' achievements in ESP vocabulary acquisition;
6. To measure the effect of using a Web 2.0 technology *CmapTools* in two mandatory ESP courses in two higher education institutions on students' achievements in ESP reading comprehension;
7. To determine factors influencing ESP students' acceptance of a Web 2.0 technology *CmapTools* in two mandatory ESP courses in two higher education institutions.

The objectives were met by reviewing relevant literature and conducting a quasi-experiment, involving an image based Web 2.0 technology *CmapTools* to investigate its effectiveness on ESP students' achievements in vocabulary and reading and to explore factors, which influenced ESP students' behavioural intentions to use the tool in the future. The research used quantitative data gathered through ESP vocabulary achievement and ESP reading posttests as well as a structured attitudinal questionnaire used as data collection instruments. The following conclusions can be derived from the relevant literature review, and from the statistical analysis of empirical data:

1. Web 2.0 has developed as a result of an array of historical, scientific and technological events of the 20th century. It is conceptualized as second generation of *World Wide Web* as well as its numerous technologies that enable interaction, collaboration and sharing between users. Driven by these unique characteristics Web 2.0 changed the ways of how people communicate and interact with each other through technologies, but most importantly, of how they construct knowledge and learn. It was with the advent of Web 2.0 that new alternatives related to traditional teacher-directed classrooms in higher education emerged, including *synchronous distributed courses*, *Web-enhanced courses*, *blended (hybrid) classroom courses*, *blended (hybrid) online courses*, *fully online courses* or *flexible mode* and in fact have almost supplanted routine *face-to-face* teaching and learning experiences. It allowed free access to huge amount of information which can be copied, modified, extended, published and shared among all the participants of educational process. It showed that learning can occur at any time and location and that teachers can no longer be treated as the sole fount of knowledge. As a consequence, educational theories have gradually moved away from using behavioural and cognitive viewpoints

and opinions to using constructivist or even connectivist approaches to learning. The last one is considered the most adequate philosophy of education for the digital age and is thus beginning to be recognized by educators. However, as research suggests, it is usually associated with the third generation pedagogy of *distance* education and receives a lot of criticism for being unable to fully explain how knowledge is built and learning occurs in connected environment.

2. In this dissertation ESP is defined as teaching English as a second or foreign language to students in higher education, where the goal of the learners is to use English in a particular occupation or profession. Web 2.0 technologies are increasingly being used for teaching and learning this discipline, allowing ESP students to engage in authentic practices closely related to their areas of study and future work. To clarify the peculiarities of using these technologies in the sphere of ESP, to summarize evidence of their effectiveness and to identify the areas where a plethora in research exists, a review of recent empirical research was conducted. It identified the following trends:
 - only a small number of available types of Web 2.0 technologies from their diverse spectrum have received attention from practitioners and researchers within the field. These as a rule are the most prevalent types of Web 2.0 technologies: *blogs*, *social networking tools*, *wikis* and *virtual worlds*. Instances of apparently neglected types of Web 2.0 technologies, which need a deeper investigation, include *image-based tools*, *audio tools*, *multimodal production tools*, *digital story telling tools*, *knowledge organization and sharing tools*, *data analysis tools*, *timeline tools* and *assessment tools*.
 - the major drawback arising from the reviewed studies is that researchers' emphasis given to different ESP skills developed through the use of Web 2.0 technologies is diversified. The centre of their attention in more cases than not is *ESP writing*. Numerous studies witness that it can be taught effectively (usually in segregation) through the use of several popular (if not overused) Web 2.0 technologies: *wikis*, *blogs* and *social networking tools*. Other language skills and knowledge areas (reading, listening, speaking and vocabulary) receive far less attention, although e.g. *ESP vocabulary learning* is considered to be one of the major linguistic obstacles as reported by relevant literature and the results of a pilot study of this dissertation.
 - the review showed that research on the use of Web 2.0 technologies in ESP instruction may be driven by *constructivist*, *socio-constructivist* and in solitary examples by *connectivist* approaches, may be grounded by *Krashen's Input hypothesis*, *Content and Language Integrated Learning (CLIL)* as well as the theories of *metacognition* and *genre analysis*. Surprisingly, in many cases researchers do not provide any clear theoretical foundation for planning and conducting Web 2.0 related activities in their ESP courses. It means that there is a huge lack of verified instructional strategies, techniques and theoretical guidance explaining how Web 2.0 technologies can effectively support the development of ESP learners' skills and consequently improve their learning outcomes.
3. Acceptance of Web 2.0 technologies in this current study was defined as students' behavioural interaction with a particular Web 2.0 tool over time within a specific educational setting and his or her psychological willingness to use or continue using the tool.

The results of literature analysis show that *Technology acceptance model* (TAM) (Davis, Bagozzi and Warshaw, 1989) has been frequently applied to determine the acceptance of Web 2.0 technologies utilized within different fields of teaching and learning ESP. The majority of researchers within the sphere confirm positive and significant relationships between core constructs of TAM in Web 2.0 enhanced ESP courses. They suggest that *perceived usefulness* and *perceived ease of use* of a certain Web 2.0 technology may jointly exert influence on the formation of students' overall *attitudes* towards using the technology and eventually may lead towards *the actual use* of it. However many of the authors agree that despite of its high validity, the model can be extended by adding complimentary variables, depending on a Web 2.0 technology researched, for more clarity. The two major drawbacks arising from the literature review are that ESP studies, utilizing TAM, pay little attention to moderating effects of individual and contextual factor. Moreover, the majority of authors within the sphere use only descriptive statistics without explicit hypotheses as a tool to analyse the data or investigate causal relationship between external and internal variables of TAM.

4. *CmapTools* is a Web 2.0 technology, defined as a client-server based software kit empowering users, individually or collaboratively, to visually represent their knowledge using concept maps, to share them with peers and colleagues, and to publish them. Assuming these affordances, it may be attributed to the cluster of *image-based* tools within the typology of educational Web 2.0 technologies (Bower, 2015) or to the category of knowledge organization applications (as suggested Orehovački, Bubaš, Kovačić, 2012). Research suggests that the use of *CmapTools* can be supported by cognitivist approach, especially by Ausubel's (1969) *assimilation theory of learning*. Also, it may be guided by constructivist philosophical approach, especially by Vygotsky's (1978) *socio-cultural theory* of human learning. The former seems to be more applicable effectively when the tool is being applied for solitary concept mapping practices and individual knowledge building purposes, while the latter can serve a solid theoretical basis when social interaction, collaboration and teacher scaffolding is involved. Resting on both approaches it was integrated to two ESP courses in two higher education institutions in Lithuania.
5. The effectiveness of *CmapTools* in this particular research was operationalized as whether or not it had a positive effect on participants' achievements in ESP vocabulary acquisition and reading comprehension, and, if so, how large this effect was. It should be noted that namely learning achievements (*outputs*) in a particular subject attained through the use of certain resources, methods or practices (*inputs*) is considered the most important indicator of educational effectiveness and thus the most prevalent criterion in educational effectiveness research. The analysis of mean scores for ESP vocabulary achievement posttests in experimental and control groups in terms of the whole research, allows us to declare that the strategy of using an image-based Web 2.0 technology *CmapTools* in ESP courses was highly effective: the findings demonstrated that experimental groups which practiced learning ESP vocabulary through the use of *scaffolded CmapTools* procedures in blended (hybrid) settings in both participating institutions, outperformed the control groups who received routine instructions. It is fairly apparent that the means of experimental groups' scores were higher in both post-

tests, and this difference was statistically significant. Moreover, the quasi-experiment was conducted in two study programmes representing two completely different areas of studies: *social sciences* and *engineering sciences*. The fact that the use of Web 2.0 technology *CmapTools* proved to be effective in supporting the acquisition of ESP vocabulary related to the area of *customs and law activities* as well as *computer systems* indicates that it is suitable to be used in different spheres of ESP. Still for any type of technology to be effective in education, its affordances must be relevant to the teaching and learning context, delivery mode, students' needs and preferences, and it is a responsibility of teachers to harness it in the most appropriate way, preferably following already verified instructional strategies and theoretical guidance. In this particular segment of research a great amount of teacher *scaffolding*, associated with Vygotsky's *sociocultural theory*, is believed to have had an effect for the achieved favourable results.

6. The analysis of mean scores for ESP reading assignments in experimental and control groups in terms of the whole research show that the results in both participating institutions were obviously higher in experimental groups which received treatment and were required to apply the strategy of using *CmapTools* than in untreated control groups. It may seem as a clear signal of effectiveness of the technology, however, despite of this favourable finding, the analysis did not identify any statistically significant differences in the results between the groups in both participating institutions. Besides, the comparison of dynamics of mean scores for ESP reading assignment No1 (with elements of *scaffolding* in experimental groups) and those for successive ESP reading assignment No2 (with *scaffolding* removed in experimental groups) between experimental and control groups in terms of overall research, revealed a slight improvement only within the performance of the untreated control groups. By contrast, the participants in experimental groups ended up showing no improvement at all. In fact, their mean scores (although still higher than in control group) decreased, once teacher assistance was deliberately removed. This again proves that teacher and student collaboration as well as *scaffolded* instruction in *CmapTools*-supported ESP reading activities are extremely important determinants and probably prerequisites regarding the effective use of *CmapTools* in this particular activity.
7. Resting on *Technology Acceptance Model*, three types of factors, exerting influence on ESP students' behavioural intention to use the technology were identified. They were related to TAM constructs, additional construct of awareness and contextual/ individual factors:
 - ESP students' *awareness* of *CmapTools* makes influence on their perceptions regarding the *ease of use* (PEOU) and *usefulness* (PU) of the tool. In other words, the more knowledge ESP students have about this particular technology, the more likely they will recognize its user-friendly nature and potential value.
 - ESP students' perceptions on the *ease of use* of *CmapTools* (PEOU) exert direct influence on their perceptions regarding its *usefulness* (PU). In other words, the less complicated an ESP student finds *CmapTools*-related activities, the more likely he or she will consider it to be useful.
 - *Perceived ease of use* (PEOU) and *perceived usefulness* (PU) of *CmapTools* jointly determine ESP students' overall *attitudes* towards the technology, suggesting that it is

necessary to introduce ESP students with sufficient training on working with ESP and to clearly communicate the aim for doing this.

- *Perceived usefulness* (PU), *positive attitude* (A) and *awareness of CmapTools* (AW) make direct influence on ESP students' *behavioural intention* to use the tools (BI), suggesting that the more information ESP students have about *CmapTools* and the more positive attitude is developed out of this knowledge, the stronger their intentions will be to use it in the future
- ESP students' *gender* and *language they most frequently use for online activities* correlate negatively with their perceptions regarding the *usefulness* of the tool (PU). It appears that male students are more strongly influenced by their perceptions regarding usefulness of the technology than their female counterparts. Moreover, the more ESP students tend to use their native languages for everyday browsing activities, the less they tend to perceive the usefulness of *CmapTools* for learning ESP;
- ESP students' self-reported proficiency in using Web 2.0 tools correlated significantly with their perceptions on *the ease of use* tool (PEOU), suggesting that students who have technical skills related to other Web 2.0 technologies, can engage themselves better in the use of *CmapTools* than those who do not have those skills.

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ANNEXES

Annex 1. Pilot Questionnaire

Mieli Studentai,

Siekdami atnaujinti Mykolo Romerio universitete dėstomo dalyko „Profesinė anglų kalba“ turinį, vykdome studentų apklausą. Jos tikslas-sužinoti Jūsų nuomonę apie antrosios kartos saityno technologijų (pvz. Facebook, YouTube, Wikipedia ir t.t.) taikymą užsienio kalbos paskaitose ir įtraukti Jus į dalyko turinio formavimo procesą. Tikimės, kad bendrų pastangų dėka, dalykas taps įdomesnis ir patrauklesnis. Tyrime dalyvauja apie 200 pirmo kurso studentų. Anketa yra anoniminė. Jai užpildyti prireiks iki 7 min. ☺

I. Pasirinkite Jums tinkantį atsakymo variantą ir pažymėkite jį varnele ✓
Kai kur atsakymą reikės įrašyti žodžiais ar skaičiais. Tokiu atveju rasite simbolį ✎

| | |
|--|--|
| Fakultetas, kuriame studijuojate: | Jūsų studijų programos pavadinimas ✎ |
| Ekonomikos ir finansų valdymo <input type="checkbox"/> | |
| Politikos ir vadybos <input type="checkbox"/> | |
| Socialinių technologijų <input type="checkbox"/> | |
| Teisės <input type="checkbox"/> | |
| Įvertinkite savo anglų kalbos žinių lygį: | Įvertinkite savo gebėjimą naudotis antrosios kartos saityno technologijomis: |
| Pradedantis vartotojas <input type="checkbox"/> | Pradedantis vartotojas <input type="checkbox"/> |
| Savarankiškas vartotojas <input type="checkbox"/> | Pažengęs vartotojas <input type="checkbox"/> |
| Geras vartotojas <input type="checkbox"/> | Įgudęs vartotojas <input type="checkbox"/> |
| Kokia veikla internete užsiimate dažniausiai? (pažymėkite <u>vieną labiausiai</u> Jums tinkantį variantą) | Kuriuos įrankius, jūsų nuomone, būtų galima taikyti mokantis profesinės anglų kalbos? (pažymėkite <u>vieną labiausiai</u> Jums tinkantį variantą) |
| Mokausi <input type="checkbox"/> | YouTube <input type="checkbox"/> |
| Bendrauju su draugais <input type="checkbox"/> | Tinklaraščius <input type="checkbox"/> |
| Naršau savo įdomumui <input type="checkbox"/> | Socialinius tinklus <input type="checkbox"/> |
| Žaidžiu internetinius žaidimus <input type="checkbox"/> | Viki svetaines <input type="checkbox"/> |
| Rašau tinklaraštį <input type="checkbox"/> | Nuorodų dalijimosi svetaines <input type="checkbox"/> |
| Rašau komentarus <input type="checkbox"/> | RSS <input type="checkbox"/> |
| Apsipirkinėju <input type="checkbox"/> | Tinklalaides (Podcasts) <input type="checkbox"/> |
| Siunčiuosi filmus ir muziką <input type="checkbox"/> | Nuotraukų dalijimosi svetaines <input type="checkbox"/> |
| Dirbu <input type="checkbox"/> | |

Kokią kalbą dažniausiai vartojate veiklai internete?



Profesinės anglų kalbos paskaitose labiausiai vertinate:

Dėstytojo-studentų bendravimą klasėje

Dėstytojo-studentų bendravimą *Moodle*

Studentų darbą grupėse

Individualų darbą su vadovu

Individualų darbą prie kompiuterio

Kokią vieną kalbinę veiklą profesinės anglų kalbos paskaitose galėtumėte įvardinti kaip nelabai įdomią:

Skaitymą

Rašymą

Kalbėjimą

Klausymą

Profesinių terminų mokymąsi

Kiek valandų per dieną praleidžiate internete?



Jūs esate:

Vaikinas

Mergina



Valio! Pirmąją anketos dalį jau įveikėte!

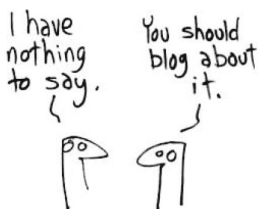
II. Pasirinkite vieną Jums tinkantį atsakymo variantą ir pažymėkite jį varnelė ✓

| <i>Informuotumas</i> | <i>Visiškai pritariu</i> | <i>Pritariu</i> | <i>Neturiu nuomonės</i> | <i>Nepritariu</i> | <i>Visiškai nepritariu</i> |
|--|--------------------------|-----------------|-------------------------|-------------------|----------------------------|
| 1. Žinau, kas yra antrosios kartos saityno technologijos | | | | | |
| 2. Žinau kaip naudotis antrosios kartos saityno technologijomis | | | | | |
| 3. Žinau, kad anglų kalbos galima mokytis, naudojantis antrosios kartos saityno technologijomis | | | | | |
| <i>Suvokiama nauda</i> | <i>Visiškai pritariu</i> | <i>Pritariu</i> | <i>Neturiu nuomonės</i> | <i>Nepritariu</i> | <i>Visiškai nepritariu</i> |
| 4. Antrosios kartos saityno technologijos gali padėti man mokytis anglų kalbos | | | | | |
| 5. Antrosios kartos saityno technologijos gali padėti man tobulinti anglų kalbos skaitymo įgūdžius | | | | | |
| 6. Antrosios kartos saityno technologijos gali padėti man tobulinti anglų kalbos rašymo įgūdžius | | | | | |

| | | | | | |
|---|---------------------------------|------------------------|--------------------------------|--------------------------|-----------------------------------|
| 7. Antrosios kartos saityno technologijos gali padėti man tobulinti kalbėjimo anglų kalba įgūdžius | | | | | |
| 8. Antrosios kartos saityno technologijos gali padėti man tobulinti anglų kalbos klausymo įgūdžius | | | | | |
| 9. Antrosios kartos saityno technologijos gali padėti man mokytis profesinės anglų kalbos terminų | | | | | |
| <i>Suvokiamas naudojimo paprastumas</i> | <i>Visiškai pritariu</i> | <i>Pritariu</i> | <i>Neturiu nuomonės</i> | <i>Nepritariu</i> | <i>Visiškai nepritariu</i> |
| 10. Man lengva mokytis anglų kalbos, naudojantis antrosios kartos saityno technologijomis | | | | | |
| 11. Man lengvai sekasi įvaldyti antrosios kartos saityno technologijas | | | | | |
| 12. Antrosios kartos saityno technologijos tinka bendravimui ir bendradarbiavimui su kolegomis ir dėstytojais | | | | | |
| 13. Antrosios kartos saityno technologijomis yra lengva naudotis | | | | | |
| <i>Požiūris</i> | <i>Visiškai pritariu</i> | <i>Pritariu</i> | <i>Neturiu nuomonės</i> | <i>Nepritariu</i> | <i>Visiškai nepritariu</i> |
| 14. Antrosios kartos saityno technologijos yra naudingos mano studijoms | | | | | |
| 15. Antrosios kartos saityno technologijose įžvelgiu daugiau privalumų nei trūkumų | | | | | |
| 16. Antrosios kartos saityno technologijų naudojimas yra gera užsienio kalbų mokymosi strategija | | | | | |
| <i>Ketinimas naudoti</i> | <i>Visiškai pritariu</i> | <i>Pritariu</i> | <i>Neturiu nuomonės</i> | <i>Nepritariu</i> | <i>Visiškai nepritariu</i> |
| 17. Naudosiuosi antrosios kartos saityno technologijomis kaip papildoma priemone, mokantis užsienio kalbos | | | | | |

| | | | | | |
|---|---------------------------------|------------------------|--------------------------------|--------------------------|-----------------------------------|
| 18. Ketinu naudotis antrosios kartos saityno technologijomis, kad pagilinčiau savo užsienio kalbos žinias | | | | | |
| <i>Naudojimas</i> | <i>Visiškai pritariu</i> | <i>Pritariu</i> | <i>Neturiu nuomonės</i> | <i>Nepritariu</i> | <i>Visiškai nepritariu</i> |
| 19. Mokydamasi(-s) užsienio kalbos, visuomet naudojuosi antrosios kartos saityno technologijomis | | | | | |
| 20. Tikiu, kad naudodamasi(-s) antrosios kartos saityno technologijomis gerinu savo užsienio kalbos kompetencijas | | | | | |

Anketa įveikta! Šaunuoliai ir Ačiū!!!! Nežinau ką daugiau pasakyti ☺



Anketą rengė Mykolo Romerio universiteto lektorė Eglė Selevičienė
ir prof. dr. Nijolė Burksaitienė.

Su tyrėjomis susisiekti galite el. paštu: eseleviciene@mruni.eu bei n.burksaitiene@mruni.eu

Annex 2.
Request and Permission to Pursue Research Granted by
Dean of the Faculty of Electronics and Informatics at VIKO

Mykolo Romerio universiteto
Edukologijos krypties
IV kurso išėstinių studijų doktorantė
Eglė Selevičienė
el. p. eseleviciene@mruni.eu, tel. +37065502175

Vilniaus Kolegijos
Elektronikos ir informatikos fakulteto dekanui
Dr. Romanui Tumasoniui

PRAŠYMAS
LEISTI VYKDYTI MOKSLINĮ TYRIMĄ
2017-01-05

Prašau suteikti leidimą vykdyti mokslinį tyrimą „Antrosios kartos saityno įrankio IHMC CmapTools efektyvumas profesinės anglų kalbos studijose aukštojoje mokykloje“ Vilniaus kolegijos Elektronikos ir informatikos fakultete.

Tyrimo tikslas: įvertinti, kokią įtaką į profesinės anglų kalbos studijas aukštojoje mokykloje integruotas antrosios kartos saityno įrankis IHMC CmapTools turi studentų profesinės anglų kalbos pasiekimams bei nustatyti kaip šį įrankį tiriamieji priima.

Tyrimo trukmė: 2016-2017 s. m. pavasario semestras


Numatomi tyrimo dalyviai:

- ~50 Vilniaus kolegijos *Kompiuterinių sistemų* nuolatinųjų studijų programos I kurso studentų, studijuojančių privalomąjį studijų dalyką *Specialybės užsienio kalba (anglų kalba)* (2 eksperimentinės ir 2 kontrolinės grupės)
- ~70 Mykolo Romerio universiteto *Teisės ir muitinės* bakalauro nuolatinųjų studijų programos I kurso studentų, studijuojančių privalomąjį studijų dalyką *Profesinės užsienio (anglų) kalba* (2 eksperimentinės ir 2 kontrolinės grupės)
- 2 Vilniaus kolegijos Elektronikos ir informatikos fakulteto lektoriai, dėstantys privalomąjį studijų dalyką *Specialybės užsienio kalba (anglų kalba)*.
- 2 Mykolo Romerio universiteto Humanitarinių mokslų instituto lektoriai, dėstantys studijų dalyką *Profesinės užsienio (anglų) kalba* (doktorantė ir dar vienas dalyką dėstantis lektorius)

Eglė Selevičienė
(vardas, pavardė)


(parašas)

Leisti



VIKO EIF
dekanas
dr. Romanas Tumasonis

Annex 3.
Participant Consent Form

INFORMUOTO ASMENS
SUTIKIMAS DALYVAUTI MOKSLINIAME TYRIME
2017-02-02

Aš, Eglė Selevičienė, Mykolo Romerio universiteto Edukologijos krypties IV kurso doktorantė, vykdau mokslinį tyrimą apie internetinio sąvokų žemėlapių kūrimo įrankio *CmapTools* integravimą ir priėmimą profesinės anglų kalbos studijose aukštojoje mokykloje. Maloniai kviečiu Jus tapti šio tyrimo dalyviais.

Koks šio tyrimo tikslas?

- įvertinti, kokią įtaką į profesinės anglų kalbos dalyko studijas aukštojoje mokykloje integruotas įrankis *CmapTools* turi studentų profesinės anglų kalbos pasiekimams;
- nustatyti kaip šį įrankį studentai priima.

Kiek truks Jūsų dalyvavimas tyrime?

visą 2016-2017 s. m. pavasario semestrą

Kas yra šio tyrimo dalyviai?

- Vilniaus kolegijos *Kompiuterinių sistemų* nuolatinųjų studijų programos I kurso studentai;
- Mykolo Romerio universiteto *Teisės ir muitinės veiklos* bakalauro nuolatinųjų studijų programos I kurso studentai;

Kaip bus atliekamas tyrimas?

Šiam tyrimui atlikti pasirinktas pedagoginio eksperimento metodas. Tai reiškia, kad prieš pradėdant vykdyti tyrimą, atsitiktine tvarka būsite suskirstyti į eksperimentines ir kontrolines grupes. Eksperimentinėse grupėse viso semestro eigoje dalyko studijose bus taikomas sąvokų žemėlapių kūrimo metodas ir naudojamas antrosios kartos saityno įrankis *CmapTools*. Kontrolinėse grupėse dalyko studijos vyks įprasta tvarka.

Ką Jums reikės daryti?

Siekiant užtikrinti tyrimo dalyvių homogeniškumą (vienodumą), eksperimento pradžioje visi dalyviai bus kviečiami atlikti diagnostinį bendrinės anglų kalbos testą. Eksperimentinių grupių studentai išmoks naudotis įrankiu *CmapTools* ir taikys jį dalyko studijose. Tyrimo pabaigoje jie bus kviečiami užpildyti klausimyną ir naudotą įrankį įvertinti.

Kokia yra su dalyvavimu tyrime susijusi rizika ir nepatogumai?

Jokių rizikų, susijusių su dalyvavimu šiame tyrime nėra. Surinkti duomenys (diagnostinio testo rezultatai ir klausimyno atsakymai) bus naudojami tik tyrimo tikslams ir nedarys jokios įtakos jūsų dalyko pasiekimų vertinimui. Tyrimo metu nebus renkami jokie padidinto jautrumo duomenys.

Kaip bus užtikrinamas Jūsų konfidencialumas?

Tyrimo rezultatai bus pristatomi anonimiškai, t.y., nebus atskleidžiama jokia informacija, galinti Jus identifikuoti.

Kokios yra Jūsų teisės?

Jūsų dalyvavimas tyrime yra visiškai savanoriškai. Jūs bet kada galėsite iš jo pasitraukti.

Sutikimo patvirtinimas:

Su aukščiau pateikta informacija susipažinau. Sutinku dalyvauti doktorantės Eglės Selevičienės vykdomame moksliniame tyrime. Sutinku, kad tyrimo metu surinkta informacija ir mano kurti sąvokų žemėlapiai, neviešinant mano vardo, pavardės ir kitų asmeninių duomenų, būtų naudojami tyrimo tikslui pasiekti.

Tyrimo dalyvis

(vardas, pavardė, parašas)

Kilus klausimams ar neaiškumams, su tyrėja susiekti galite
el. paštu eseleviciene@mruni.eu

Annex 4. Placement Test

Open Mind
Beginner to Advanced

PLACEMENT TEST

Read the sentences and choose the best answer for each question.

Choose only one answer.

Time: 40 minutes

- We _____ at school.
 - am
 - is
 - are
- My English teacher is nice. _____ name is Anna.
 - Your
 - Our
 - Her
- I am _____ student.
 - a
 - an
 - any
- Josh:** Is she your friend?
Anissa: Yes, she _____.
 - is
 - are
 - isn't
- My brother _____.
 - is twelve
 - is twelve years
 - has twelve years
- Paul and Maria are _____ parents.
 - Tom
 - Tom's
 - of Tom
- Teresa:** _____ is the bank?
Emilio: It's at the end of the road, on the left.
 - Who
 - What
 - Where
- Giulia, can you _____ tennis?
 - play
 - to play
 - playing
- _____ you go to school every day?
 - Do
 - Are
 - Does
- Lisa _____ in an office.
 - work
 - works
 - working
- Pete doesn't _____ Spanish.
 - speak
 - speaks
 - speaking
- What time _____ have breakfast?
 - you
 - do you
 - are you
- Give me the pen. It's _____!
 - my
 - me
 - mine
 - yours
- _____ book is this?
 - Is
 - Who
 - Does
 - Whose
- Leo loves parties and going out. He is very _____.
 - shy
 - loyal
 - funny
 - sociable



- 16 I _____ take the bus to school. I take it at least four times a week.
- never
 - often
 - always
 - sometimes
- 17 I work _____ 11pm, then I go home.
- at
 - until
 - after
 - before
- 18 There aren't _____ restaurants near here.
- a
 - any
 - some
 - several
- 19 Tim and Norah _____ the same book.
- are reading
 - is reading
 - reading
 - reads
- 20 Sam has a very _____ lifestyle. He exercises every day and eats a lot of fruit.
- boring
 - healthy
 - relaxing
 - stressful
- 21 She can speak English very _____.
- well
 - clear
 - good
 - quick
- 22 My new car is _____ than my old one.
- fast
 - faster
 - not fast
 - very fast
- 23 How _____ cheese is there in the fridge?
- any
 - many
 - much
 - some
- 24 Let's _____ a film today.
- watch
 - to watch
 - watching
 - to watching
- 25 I _____ to Canada for my holiday last year.
- go
 - was
 - went
 - going
- 26 What did Max _____ on Saturday night?
- do
 - did
 - does
 - to do
- 27 Monica and Javier _____ for the exam tomorrow.
- study
 - to study
 - is studying
 - are studying
- 28 I'm going _____ on Saturday morning.
- shop
 - shopping
 - to shopping
 - not shopping
- 29 I _____ to work when I saw the accident happen.
- was walking
 - walking
 - walked
 - to walk
- 30 My laptop is not as _____ yours.
- expensive as
 - expensive
 - too expensive
 - more expensive
- 31 Lola is _____ student in my class.
- best
 - better
 - the best
 - the better



- 32 My sister is going on holiday by _____.
a) herself
b) itself
c) her
d) she
- 33 Have you ever _____ to China?
a) went
b) been
c) go
d) be
- 34 You look tired. I think you _____ go to bed earlier.
a) should
b) would
c) ought
d) have
- 35 I'm going to the library. I _____ to study for my exams.
a) can
b) have
c) must
d) should
- 36 I can't understand him. He speaks _____ than you do.
a) less
b) clearly
c) less clearly
d) the least clearly
- 37 I don't like this soup. It's _____ salty.
a) too
b) enough
c) too much
d) not enough
- 38 _____ to go to the theatre this evening?
a) How about
b) Do you like
c) Would you like
d) What do you want
- 39 I really enjoy _____ to the cinema with my sister.
a) go
b) going
c) to go
d) we go
- 40 **Victor:** Do you think it will rain today?
Paula: I'm not sure. It _____.
a) can
b) does
c) won't
d) might
- 41 Could you ring the shop _____ out what time they close today?
a) find
b) found
c) to find
d) finding
- 42 All these clothes _____ from recycled materials.
a) made
b) is made
c) are made
d) are making
- 43 I'll go to the cinema if I _____ my homework.
a) finish
b) finished
c) to finish
d) will finish
- 44 If I _____ the job of my dreams, I would be very happy.
a) had
b) have
c) will have
d) would have
- 45 I haven't been to the new shopping centre _____.
a) yet
b) already
c) not yet
d) not already
- 46 Stefan and Natalia _____ living here since 2001.
a) are
b) were
c) will be
d) have been
- 47 I don't eat meat now, but I _____ have a steak every day.
a) use to
b) used to
c) am used to
d) was used to



- 48 I _____ my dinner by the time you arrived.
- a) had finished
 - b) have finished
 - c) finished
 - d) finish
- 49 _____ me how much this is?
- a) Tell
 - b) Do tell
 - c) Can you tell
 - d) Don't you tell
- 50 I need to get my watch _____.
- a) repair
 - b) to repair
 - c) repaired
 - d) repairing
- 51 Maura _____ him she would go to the cinema with him.
- a) told
 - b) said
 - c) talked
 - d) spoke
- 52 If I _____ gone to Australia, I wouldn't have met my girlfriend there.
- a) had
 - b) have
 - c) hadn't
 - d) haven't
- 53 Michael drives very slowly. He's very _____.
- a) careful
 - b) careless
 - c) carefree
 - d) carefully
- 54 You work in a hospital, _____?
- a) isn't it
 - b) you are
 - c) don't you
 - d) aren't you
- 55 I've finished _____ my essay. At last!
- a) write
 - b) written
 - c) writing
 - d) to write
- 56 I wish I _____ that double burger. I'm very full now.
- a) didn't eat
 - b) hadn't eaten
 - c) wouldn't eat
 - d) haven't eaten
- 57 I don't know many people _____ don't have a smartphone nowadays.
- a) they
 - b) who
 - c) what
 - d) which
- 58 I'm very tired today. I _____ have gone out last night.
- a) mustn't
 - b) couldn't
 - c) wouldn't
 - d) shouldn't
- 59 Where were you yesterday? You _____ to come to class.
- a) must
 - b) should
 - c) were having
 - d) were supposed
- 60 I was _____ excited last night that I couldn't sleep at all.
- a) so
 - b) too
 - c) very
 - d) such
- 61 My sister _____ her toys with me.
- a) would never to share
 - b) never used to share
 - c) used to never share
 - d) was never sharing
- 62 The more I get to know her, _____ less I like her.
- a) the
 - b) so
 - c) even
 - d) much
- 63 He promised that he _____ us, but he didn't.
- a) will
 - b) was helping
 - c) had helped
 - d) would help



- 64 Can you tell me _____ you chose not to accept the job?
a) who
b) where
c) why
d) what
- 65 I stood on a chair _____ better.
a) in order seeing
b) in order to seeing
c) in order to have seen
d) in order to see
- 66 There is no water for the crops because of the _____.
a) famine
b) pollution
c) drought
d) climate change
- 67 You'll soon _____ up early.
a) used to get
b) get used to getting
c) get used to get
d) used to getting
- 68 My parents encouraged _____ my dreams.
a) me follow
b) I follow
c) me following
d) me to follow
- 69 They are _____ a new range of clothing next month.
a) bringing out
b) catching on
c) drawing up
d) taking off
- 70 It was obvious from her red eyes that Maria _____.
a) had cried
b) has cried
c) had been crying
d) has been crying
- 71 I'd rather you _____ to loud music in here.
a) didn't to listen
b) don't listen
c) don't listening
d) didn't listen
- 72 I get very excited _____ new dishes.
a) about cooking
b) to cook
c) for cooking
d) about to cook
- 73 Do you think Adam is capable _____ the exam?
a) to pass
b) in passing
c) of passing
d) of pass
- 74 I wish you'd _____ me what to do all the time!
a) stop to tell
b) stopped telling
c) stop tell
d) stop telling
- 75 He looked very fresh, _____ just returned from a long trip.
a) despite he
b) despite having
c) despite the fact that
d) despite
- 76 Yes, I went to Moscow last year. _____ you?
a) I told
b) Did I tell
c) I didn't tell
d) Didn't I tell
- 77 In the future, all our housework _____ by robots.
a) is done
b) will be done
c) will have been done
d) will be doing
- 78 I'm taking an umbrella, just in case it _____ later.
a) to rain
b) will be raining
c) rains
d) will rain
- 79 She described her neighbour _____ friendly woman.
a) as a
b) as
c) to be
d) she is a



- 80 If I had joined his company, I _____ rich by now.
- will be
 - might be
 - had been
 - will have been
- 81 Eating plenty of fresh food _____ good for your health.
- believes to be
 - it is believed
 - they believe is
 - is believed to be
- 82 We can't move into the new house next week. The builders won't _____ by then.
- finish
 - be finishing
 - have finished
 - be going to finish
- 83 She is completely dependent _____ her parents.
- on
 - of
 - to
 - by
- 84 Please turn the light off before _____ the building.
- to leave
 - leave
 - leaving
 - you are leaving
- 85 _____ you were coming, I'd have offered you a lift.
- Had I known
 - Did I know
 - Have I known
 - If I knew
- 86 It's essential that we _____ this event carefully.
- planned
 - will plan
 - plan
 - are planning
- 87 I recommend _____ the castle.
- to visit
 - visiting
 - you visiting
 - you will visit
- 88 Hardly _____ down when he started shouting at us.
- did we sit
 - were we sitting
 - have we sat
 - had we sat
- 89 Imagine how you would feel if someone _____ your best friend.
- annoys
 - has annoyed
 - annoyed
 - would annoy
- 90 A fire is thought _____ the building.
- to destroy
 - that it destroyed
 - to have destroyed
 - to be destroyed by

Score / 90

Annex 5. Placement Test. Answer Key

Open Mind

Beginner to Advanced

PLACEMENT TEST

TEACHER INSTRUCTIONS AND ANSWER KEY

Administering the Placement Test

Allow a maximum of **40 minutes** for the Test.

The questions in the Placement Test become progressively difficult. Students should only attempt as many questions as they feel they are able to within the time allowed.

Placing students

Placement according to the scores on the Test is based on the assumption that students have attempted to answer all 90 questions.

The following table is a guide to suitable starting points in Open Mind, according to scores achieved.

| SCORE RANGES | Open Mind Level | Starting point |
|--------------|--------------------|----------------|
| 0–10 | Beginner | Unit 1 |
| 11–19 | Elementary | Unit 1 |
| 20–26 | Elementary | Unit 7 |
| 27–34 | Pre-intermediate | Unit 1 |
| 35–42 | Pre-intermediate | Unit 7 |
| 43–50 | Intermediate | Unit 1 |
| 51–59 | Intermediate | Unit 7 |
| 60–68 | Upper Intermediate | Unit 1 |
| 69–75 | Upper Intermediate | Unit 7 |
| 76–81 | Advanced | Unit 1 |
| 82 or more | Advanced | Unit 7 |

Answer Key

| | | | | | | | | | | | |
|----|---|----|---|----|---|----|---|----|---|----|---|
| 1 | c | 16 | b | 31 | c | 46 | d | 61 | b | 76 | d |
| 2 | c | 17 | b | 32 | a | 47 | b | 62 | a | 77 | b |
| 3 | a | 18 | b | 33 | b | 48 | a | 63 | d | 78 | c |
| 4 | a | 19 | a | 34 | a | 49 | c | 64 | c | 79 | a |
| 5 | a | 20 | b | 35 | b | 50 | c | 65 | d | 80 | b |
| 6 | b | 21 | a | 36 | c | 51 | a | 66 | c | 81 | d |
| 7 | c | 22 | b | 37 | a | 52 | c | 67 | b | 82 | c |
| 8 | a | 23 | c | 38 | c | 53 | a | 68 | d | 83 | a |
| 9 | a | 24 | a | 39 | b | 54 | c | 69 | a | 84 | c |
| 10 | b | 25 | c | 40 | d | 55 | c | 70 | c | 85 | a |
| 11 | a | 26 | a | 41 | c | 56 | b | 71 | d | 86 | c |
| 12 | b | 27 | d | 42 | c | 57 | b | 72 | a | 87 | b |
| 13 | c | 28 | b | 43 | a | 58 | d | 73 | c | 88 | d |
| 14 | d | 29 | a | 44 | a | 59 | d | 74 | d | 89 | c |
| 15 | d | 30 | a | 45 | a | 60 | a | 75 | b | 90 | c |

Annex 6.
Parent Questionnaire

**Mykolo Romerio universiteto ir Vilniaus kolegijos studentų nuomonė
apie profesinės anglų kalbos dalyko studijose taikytą antrosios kartos
saityno įrankį CmapTools**

Mieli studentai, šia anketa siekiu sužinoti Jūsų nuomonę apie profesinės anglų kalbos dalyko studijose taikytą antrosios kartos saityno įrankį *CmapTools*. Anketa yra anoniminė.

**I. Pasirinkite vieną Jums tinkantį atsakymo variantą ir pažymėkite jį varnele ✓
Kai kur atsakymą reikės įrašyti žodžiais. Tokiu atveju rasite simbolį ✎**

| |
|--|
| <i>Aukštojo mokslo mokykla, kurioje studijuojate:</i> |
| Mykolo Romerio universitetas <input type="checkbox"/> |
| Vilniaus kolegija <input type="checkbox"/> |
| <i>Jūs esate:</i> |
| Vaikinas <input type="checkbox"/> |
| Mergina <input type="checkbox"/> |
| <i>Jūsų gimtoji kalba?</i> ✎ |
| <i>Kalba, kurią dažniausiai vartojate internete?</i> ✎ |
| <i>Įvertinkite savo bendrinės anglų kalbos lygį:</i> |
| Pradedantis vartotojas <input type="checkbox"/> |
| Savarankiškas vartotojas <input type="checkbox"/> |
| Geras vartotojas <input type="checkbox"/> |
| <i>Įvertinkite savo gebėjimą naudotis antrosios kartos saityno technologijomis:</i> |
| Visai neturiu įgūdžių <input type="checkbox"/> |
| Nelabai įgudęs <input type="checkbox"/> |
| Pakankamai įgudęs <input type="checkbox"/> |
| Labai įgudęs <input type="checkbox"/> |
| Puikiai įgudęs <input type="checkbox"/> |

Įvertinkite savo gebėjimą naudotis antrosios kartos saityno įrankiu CmapTools:

- Visai neturiu įgūdžių
- Nelabai įgudęs
- Pakankamai įgudęs
- Labai įgudęs
- Puikiai įgudęs

Koks buvo Jūsų profesinės anglų kalbos užsiėmimų lankomumas?

- Sistemiškai lankiau visus užsiėmimus
- Sistemiškai lankiau didžiąją dalį užsiėmimų
- Atvykdavau tik į tarpinius atsiskaitymus
- Praleidau nemažai užsiėmimų
- Praleidau didžiąją dalį užsiėmimų



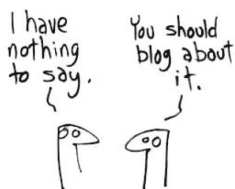
Valio! Pirmąją anketos dalį jau įveikėte! Liko dar viena:

II. Pasirinkite vieną Jums tinkantį atsakymo variantą ir pažymėkite jį varnele ✓

| Informuotumas | Visiškai pritariu | Pritariu | Neturiu nuomonės | Nepritariu | Visiškai nepritariu |
|--|--------------------------|-----------------|-------------------------|-------------------|----------------------------|
| 1. Žinau, kas yra įrankis <i>CmapTools</i> | | | | | |
| 2. Žinau kaip naudotis įrankiu <i>CmapTools</i> | | | | | |
| 3. Žinau, kad įrankiu <i>CmapTools</i> galima naudotis, mokantis profesinės anglų kalbos | | | | | |
| Suvokiama nauda | Visiškai pritariu | Pritariu | Neturiu nuomonės | Nepritariu | Visiškai nepritariu |
| 4. Įrankis <i>CmapTools</i> padėjo man mokantis profesinės anglų kalbos | | | | | |
| 5. Įrankis <i>CmapTools</i> padėjo man tobulinti profesinės anglų kalbos skaitymo įgūdžius | | | | | |
| 6. Įrankis <i>CmapTools</i> padėjo man tobulinti profesinės anglų kalbos rašymo įgūdžius | | | | | |
| 7. Įrankis <i>CmapTools</i> padėjo man tobulinti kalbėjimo profesine anglų kalba įgūdžius | | | | | |
| 8. Įrankis <i>CmapTools</i> padėjo man tobulinti profesinės anglų kalbos klausymo įgūdžius | | | | | |

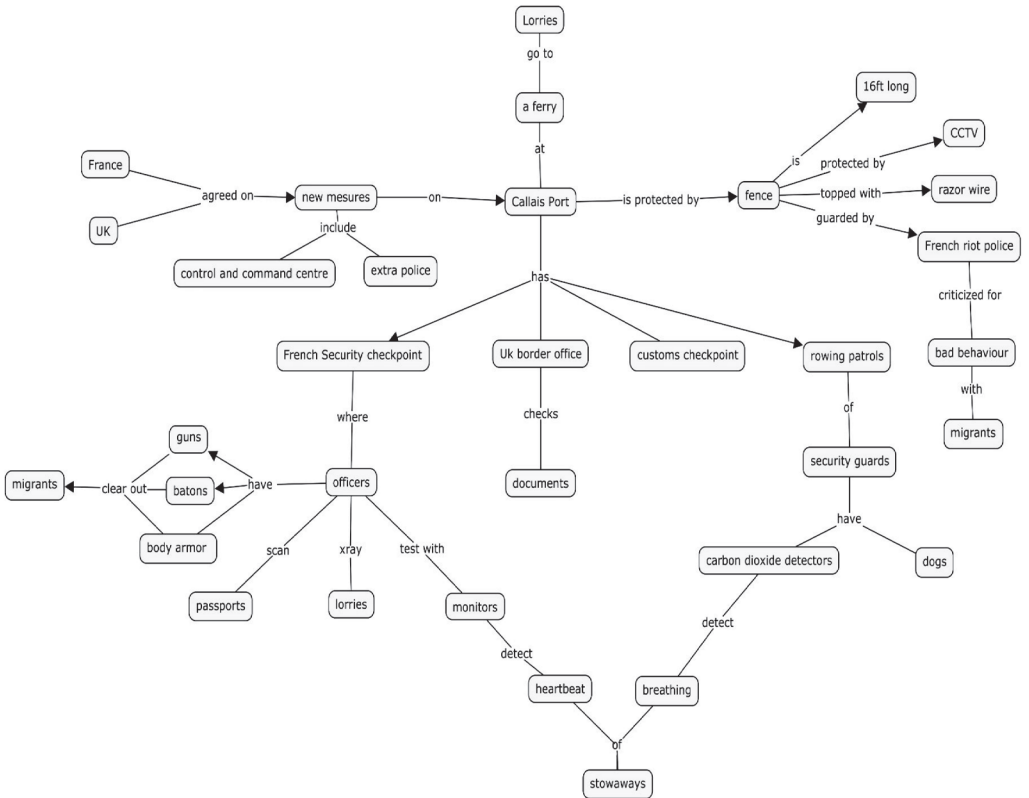
| | | | | | |
|--|--------------------------|-----------------|-------------------------|-------------------|----------------------------|
| 9. Įrankis <i>Cmaptools</i> padėjo man mokytis profesinės anglų kalbos terminų ir sąvokų | | | | | |
| Suvokiamas naudojimo paprastumas | Visiškai pritariu | Pritariu | Neturiu nuomonės | Nepritariu | Visiškai nepritariu |
| 10. Man buvo lengva mokytis profesinės anglų kalbos, naudojantis įrankiu <i>CmapTools</i> | | | | | |
| 11. Man lengvai sekėsi įvaldyti įrankį <i>CmapTools</i> | | | | | |
| 12. Įrankis <i>CmapTools</i> tinka bendravimui ir bendradarbiavimui su grupiokais ir dėstytoju | | | | | |
| 13. Naudotis įrankiu <i>CmapTools</i> yra lengva | | | | | |
| Požiūris | Visiškai pritariu | Pritariu | Neturiu nuomonės | Nepritariu | Visiškai nepritariu |
| 14. Įrankis <i>CmapTools</i> yra naudingas mano studijoms | | | | | |
| 15. Įrankyje <i>CmapTools</i> išvelgiu daugiau privalumų nei trūkumų | | | | | |
| 16. Įrankio <i>CmapTools</i> naudojimas yra gera užsienio kalbos mokymosi strategija | | | | | |
| Ketinimas naudoti | Visiškai pritariu | Pritariu | Neturiu nuomonės | Nepritariu | Visiškai nepritariu |
| 17. Toliau ketinu naudoti įrankius <i>CmapTools</i> | | | | | |
| 18. Ir toliau ketinu naudoti įrankius <i>CmapTools</i> , kad gilinčiau savo užsienio kalbos žinias | | | | | |

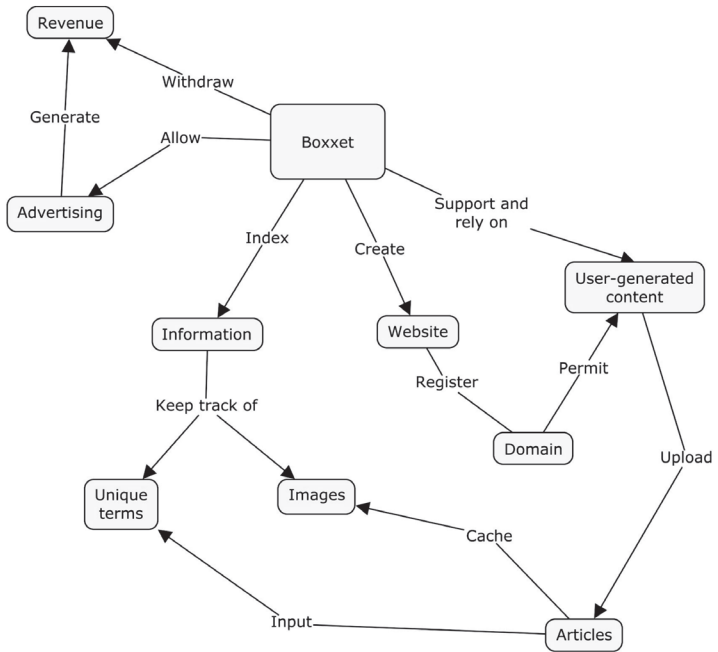
Anketa įveikta! Šaunuoliai ir Ačiū!!!! Nežinau ką daugiau pasakyti ☺

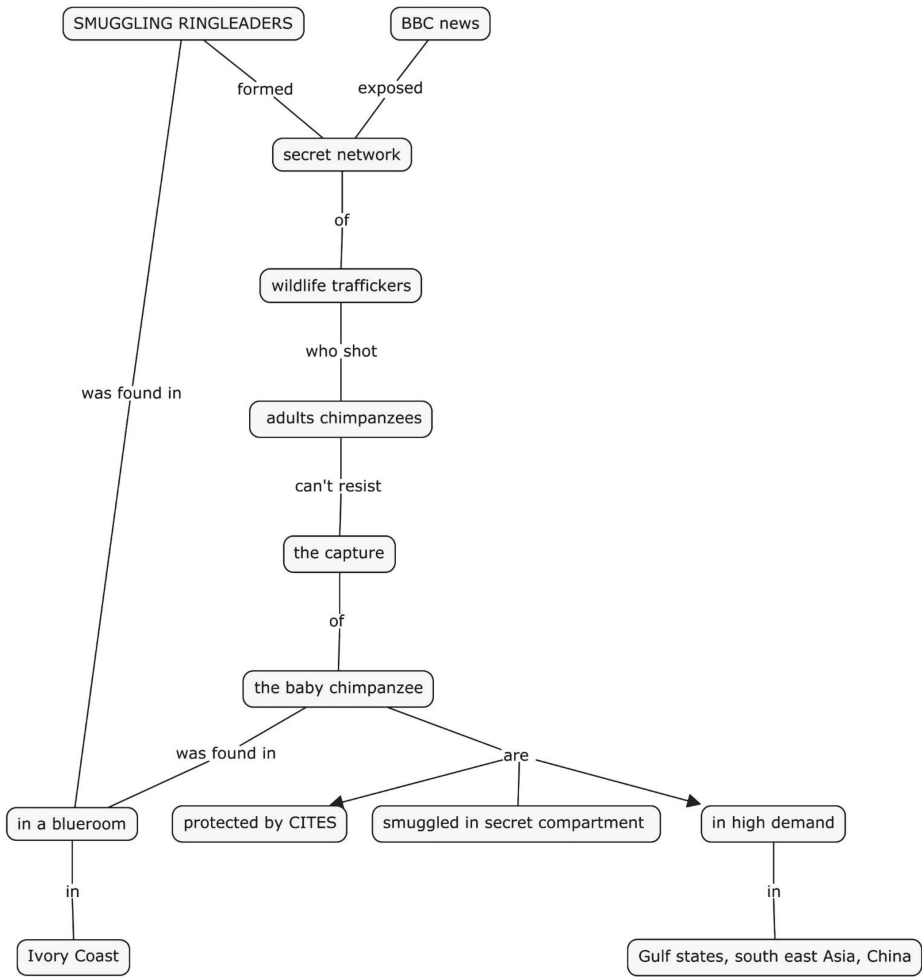


Anketą rengė Mykolo Romerio universiteto lektorė ir doktorantė Eglė Selevičienė.
Su tyrėja susisiekti galite el. paštu : eseleviciene@mruni

Annex 7. Examples of Student-Generated Concept Maps



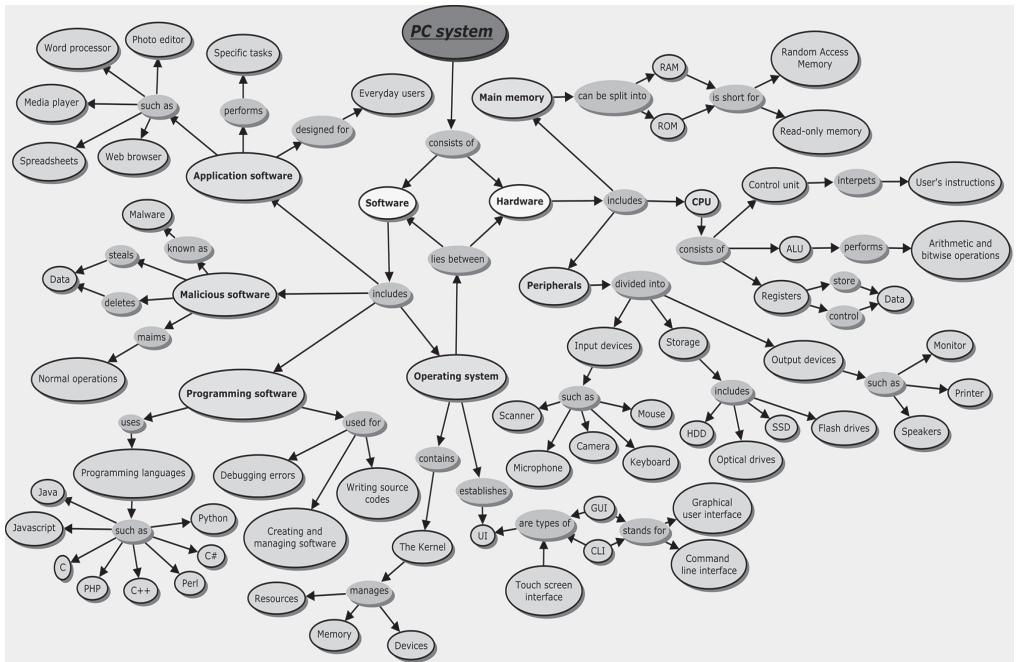






Annex 8.

Student-Generated Concept Map Visualizing the Vocabulary Acquired in an ESP Course at VIKO



MYKOLAS ROMERIS UNIVERSITY

Eglė Selevičienė

**EFFECTIVENESS AND ACCEPTANCE
OF WEB 2.0 TECHNOLOGIES
IN THE STUDIES OF
ENGLISH FOR SPECIFIC PURPOSES
IN HIGHER EDUCATION**

Summary of Doctoral Dissertation
Social Sciences, Education Science (S 007)

Vilnius, 2020

This doctoral dissertation was written in 2013 – 2019 at Mykolas Romeris University pursuant to permission for implementing doctoral studies in the field of education science granted to Vytautas Magnus University jointly with Klaipėda University, Mykolas Romeris University and Vilnius University, on 22 February, 2019, by the order of the Minister of Education, Science and Sports of the Republic of Lithuania No. V-160.

Scientific supervisor:

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Scientific consultant:

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The doctoral dissertation will be defended at the Scientific Council of Klaipėda University, Mykolas Romeris University, Vilnius University and Vytautas Magnus University in the field of Education science:

Chairperson:

prof. dr. Irena Žemaitaitytė (Mykolas Romeris University, Social Sciences, Education Science, S 007).

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prof. habil. dr. Margarita Teresevičienė (Vytautas Magnus University, Social Sciences, Education Science, S 007).

The doctoral dissertation will be defended at the open meeting of the Scientific Council in the field of Education Science on 27 March, 2020, at 11.00 at Mykolas Romeris University, room I-414.

Address: Ateities g. 20, LT – 08303, Vilnius, Lithuania.

The summary of the doctoral dissertation was sent out on 27 February, 2020.

The dissertation is available at Martynas Mažvydas National Library of Lithuania (Gedimino pr. 51, Vilnius) and libraries of Klaipėda University (K. Donelaičio a. 3, Klaipėda), Mykolas Romeris University (Ateities g. 20, Vilnius), Vilnius University (Universiteto g. 3, Vilnius) and Vytautas Magnus University (K. Donelaičio g. 52, Kaunas).

SUMMARY OF DOCTORAL DISSERTATION

Dissertation topicality. English for specific purposes (henceforth ESP) is a subfield of the English language, the pedagogy and research of which has always maintained a close relationship with technology in its various forms. Radio and television, CD-ROMs and DVDs, tape recorders and CD players, laptops and smartphones, Web 1.0 and Web 2.0 tools, all of these technologies have served one or another purpose throughout the history of ESP. Some of them, say for instance, tape recorders or CD-ROMS, have faded away due to the processes of technological evolution; others, like smartphones or multiple Web 2.0 technologies are currently being used in ESP contexts around the world to enhance language teaching and learning.

The term “ESP” is defined as teaching English as a second or foreign language to students in higher education or to people in employment already, where the goal of the learners is to use English in a particular occupation or profession (Gatehouse, 2001; Paltridge & Starfield, 2013; Lesiak-Bielawska, 2015). The need of such a profession-oriented international language, according to Hutchinson and Waters (1991), developed for several reasons: the explosive growth of scientific, economic and technological pursuits on an international arena at the end of World War II, as well as the First Oil Crisis in 1973, which ended up with Western experience and massive amounts of capital flowing into a number of oil-rich countries. This impetus gave rise to the demand for English as a global language of science, commerce and technology. Gradually people around the world started learning it not because it was a prerequisite for being considered a well-educated person, but for their own very *specific* wishes and purposes. Another key reason was the revolution within the spheres of linguistics and language pedagogy. If traditional approaches to language teaching, according to Richards (2006), prioritized grammatical competence as the basis of language proficiency, the new ones concentrated on the ways the language may be used in real-life contexts and placed learners and their very specific needs at the heart of the teaching-learning process. Hence the most widely accepted definition of ESP, provided by Hutchinson and Waters (1991): “*ESP is an approach to language teaching in which all decisions as to content and method are based on the learner’s reason for learning*” (Hutchinson & Waters, 1991, p. 19). This shift in language pedagogy was also spurred by rapidly developing technologies. Using computers in foreign language pedagogy (and naturally in ESP), even though it was primarily the concern only to a small number of language teachers, dates back to the beginning of the 1960s, right after IBM introduced the first electric and mass-produced computer. Thenceforward it captured attention of language researchers around the world and developed into a very specific field, usually referred to as computer-assisted language learning (henceforth CALL). Back in the 1990s, Levy (1997) defined it as “*the search for and study of applications on the computer in language teaching and learning*” (Levy, 1997, p. 1). According to the author, the nature of CALL at any particular time may be treated as the reflection of the level of development of technology. Warschauer (1996) and Stockwell (2010) noticed that at the same time CALL replicated fundamental pedagogical and methodological approaches, thus its development is traditionally

categorized into several distinct phases: *behaviouristic*, *communicative* and *integrative* CALL (Warschauer, 1996). Implemented in the 1960s and 1970s and based on the theories, embodying behaviouristic view of language learning, *behaviouristic* CALL introduced the first generation computer programs for language learners, which entailed translation tests, vocabulary and grammar drills, repeated patiently by computers. This early phase of CALL, which applied the objectivist “computer as tutor model”, was supplanted by *communicative* CALL in the 1970s. The latter and related language learning theories emphasized the value of meaning-focused teaching and learning and can be considered one step towards the learner autonomy, when computers and technologies were already being used not as a never-tiring-tutor, but as a learning technology and stimulus. In the 1980s, CALL moved towards its *integrative* phase, when higher education institutions around the world started applying multimedia and most importantly, World Wide Web for language teaching purposes. Multimedia allowed teachers to put more emphasis on language use in authentic contexts by integrating texts, images, sounds, videos and animation, but did not really involve learner interaction. Only with the advent of Web 1.0 (the early phase of World Wide Web) were the language learners able to truly immerse into the authentic learning environment by getting an instant access to countless authentic resources tailored exactly to their own interests and needs. This was of particular importance to ESP learners, whose very specific interests and needs often go beyond the information presented in textbooks. However, it was the advent of Web 2.0 which brought the most significant changes in the sphere of teaching and learning foreign languages, especially in teaching and learning ESP. As noticed by Lesiak-Bielawska (2015), Web 2.0, more than any other type of technologies, provides ESP students “with an opportunity to engage in authentic discursive practices related to their areas of study or work” (Lesiak-Bielawska, 2015, p. 7). A great number of Web 2.0 technologies allow purposeful communication and collaboration with real likeminded people who are often speakers of a target language. It is thus natural that in this third phase of CALL researchers often draw upon sociocultural theories of learning, which view the role of social interaction as crucial in second language acquisition. Moreover, they suggest that due to the omnipresence of technologies in foreign language classrooms, *integrative* CALL is already taken over by the fourth phase, *ubiquitous* CALL (Veselá, 2012), which is both the present and the future of language education.

Dissertation research problem and research questions. Despite the worldwide surge in the use of Web 2.0 technologies within the field of teaching and learning ESP in higher education, it appears from CALL literature (Dashtestani & Stojković, 2015; Golonka et al., 2014; Luo, 2013; Wang & Vásquez, 2012) that preference is traditionally given to the most widely investigated mainstream Web 2.0 technologies that have already grown roots in many spheres of education: *blogs*, *social networking tools* and *wikis*. Given these types of Web 2.0 technologies always involve written communication, the development of ESP students’ writing skills through the use of these technologies have received more attention from researchers in CALL literature than the development of other language skills (speaking, listening, reading) and knowledge areas, such as ESP vocabulary acquisition. There is lack of empirical reference, to how teachers are applying less frequently explored and less widespread types of Web 2.0 technologies in ESP classroom in higher education. What is most important, there is a lack of empirical evidence of what their *effectiveness* in it is, i.e.,

of what *effect (if any) the use of Web 2.0 technologies has in supporting the improvement of ESP students' learning achievements*. The operational definition of *Web 2.0 effectiveness in ESP* in this dissertation is coined resting on the reasoning of Agodini, Dynarski, Honey and Levin (2003) who believe that discussing *technology effectiveness* in education “actually is asking whether they *do* improve students outcomes” (Agodini, Dynarski, Honey & Levin, 2003, p. 4) and that of Lockheed and Hanushek (1994) who address the broader term *educational effectiveness* as “*whether or not a specific set of resources has a positive effect on achievement and, if so, how large this effect is*” (Lockheed & Hanushek, 1994, p. 2). When talking about resources (both material and non-material), the authors refer to them as *inputs*, while achievements are associated with observable *outputs* of educational production. CALL literature suggests the specific spheres which need more nuanced explanations within the area of interest are the effects of Web 2.0 technologies (*inputs*) on students' achievements (*outputs*) in ESP vocabulary acquisition (Behjat, 2013; Ventura & Martín-Monje, 2016; Dashtestani, 2018) as well as in ESP reading comprehension (Chew & Lee, 2013; Tananuraksakul, 2015; Seiradakis & Spantidakis, 2018).

Moreover, Web 2.0 technologies are frequently integrated in to education and in ESP curricula, based on a commonly accepted assumption that once they are ingrained in every aspect of young people's lives, they will naturally fit the needs of the so called net-generation, will add relevance in creating an authentic playful learning environment and will hopefully be accepted with enthusiasm. The reality is that the use of Web 2.0 technologies in young people's personal lives is always voluntary: they have the freedom to choose (or to ignore) a social media platform, to decide about their willingness (or refusal) to stay online, to distribute their contents on *YouTube* or *Instagram*, to comment on a news article, etc. Requiring learners to use a seemingly familiar Web 2.0 technology (*Facebook* for example) for educational purposes and to forcibly interact with their teachers may have an adverse effect, commonly known as a *creepy tree house syndrome*. The term was popularized by Stein (2008) referring to a phenomenon, whereas teachers push down hot Web 2.0 technologies, while students push back with vocal disapproval or passive resistance. Investigations into reasons behind this possible resistance or, vice versa, potential acceptance of mandatory Web 2.0 technologies used for teaching and learning ESP in higher education settings are surprisingly scarce. These arguments strengthen the need to search for nuanced explanations and a better understanding of the factors that present powerful influences on *the acceptance*, i.e. students' *psychological willingness to use or continue using* teacher-dominated Web 2.0 technologies in ESP classrooms in higher education.

Addressing the twofold research problem, this dissertation falls into two clear domains: *the effectiveness and the acceptance of Web 2.0 technologies in ESP studies in higher education*. The Web 2.0 effectiveness part focuses on the role of Web 2.0 technologies in higher education, including the sphere of teaching and learning ESP. It further narrows down to investigating the educational effectiveness of a selected Web 2.0 technology *IHMC Cmap-Tools* (henceforward *CmapTools*) on ESP students' achievements in vocabulary acquisition and reading comprehension in a blended-ESP course taught at two higher education institutions in Lithuania. The second, Web 2.0 acceptance field, discusses the issue of Web 2.0 technology acceptance in ESP studies in higher education. It then narrows down to

examining user acceptance of an image-based Web 2.0 technology *CmapTools* in a blended ESP course in the context of higher education. The three specific research questions arising from this general focus are as follow:

RQ₁. What effect (if any) does the use of a Web 2.0 technology *CmapTools* in ESP studies in higher education have on students' achievements in ESP vocabulary acquisition?

RQ₂. What effect (if any) does the use of a Web 2.0 technology *CmapTools* in ESP studies in higher education have on students' achievements in ESP reading comprehension?

RQ₃. What factors influence ESP students' acceptance of a Web 2.0 technology *CmapTools* in ESP studies in higher education?

Research object: the use of Web 2.0 technologies in ESP studies in higher education

Dissertation research aim. The aim of this present research is to expand the existing body of knowledge about the significance of Web 2.0 technologies in higher education (the sphere of ESP included), their role in supporting the improvement of ESP students' learning achievements and the factors influencing the acceptance of these technologies used in ESP classrooms in higher education.

Dissertation research objectives:

1. To highlight the significance of Web 2.0 and its technologies within the sphere of higher education;
2. To explore the peculiarities of using Web 2.0 technologies in ESP studies in higher education;
3. To explore the drivers of accepting Web 2.0 technologies by ESP students in higher education;
4. To analyse the affordances of a Web 2.0 technology *CmapTools* and integrate it into two mandatory ESP courses in two higher education institutions in Lithuania;
5. To measure the effect of using a Web 2.0 technology *CmapTools* in two mandatory ESP courses in two higher education institutions on students' achievements in ESP vocabulary acquisition;
6. To measure the effect of using a Web 2.0 technology *CmapTools* in two mandatory ESP courses in two higher education institutions on students' achievements in ESP reading comprehension;
7. To determine factors influencing ESP students' acceptance of a Web 2.0 technology *CmapTools* in two mandatory ESP courses in two higher education institutions.

Methodology of the research (methods and implementation). Based on the research questions raised, this dissertation employs a quantitative research methodology. The three research questions are addressed by taking advantage of a quasi-experiment, incorporating a *static-group comparison design* (Campbell & Stanley, 1963; Cook & Campbell, 1979;

Martella et al., 2013), whereby 107 first year full-time undergraduate ESP students enrolled in two study programmes in two higher education institutions in Lithuania were assigned to 2 experimental and 2 control groups. The experimental group in each institution was exposed to a one-semester-long treatment using Vygotsky's (1978) sociocultural approach as well as Novak's (1970) and Ausubel's (1969) concept mapping strategy involving the usage of an image-based Web 2.0 technology *CmapTools* in blended (hybrid) classroom settings, whereas control groups received no treatment and were taught in conventional settings. According to Jenkinson (2009), effectiveness and success of technologies in education as a rule "is measured in terms of student individual performance, as demonstrated by tests assessing factual recall and knowledge of basic concepts" (Jenkinson, 2009, p. 274). Thus, to answer the first two research questions and to compare the effects of the treatment between the participants in experimental and control groups, 2 ESP vocabulary achievement tests (posttests) and 2 ESP reading assignments (posttests) were used as data collection instruments. The third research question was addressed by making use of a structured attitudinal questionnaire based on the Technology Acceptance Model (Davis, Bagozzi & Warshaw, 1989), administered to the participants assigned to experimental groups at the end of the treatment.

The summary of the dissertation.

Chapter 1. Conceptualization of Web 1.0, Web 2.0 and Web 3.0. The *World Wide Web*, which is usually associated with three clear-cut stages of development, was created by computer scientists Berners-Lee, Cailiau and others in 1989. It was defined by Berners-Lee (2000) as "the set of all information accessible using computers and networking, each unit of information identified by a *URL*" (Berners-Lee, 2000, p. 239). In fact, this definition suits well for its very first generation, Web 1.0. Although it generally served for content delivery purposes (hence the concept "read-only" web), it offered enormous potential within the sphere of education, especially within foreign language teaching and learning, as both language teachers and learners were offered access to a great amount of authentic target-language resources. The era of Web 1.0 coincides with the era of integrative *CALL*, when multimedia, including a number of CD-ROMs, was frequently being used by language learners, even though for consumption purposes only. Nevertheless, once instructional materials became available online, educational institutions immediately unlocked the educational value of the Web to language learners, no matter what their ethnicity, gender or place of residence were. Moreover, this initiated the birth of completely new forms of delivery modes, known as *online*, *Web-based* or *e-learning*.

The second generation of World Wide Web (Web 2.0) started at the turn of the century in early 2000 and represents a remarkable step forward in the way knowledge and information can be created, accessed, disseminated or stored. The concept of Web 2.0 was first mentioned by Doherty and O'Reilly at the O'Reilly Media Web 2.0 technology conference brainstorming session in 2004, when discussing this fundamental process, i.e., "the transition from the Internet's use as a one-way medium for transmitting information from centralized sources to a global audience of users to its use as a two-way medium by which new software and the unique characteristics of the Internet position users to control their

own data and share it with others” (Verdier, 2009, p. 7). Freedman (2006) defined Web 2.0 as “*a means whereby just about anyone can contribute to an ongoing “conversation” in which knowledge is both discovered and constructed as it goes on*” (Freedman, 2006, p. 13). Witts (2008) called it *software* that entitles the user or consumer to become the creator or broadcaster. Grosseck (2009) stated that “Web 2.0 refers to the *social use of the Web* which allows people to collaborate, to get actively involved in creating content, to generate knowledge and to share information online” (Grosseck, 2009, p. 478.) According to Redecker et al. (2009), Web 2.0 or “social computing” “refers to *the range of digital applications* that enable interaction, collaboration and sharing between users” (Redecker et al., 2009, p. 19), while in Wilson’s et al. (2011) opinion “Web 2.0 refers to *the second generation of the Web*, wherein interoperable, user-centered web applications and services promote social connectedness, media and information sharing, user-created content, and collaboration among individuals and organizations” (Wilson et al., 2011, p. 2).

As alluded to above, the authors may address Web 2.0 as *a process, a software, a range of digital applications, a means of communication, social use or the second generation of Web*, however all of the definitions imply its participatory nature and incorporate the idea of democracy and user-generated content. In this dissertation the term **Web 2.0** is operationalized as *the second generation of World Wide Web as well as its numerous technologies that enable interaction, collaboration and sharing between users*. Since 2004 these technologies (social networks, blogs, image sharing tools, etc.) have already become or are becoming an integral part of our private and professional lives. Pop (2010) noticed that the English language teachers were among the first to recognize the benefits deriving from employing Web 2.0 technologies in foreign language acquisition. Wang & Vásquez (2012) are convinced that due to the above mentioned attributes of Web 2.0 technologies, second language research experienced a paradigm shift: it has moved from a cognitive orientation to a social orientation, from classroom contexts to naturalistic settings, from an acquisition metaphor to a participation metaphor, and from foreign language learning to foreign language use. Moreover, it initiated discussions about the mismatch of the existing traditional learning theories and the needs of so called digital generation. These discussions are becoming even more intense in the era of Web 3.0, which is conceptualized by Balaji et al. (2018) as a third generation technology upgrade through 2010-2020s, mainly characterized by semantics of meaning and intelligence and comprising a set of tools related to markup data, crowd-sourced content, data mining and machine learning to enhance intelligence, underlying frameworks and architecture of the Web towards establishing semantic connections, so that machines understand and interpret what humans exactly want – contextual, relevant results” (Balaji et al., 2018, p. 2).

Convergence of Web 1.0, Web 2.0 and Web 3.0 with Philosophies of Education. Talandis (2008), Mc Loughlin & Lee (2008), Dede (2008), Enonbun (2010), Hicks & Graber (2010), Crompton (2012) and Pascoe et al. (2018) notice that when raised in a visible form, the conceptual model of Web 1.0 greatly resembles the teaching and learning, functioning in a traditional hierarchical *expert-amateur* model (Lave & Wenger, 1991; McDonald & Postle, 1999). This model was also postulated by Palmer (2005) as *the objectivist myth of truth*, where information was transferred down from a trained expert (e.g. foreign lan-

guage teacher) who was supposed to know the truth about the object to amateurs (e.g. foreign language students) who were only capable to receive, remember and repeat it. Within this model knowledge was embodied in primary reference sources, such as dictionaries, encyclopaedias or instructional materials, such as textbooks and thus closely resembles Web 1.0 (read-only) platform which transferred information from centralized sources to consumers who were capable to read it, but were deprived of an opportunity to modify or make any other input to its content. In contrast, the shift from Web 1.0 to Web 2.0 not only enabled the consumers to become active creators and broadcasters of information, but also allowed them to engage with like-minded groups of people addressed by Wenger-Trayner and Wenger-Trayner (2015) as *communities of practice*. Within such communities everyone can collectively share experience and expertise. In this perspective, according to Talandis (2008), the conceptual Web 2.0 model mirrors Palmer's (2005) circular, dynamic and interactive *community of truth* model. In contrary to objectivism, where an expert is the necessary connective core, in Palmer's (2005) *community of truth*, the focus is always on the subject. In order to understand it "we have to enter into complex patterns of communication-sharing observations and interpretations, correcting and complementing each other, torn by conflict in this moment and joined by consensus in the next" (Palmer, 2005, p. 630). Some scholars (Pascoe et al., 2018; Mattar, 2018; Imathiu, 2018; Foroughi, 2015; Crompton, 2012; Enonbun, 2010; Hicks & Graber, 2010; Mc Loughlin & Lee, 2008; Talandis, 2008) are convinced that by its very nature, Web 2.0 paradigm lends itself towards *constructivist* epistemology and a learning theory, which equally postulates that scientific knowledge is constituted by people, striving to construct their own subjective idea of objective reality, based on their unique prior knowledge and different dimensions of personal experiences. Teachers in this process act only as guides, encouraging learners to question, to explore and to develop their own subjective ideas, attitudes and conclusions. Moreover, Martín-Monje (2014), Lei et al. (2012), Crompton, (2012), Gunawardena et al. (2009) suggest that *social-constructivism* can actually be considered the pedagogical backbone of the introduction of Web 2.0 technologies in education. In constructivist philosophical orientation the learners' scientific knowledge framework can be expanded through the processes of assimilation and accommodation facilitated by an expert, especially in situations in which learners encounter challenges they cannot solve by themselves. However, Siemens (2005) and Downes (2007) argue that traditional learning theories were developed in times when learning was not influenced through technologies, therefore they cannot fully explain how learning occurs and how knowledge is created in the networked world. The authors propose that teaching and learning approaches in the digital age should be based on the theories of connectivism of cognition and instruction and are convinced that Web 2.0 fits well into a connectivist model of learning. *Connectivism*, introduced by Siemens (2005) and Downes (2007) is a relatively new philosophy of education, which views learning as *actionable knowledge* distributed across networks and therefore this learning consists of the ability to construct and traverse the networks. A network is defined by Siemens (2005) simply as connections between entities. He explains that "computer networks, power grids, and social networks all function on the simple principle that people, groups, systems, nodes, entities can be connected to create an integrated whole. Alterations within

the network have ripple effects on the whole” (Siemens, 2005, p. 6). *The connectivist learning model* introduced by AlDahdouh, Osório and Caires (2015), who created it on the basis of Siemens and Downes’ theory of connectivism, offers a unique vision regarding the interaction between learners and information (content). Here “the content is just a node in the network and learners are mainly not interested in putting it inside their minds. In contrast, learners are interested in using, copying and pasting this content to reach” (AlDahdouh, Osório & Caires, 2015, p. 16). It is interesting that in this model learners, facing new information, are put on an equal footing with scientists, i.e., they are never proposed premeditated solutions to the issues to be addressed and the problems to be dealt with. Meanwhile, a teacher is seen as a specialized fellow node or a partner who has already connected to the network of the right people in the right context or to non-human appliances. An abundant number of researchers (Montebello & Camilleri, 2018; Wang, Anderson & Chen, 2018; Zulkifley, Nor Hasbiah & Siti, 2017; Tinmaz, 2012; Anderson & Dron, 2011; Shriram & Warner, 2010; Pop, 2010; etc.) are convinced that Web 2.0 fits perfectly into a connectivist model of learning. It is noteworthy, however, that all of the authors discuss the advantages of using Web 2.0 technologies either in *fully online* learning environments, *mobile* learning environments or in *blended (hybrid) online* courses. Anderson and Dron (2011) go so far as defining the connectivist teaching and learning approach as a second or third generation pedagogy of *distance* education. A number of scientists (Balaji et al., 2018; Foroughi, 2015; Hussain, 2013; Loureiro, Messias and Barbas, 2012; Anderson and Dron, 2011 and Wheeler, 2009) criticize this approach and assert that the connectivist principles of learning seem to be more compatible with Web 3.0 rather than with Web 2.0 technologies. Despite their attractiveness, they state, the role of both Web 3.0 and connectivism in higher education is still hypothetical. It is questionable whether students are prepared to be that autonomous learners, as required by Web 3.0 and connectivist learning, and whether teachers are ready to transfer so much instructional control both to technologies and to students. Bearing in mind the criticism related to connectivist approach to teaching and learning as well as the fact that the empirical part of this research was planned for blended (hybrid) classroom settings rather than online or distant studies of ESP in formal higher education, *social-constructivist* epistemology was drawn upon as the theoretical framework for the Web 2.0 effectiveness part of this research.

Classifications of Web 2.0 Technologies Having Educational Potential. The essence of Web 2.0 lies in such *fundamental shared characteristics* as user-generated content, knowledge sharing and most importantly, collaboration. However, having in mind that there are hundreds of Web 2.0 technologies available, each offering countless affordances for their users, it is vital to identify which of them might be meaningful in a particular area of education, such as ESP, and whether or not a teacher should opt for them. Crook et al. (2008), McLoughlin and Lee (2008), Dohn (2009) and Bower (2017) warn that too often the use of Web 2.0 technologies in education is seen as a panacea that will cure all its ills. The reality is, they notice, that the use of Web 2.0 technologies in education will never guarantee an effective and meaningful lesson; vice versa, using them incompetently can leave a learner confused or even hostile. Therefore, prior understanding about *fundamental dividing characteristics* of Web 2.0 technologies, their educational potentials as well as theoretical guid-

ance are necessary before incorporating them in education and in a particular teaching and learning activity. For this reason a number of classifications of Web 2.0 technologies with educational potential have been produced by different authors (Mejias, 2005; Franklin & van Harmelen, 2007; Churches, 2008; Crook et al., 2008; Grosseck, 2009; Light & Polin, 2010; Orehovački, Bubaš, & Kovačić, 2012; Bower, 2015). In this dissertation three classifications, representing different periods of Web 2.0 development were reviewed, including the taxonomy elaborated by Churches' (2008) (also known as *Bloom's Digital Taxonomy*), a three-dimensional model of educational Web 2.0 technologies, developed by Orehovački, Bubaš and Kovačić (2012) and a typology developed by Bower (2015). The latter two were constantly relied upon in this dissertation when distilling the Web 2.0 related empirical research within the sphere of ESP and when tackling pedagogical issues of using one or another type Web 2.0 technologies in different ESP areas.

Chapter 2. Peculiarities of Using Web 2.0 Technologies in ESP Studies in Higher Education. One of the purposes of this section was to provide an overview of recent empirical research on the effective use of Web 2.0 technologies in ESP studies in formal higher education to confine spheres, where a plethora of research exists. It aimed at investigating which types of Web 2.0 technologies had already been examined in this specific area of interest, which of the traditional language skills or other knowledge areas had been addressed effectively through the use of these technologies and which theoretical frameworks grounded the previous research. The review incorporated articles, matching the pre-selected criteria and published within the time frame of 2013 – 2018. To this end 29 full text articles were detected and analysed, providing interesting insights and potential directions for the empirical research of this dissertation. In his typology of educational Web 2.0 technologies Bower (2015) identified at least 37 types of Web 2.0 technologies, suitable for teaching and learning purposes. It was discovered, however, that the reviewed research hardly examined 9 types of this diverse spectrum. Moreover, these were the most prevalent types of Web 2.0 technologies in education, i.e., *blogs, social networking tools, wikis and virtual worlds*. Interestingly, the ESP scholars tended to stick to one particular product or apply only the generic version of it (e.g. social network *Facebook*), for some reason avoiding its tailor-made alternatives (e.g. social networks designed for foreign language learning purposes: *Englishtown; Open English; Global English; English Central*). The major gap identified is that there exists too little empirical proof on how less investigated types of Web 2.0 technologies are being applied in ESP classrooms, and on what their effectiveness is. Instances of these neglected types of Web 2.0 technologies include *image-based tools, audio tools, multimodal production tools, digital story telling tools, knowledge organization and sharing tools, data analysis tools, timeline tools, assessment tools*. The research findings also show that the emphasis given to different language skills was diversified: the majority of researchers have put their attention namely on *ESP writing*, taught through the use of wikis, blogs and social networking tools and this trend remained stable since 2004. Other language skills and knowledge areas that were targeted effectively through the use of Web 2.0 technologies were *reading, vocabulary acquisition, listening and speaking*. Only several studies addressed them developed in segregation, however, quite a number of them followed an integrated

skills approach, whereas the teaching of dominant language skills and the development of different knowledge areas was conducted in conjunction with each other, and thus targeted the development of ESP students' communicative competence, intercultural awareness, RA genre knowledge or examined the affordances of Web 2.0 technologies in promoting ESP students' authentic cognitive, metacognitive and strategic competences. An unexpected finding of this literature review was that almost half of the reviewed empirical studies were not driven by or did not indicate any theoretical framework. The finding is in line with the previous overview conducted by Wang and Vásquez (2012) and echoes their concern that future research, concentrating on the use and effectiveness of Web 2.0 technologies in the sphere of teaching and learning foreign languages, should be better-designed and theoretically grounded. The remaining part of the articles were mostly framed along *constructivist* or *socio-constructivist* dimensions and were frequently supported by *collaborative learning approach*. Other educational and language learning theories or approaches mentioned were *connectivism*, *Krashen's Input hypothesis*, *Content and Language Integrated Learning (CLIL)* as well as the theories of *metacognition* and *genre analysis*.

Image-based Web 2.0 Technology CmapTools. When conducting her PhD internship at Aveiro University (Portugal) in 2016 the author of this dissertation had an opportunity to observe how *CmapTools*, a Web 2.0 supported concept mapping tool, was being integrated and used in a Business English course delivered at Águeda School of Technology and Management of the University of Aveiro (UA). As it fell out of the category of "hot" Web 2.0 technologies and hasn't received excessive attention from researchers within the area, it was considered interesting to investigate its effectiveness and acceptance in ESP courses delivered in higher education institutions in Lithuania. *CmapTools* is a freeware, developed as the result of the research conducted by American scientists Novak and Cañas in around 2000. It is defined as a client-server based software kit empowering users, individually or collaboratively, to visually represent their knowledge using concept maps, to share them with peers and colleagues, and to publish them. Assuming these affordances, Selevičienė and Burkšaitienė (2016) propose that it may be attributed to the cluster of *image-based* tools within the typology of educational Web 2.0 technologies (Bower, 2015) or to the category of knowledge organization applications in a three-dimensional model, developed by Orehovački, Bubaš, Kovačić, 2012). Research suggests that the use of *CmapTools* can be supported by cognitivist approach, especially by Ausubel's (1969) *assimilation theory of learning*. Also, it may be guided by constructivist philosophical approach, especially by Vygotsky's (1978) *socio-cultural theory* of human learning.

Chapter 3. Technology Acceptance in ESP Studies in Higher Education.

Conceptualization of Technology Acceptance. One of the earliest definitions of **technology acceptance** was that suggested by Gattiker (1984, 1987) who conceptualized it as "*a person's receptive psychological state based on perceived impact on such things as one's job, skills, and career progress*" (Gattiker, 1984, as cited in Gattiker, 1987, p. 11). Hiltz and Johnson (1989) treated **technology acceptance** as a key indicator of information system success. According to Dillon and Morris (1996) **technology acceptance** is "*the demonstrable*

willingness within a user group to employ information technology (IT) for the tasks it was designed to support” (Dillon & Morris, 1996, p. 5). Ausserer and Risser (2005) also provided a very similar definition by framing acceptance as “a phenomenon that reflects, to what extent potential users are willing to use a certain system” (Ausserer & Risser, 2005, p. 3). Resting on various definitions related to acceptance of technologies, the current study modified the existing term and operationalised “**acceptance of Web 2.0 technologies**” as *user’s behavioural interaction with a particular Web 2.0 tool over time within a specific educational setting and his or her psychological willingness to use or continue using the tool*. Similarly, “**acceptance of CmapTools in ESP studies in higher education**” is operationalised as *user’s behavioural interaction with CmapTools over time in ESP studies in higher education and his or her psychological willingness to use or continue using the tool*.

The technology acceptance domain of the dissertation employed *Technology Acceptance Model (TAM)*, developed by Davis, Bagozzi and Warshaw (1989), which is considered as “one of the most influential and commonly applied theory for describing individual user acceptance of information systems” (Lee, Kozar & Larsen, 2003). In this model two specific beliefs, mainly, *perceived usefulness* and *perceived ease of use* are treated as important user acceptance criteria. They further jointly exert influence on the formation of users’ overall *attitudes* towards using a system or a technology and eventually lead towards their *behavioural intention to use* and the *actual use* of the system or a technology. The main two determinants of *perceived usefulness* and *perceived ease of use* are also influenced by numerous external variables. *Perceived usefulness* is defined by Davis (1985) as “the degree to which an individual believes that using a particular system would enhance his or her job performance” (Davis, 1985, p. 82). *Perceived ease of use* is operationalized as “the degree to which an individual believes that using a particular system would be free of physical and mental effort” (Davis, 1985, p. 82). *Attitude towards using* refers to “the degree of evaluative effect that an individual associates with using the target system in his or her job” (Davis, 1985, p. 25). *Behavioural intention of use* is defined by Warshaw and Davis (1985) as “the degree to which a person has formulated conscious plans to perform or not perform some specified future behaviour” (Warshaw & Davis, 1985, p. 214). *Actual system use* refers to an individual’s actual direct usage of the given system in the context of his or her job (Davis, 1985, p. 25).

Literature analysis. The analysis of research studies utilizing TAM to investigate ESP students’ acceptance of Web 2.0 tools in ESP studies in higher education (published within the period of 2010 – 2017) relinquished the following results. *Technology acceptance model* has been applied to determine the acceptance of different Web 2.0 technologies, e.g. *3D modelling tools, website creation tools, social networking systems, video tools and text-based tools*, utilized within different fields of teaching and learning ESP, including *law, literature, sociology, business, humanities, commerce and international studies, economics and education, counselling and guidance, science and technology*, etc. However, there is still insufficient empirical evidence to determine how ESP students accept *audio-based tools, multimodal production tools, digital story telling tools, knowledge and organization tools, data analysis and synchronous collaboration tools*. No research was detected to predict the acceptance of *image-based Web 2.0 tools*, including *CmapTools* either.

The majority of ESP related studies confirm positive and significant relationships between core constructs of TAM in Web 2.0 enhanced ESP courses. The two most important determinants of acceptance, namely *perceived ease of use* and *perceived usefulness* of Web 2.0 technologies are usually interrelated and jointly exert influence on students' *behavioural intention* to use one or another Web 2.0 technology. Moreover, *perceived ease of use* may be related to *attitude towards usage*, while *attitude towards usage* can be affected by *perceived usefulness*.

Despite of the fact that TAM has been used in the reviewed literature due to its high validity, most of the authors within the sphere agree that the model can be extended by adding complimentary variables, depending on a technology researched, for more clarity. TAM theorizes that the influence of external moderators (e.g. users' individual or contextual characteristics) on *behavioural intention* to use technologies are mediated by the factors of *perceived ease of use* and *perceived usefulness*. However, most of ESP studies, utilizing TAM pay little attention to moderating effects of individual and contextual factors and this is one of the major limitations of the research reviewed. Another limitation is that some of the reviewed studies use only descriptive statistics without explicit hypotheses as a tool to analyse the data or investigate causal relationship between external and internal variables of TAM.

The results achieved by the literature analysis on technology acceptance indicated that a quantitative approach, a survey research and a questionnaire, employed as a data collection method, are as a rule used by the researchers to measure user acceptance of one or another technology, Web 2.0 technologies included. Dörnyei (2014) notices that survey research; questionnaires and testing are one of the most common methods of data collection in second language (L2) research too. Namely testing and a TAM-based questionnaire were selected as data collection instruments measuring the effectiveness and acceptance of the selected Web 2.0 technology (i.e. *CmapTools*) in this dissertation. The instruments are introduced in the methodology part of this dissertation. The latter discusses the methodology of the parent empirical research, describes its setting and participants involved and outlines selection procedure for sample collection. However, it starts with a brief representation, results and a discussion of an external pilot study, which served as ESP students' needs analysis tool and tested the adequacy of the TAM-based questionnaire before constructing its final form to be properly used in the parent study of this dissertation.

Chapter 4. Research Methodology.

Pilot Study. The findings of this literature overview on the effective use and the acceptance of Web 2.0 technologies in ESP studies in higher education supplied valuable insights into the reality of how, when and why teachers use Web 2.0 technologies in their ESP classrooms in higher education, and what the drivers influencing the acceptance of these technologies are. In order to learn what ESP students' attitudes and preferences regarding the use of Web 2.0 technologies in ESP courses are, an external pilot study "*University Students' Attitudes towards the Usage of Web 2.0 Tools for Learning ESP*" / „*Universiteto studentų nuomonė apie antrosios kartos saityno technologijų naudojimą profesinės anglų kalbos studijose*” was conducted in 2015 at MRU. The study also served for pre-testing the research instrument (questionnaire) planned for the parent study of this dissertation. The question-

naire was adapted from Arshad, Tan and Hashim's (2012) study "*Tertiary Students' Application of Web 2.0 for English Language Learning*" and was based on *Technology Acceptance Model (TAM)*. The instrument was slightly modified by preparing the demographic part of it and by complementing the theoretical part with several additional statement items (see Annex 1). It was distributed to all available first year full-time undergraduate students (n=226) enrolled in a compulsory "*English Language for Specific Purposes*" course taught in autumn semester of academic year 2014 – 2015 at MRU. A total of 101 questionnaires (45%) were completed and returned. Statistical Package for Social Sciences (*SPSS*) software was used to analyse the collected data. To evaluate the internal consistency of the statement items that made up the theoretical part of this questionnaire, *Cronbach's alpha* reliability coefficient was computed. Both descriptive and inferential statistical tests were then conducted by this study. Its findings provided valuable insights into the world of typical representatives of the so called *digital natives'* generation, identifying themselves as independent or even proficient users of *Web 2.0* technologies and spending 3 to 5 hours of their free time online. Most of this time is devoted for socialization in social networks. The latter (together with *YouTube*, wikis and blogs) was reported to have most potential to be applied for learning ESP, especially its terminology. It is noteworthy that learning ESP terminology was admitted by the respondents as the most troublesome and least interesting activity in their ESP classrooms. The investigation was based on the assumption that ESP students' gender, their study programme, an average of hours they spend online daily and their self-reported ability to use *Web 2.0* technologies may have had an impact on their acceptance of *Web 2.0* technologies for learning ESP. However, the findings revealed that only students' self-reported ability to use *Web 2.0* had positive statistically significant relationships with their awareness of, attitude towards, intention to use and actual system usage of *Web 2.0* technologies meant for learning ESP at the university. The results obtained from the systematic literature review and the pilot study provided the directions for conducting the successive parent study. It became clear, that it should primarily concentrate on researching the *Web 2.0* technology which hadn't received excessive attention from researchers within the area, which is framed with a particular educational theory and which can preferably assist in enhancing ESP students' vocabulary acquisition, since it is considered to be one of the major linguistic obstacles as reported by researchers and by ESP students themselves.

Educational Experiment. Jenkinson (2009) notices that when researchers set out to measure the effect of a technology upon learning, more often than not they are attempting to compare the benefits of a technological innovation with traditional pedagogy. The empirical part of this dissertation is not an exception, as it employed an experimental design and measured ESP students' learning outcomes depending on whether they were achieved in *CmapTools*-supported course or in a "conventional" way. This current experimental research incorporated a *static-group comparison* (pre-experimental) design (Campbell & Stanley, 1963; Martella et al., 2013) which entails a comparison of two nonrandomized groups on certain outcome through post testing, but does not envisage pretest measures. Research participants were 107 undergraduate full-time ESP students enrolled in two study programmes: *Law and Customs Activities Bachelor's Degree Programme* at the Faculty of Law at Mykolas Romeris University (n=61) and *Computer Systems Professional Bachelor's*

Degree Programme at the faculty of Electronics and Informatics at VIKO (n=46). Since this current research was conducted in the university setting, it was not possible to randomly assign subjects to the treatment condition; therefore it utilized a *convenience* sampling strategy. As information concerning the statistics on the first year full-time bachelor degree students studying ESP at formal higher education institutions in Lithuania in 2017 was unavailable in the databases of Department of Statistics to the Government of the Republic of Lithuania, nor was it provided by individual higher education institutions, the sample size of this research was calculated, using the equation for unknown populations $n = \frac{z^2 \cdot s^2}{\Delta^2}$ as proposed by Kardelis (2005), where n refers to the sample size, z refers to the value, obtained from the standard normal distribution for the selected confidence level (e.g., for a 95% confidence level, $p=0.05$, $z=1.96$), s refers to the population standard normal deviation, while Δ is the precision or acceptable margin of error (Kardelis, 2005, p. 312). In this current case $s=1.752$, while $\Delta=0.35$. The Δ value=0.35 was selected, as previous teaching experience with identical populations gave the mean score of 7 for placement tests. A 5 percent margin of error was applied, hence $\Delta=7 \times 0.05=0.35$. The value of n was calculated using the following parameters: $(1.96^2 \times 1.752^2) / 0.35^2 = 92.78$. Thus, the sample size of 107 subjects in this current research was considered adequate, sufficient and representative. Students in each aforementioned higher education institution were assigned to 2 experimental and 2 control groups. Experimental groups were exposed to a treatment using the selected Web 2.0 technology *CmapTools* throughout the whole semester, whereas control groups received no treatment and were taught the “traditional” way.

As this educational experiment incorporated a *static-group comparison design*, no pre-test measures prior to the treatment were employed, however, both groups were post tested to compare the effect of the treatment, as suggested by Campbell and Stanley (1963), Cook and Campbell (1979) and Martella et al. (2013). It should be noted, however, that the participating ESP teachers had no control over how many students would be assigned to their groups, as these were naturally assembled or *intact* groups. To minimize selection bias, potential with intact groups, the principles of homogeneity related to participants’ age, the similarity of their learning environments and level of their English language proficiency were taken into account. The age range of the participants was between 18 and 20 years old. All the participants were first year full-time undergraduate students enrolled in a compulsory 6 ECTS credit ESP course (face-to-face delivery mode) and were assumed to be computer-literate, however, none of them claimed to be familiar with the *CmapTools* application. The general language level of the participants theoretically was B2 based on *Common European Framework of Reference for Languages: Learning, Teaching, Assessment (CEFR)* as required by their course syllabi. Considering the fact that 100% of participants (n=46) within naturally assembled groups at VIKO were male, whereas the sample at MRU (n=61) was gender-mixed with female predominance, any outcomes analyses related to gender differences within this current segment of research were deliberately avoided.

Treatment Procedures. Treatments or interventions are the specific components of any experimental research that distinguish this particular design from other research methods. The treatment in this current quasi-experiment was conducted during the second semester of academic year 2016-2017 (February-June) in two *blended (hybrid) classroom courses*,

specified by Mayadas, Miller and Sener (2015) as settings, in which online activities intermingle with classroom sessions and replace a significant percentage (about 20-79%) but not all required face-to-face instructional activities. The online activities of applying image-based Web 2.0 technology *CmapTools* with the students assigned to experimental groups at MRU and VIKO were considered *independent variable*, whereas ESP learning achievements defined as the average scores on the participants' ESP vocabulary achievement tests (posttests) and ESP reading assignments (posttests) were used as *dependent variables* of the study. The treatment was accomplished in five successive phases and several formats, which are elaborated on in the following paragraphs:

I. *Initiation phase (teacher briefing and training)* started at the beginning of January, 2017, having received the approval of administrations in both institutions to conduct the research. It aimed at delivering the idea of the current empirical research, communicating its purpose, objectives and design for the teachers involved in the research, *without* disclosing the research hypotheses. The teacher working with experimental groups at VIKO has received initial training, whereby she was introduced to Novakian concept mapping strategy as well as to an image-based Web 2.0 technology *CmapTools*. Having successfully downloaded the software onto her personal computer, she received explanations on its various features and functions and tried constructing her own cmap. The second meeting with the teacher was organized in one week's time. The second meeting was devoted for reflecting on her experiences and concerns that arouse while brushing skills on working with the tool, studying the course syllabi and deciding which topics or texts may be complemented with *CmapTools* activities. At the close of the initiation phase, the software was installed onto classroom computers intended for the experimental groups upon the approval of administration of both institutions.

II. *Pre-treatment phase (administration of placement test)*. To make sure all of the participants (n=107) involved in this current empirical research were literally at the same level of general English proficiency, a placement test was administered among all of them at the very first meeting, after the teachers in each institution and group got acquainted with their students, familiarized them with the objectives and the requirements for the course, presented the evaluation strategy and other necessary information.

III. *Training phase*. The participants in experimental groups (n=60) were introduced to a Novakian concept mapping strategy with the explanations on when and how it can be used. They also were taught how to utilize the *CmapTools* software, previously installed onto their classroom computers, addressing the basic functions of the tool, such as creating a new cmap, adding concepts, propositions and inserting linking words to tie the two concepts together, adding resources, establishing links, saving a file, creating a new folder, exporting the cmap and assessing it online, etc.

IV. *The treatment phase* was conducted in two formats, involving *in-class* and *out-of-class* activities and an array of techniques with the equivalent amount of work to do both in experimental and control groups. In majority of *in-class* sessions the students in experimental and control groups would normally be introduced to a new topic or subtopic as indicated in the syllabus and exposed to an appropriate text preceded by a vocabulary list and prereading tasks. After analysing the vocabulary list, they would usually skim the text and

do regular follow-up activities. However, the activities in experimental groups additionally involved two concept map building techniques, supported with *CmapTools*. The “*fill-in-a-cmap*” technique involved elements of *scaffolding*, by using an expert “skeleton” concept maps, in which certain concepts or some linking words would be deliberately omitted. The “*create-a-cmap*” technique invited students to create their own concept maps with a unique structure and linking words based on the concepts and terms related to a previously covered text. Two vocabulary achievement test were administered to each student in experimental and control groups in the course of the semester; the differences between test achievement scores were analysed and compared between groups in each institution. *Out-of-class* activities for ESP students assigned to experimental and control groups were meant for developing their independent reading and vocabulary building skills through the use of so called “home reading” assignments in independent settings. Students would be exposed to two teacher selected authentic articles related to their study programme. They would be given an agreed period of time (one month approximately) to read the text individually at home. On an agreed day they would make their oral presentations on the article in class. The presentation would include the information referring to the title and author of the article, a summary of the article, students’ evaluation about whether the article was clear and thorough, as well as a glossary of 10 key article related concepts with their definitions and translations in Lithuanian. The only difference in the assignment between the participating groups was that the students in experimental groups were requested to present it in the form of a student-generated concept map through the use of *CmapTools*.

V. *Post-treatment phase (administration of an attitudinal questionnaire)*. At the end of the semester the participants assigned to experimental groups were administered a structured questionnaire based on the Technology Acceptance Model (Davis, Bagozzi & Warshaw, 1989), to determine what their attitudes and behavioural intentions related to the mandatory Web 2.0 technology *CmapTools* were.

Chapter 5. Research findings on the effectiveness of a Web 2.0 technology *CmapTools* in ESP Studies in Higher Education.

According to Campbell and Stainley (1963) and Martella et al. (2013), the data from pre-experimental designs with pretest measures unavailable, are analysed by conducting a *t*-test to compare the means of the posttest scores of the experimental and control groups. Additionally, a nonparametric test such as the *Mann-Whitney U* test should be used if the data violate the assumptions underlying these parametric tests. Following these recommendations, when analysing the results of the placement test and the two vocabulary achievement tests, means of two continuous normally distributed variables were compared by conducting *independent samples Student’s t* test. Prior to this, the normality of distribution of continuous variables was tested by *one-sample Kolmogorov-Smirnov* test. A nonparametric *Mann-Whitney U* test was used, respectively, to compare means of two groups of variables not normally distributed. A value of $p < 0.05$ was considered significant throughout the research.

Results of Placement Test. The purpose of administering this test was to find out whether prior to treatment research participants (n=107) were at the same level of general English

proficiency. As they were assigned to either experimental (n=60) or control (n=47) groups, the homogeneity of the placement test scores was initially tested within both of them. To verify the assumption of normality, *one-sample Kolmogorov-Smirnov* test was performed. It was established, that the data did not follow a normal distribution ($p=0.008$), therefore a non-parametric *Mann-Whitney U* test was applied to examine whether two independent samples were selected from populations having the same continuous distribution. A null hypothesis H_0 : ***the distributions of placement test scores for the two groups before the treatment were equal*** was tested. The decision rule used throughout the entire research was to reject H_0 if the p -value $< \alpha$, or to retain it if the p -value $\geq \alpha$ (Čekanavičius & Murauskas, 2000). It was established that there was no statistically significant difference in the placement test evaluations of the research participants in the experimental and control groups ($p=0.283$) ($p > \alpha$). Thus, we failed to reject the null hypothesis and can conclude that both groups were homogeneous regarding their general English proficiency prior to introduction of the independent variable, i.e. treatment to the experimental group. As groups of research participants were assembled from two higher education institutions, the evaluations of the test were compared within each institution too. No statistically significant differences were found in placement test evaluations either: p -values from t statistics assumed in both institutions were $p=0.073$ ($p > \alpha$) at MRU and $p=0.872$ ($p > \alpha$) at VIKO respectively, thus we failed to reject the null hypothesis and can safely conclude that all the research participants were homogeneous regarding their general English proficiency prior to introduction of the independent variable, i.e. treatment to the experimental group.

Results of ESP Vocabulary Achievement Tests. One of the goals of this empirical study was to research the following question: *what effect (if any) does the use of a Web 2.0 technology CmapTools in ESP studies in higher education have on students' achievements in ESP vocabulary acquisition?* This was pursued by analysing and comparing mean scores of the two ESP vocabulary achievement tests (posttests). As groups of research participants were recruited from two higher education institutions, posttests results were initially compared within each institution separately.

Results of ESP Vocabulary achievement posttests at MRU. Before comparing the mean scores for ESP vocabulary achievement posttest No 1 at MRU, *one-sample Kolmogorov-Smirnov* test was conducted to verify the assumption of data normality. As it was established that mean scores for vocabulary achievement posttest No1 in each group at MRU were normally distributed ($p=0.419$), independent samples *Student's t* test was used, and p -value < 0.05 was considered statistically significant. The null hypothesis H_0 : ***the mean scores of vocabulary achievement posttest No 1 for the experimental and control groups at MRU were equal*** was tested. The analysis of posttest results indicated, the experimental group (n=32) (5.19 ± 1.942) outperformed the control group (n=24) (3.88 ± 2.173) in *vocabulary achievement posttest No 1*. The assumption of homogeneity of variance was tested using *Levene's Test of Equality of Variances*, which is often run before a comparison of means. The decision rule was to reject H_0 if the p -value $< \alpha$, or to retain it if the p -value $\geq \alpha$. In this particular case p -value = 0.021 ($p < \alpha$), which indicates that there is a significant difference between the achievements in *vocabulary achievement posttest No1* of the participants in the experimental group comparing it to the control group. Therefore, based on the results ob-

tained from t -test, the null hypothesis H_0 , *the mean scores of vocabulary achievement posttest No 1 for the experimental and control groups at MRU were equal* was rejected. The analysis of *vocabulary achievement posttest No2* results in each group at MRU reported that the mean scores for experimental group ($n=32$) and control group ($n=25$) were 5.38 ± 1.827 and 4.60 ± 1.915 respectively. *One-sample Kolmogorov-Smirnov* test results indicated, that the data did not follow a normal distribution ($p=0.027$), therefore a non-parametric *Mann-Whitney U* test was applied to examine whether the two populations had the same continuous distribution. The null hypothesis H_0 , *the mean scores of vocabulary achievement posttest No 2 for the experimental and control groups at MRU were equal* was tested. The decision rule was to reject H_0 if the p -value is less than 0.05 or to retain it if the p -value $\geq \alpha$. Despite of the fact that students in the control group, who did not receive treatment, scored clearly lower (4.60) than their peers in the experimental group (5.38), no significant difference was determined (p -value=0.078) ($p > \alpha$). Therefore the null hypothesis failed to be rejected.

Results of ESP Vocabulary achievement posttests at VIKO. Meanwhile, the analysis of mean scores for *vocabulary achievement posttests No1* and *No2* in experimental and control groups at VIKO, following the same procedures of statistical analysis, found significant difference between both vocabulary tests achievements of the participants in the experimental group comparing it to their counterparts' achievements in control group: (p -value=0.012) ($p < \alpha$) and (p -value=0.000) ($p < \alpha$) respectively, therefore the null hypothesis was rejected.

Variability of Vocabulary achievement posttests Scores between Experimental and Control Groups in Terms of Overall Research. The null hypothesis H_0 : *mean scores of vocabulary achievement posttest No 1 are equal for all experimental and control groups in both participating HE institutions* was tested. As it was established that mean scores for *vocabulary achievement posttest No1* in both groups of the research were normally distributed ($p=0.247$), independent samples *Student's t* test was run accordingly, and p -value < 0.05 was considered significant. It was found that the mean score for experimental groups ($n=56$) was 6.29 ± 2.432 , while for the control groups ($n=43$) it was only 4.98 ± 2.144 . The reported p -value=0.000 was lower than the critical p -value which means there was a significant difference between the achievements of the participants in the experimental groups comparing it to the control groups. Therefore, based on the results obtained from t -test the null hypothesis was rejected. Thus, it can be safely concluded that the results of vocabulary test No1 were significantly higher within experimental groups than within the control groups. The null hypothesis H_0 , *the mean scores of vocabulary achievement posttest No 1 are equal for the experimental and control groups in both participating HE institutions* was rejected. The results of *vocabulary achievement posttest No 2* were in turn analysed following the same principles of statistical data analysis. As the data set was not normally distributed ($p=0.010$), *Mann-Whitney U* test was performed. The null hypothesis H_0 : *the distributions of vocabulary achievement posttest 2 scores are equal for experimental and control groups in both participating HE institutions* was tested. The results revealed a statistically significant difference ($p=0.011$) ($p < \alpha$) in favour of the experimental groups. Thus, the null hypothesis H_0 : *the distributions of vocabulary achievement*

posttest 2 scores are equal for experimental and control groups in both participating HE institutions is rejected and conclusion can be made that the experimental groups outperformed the control groups in this vocabulary test too. *Figure 1* represents the variability of vocabulary achievement posttests mean scores between experimental and control groups throughout all the research:

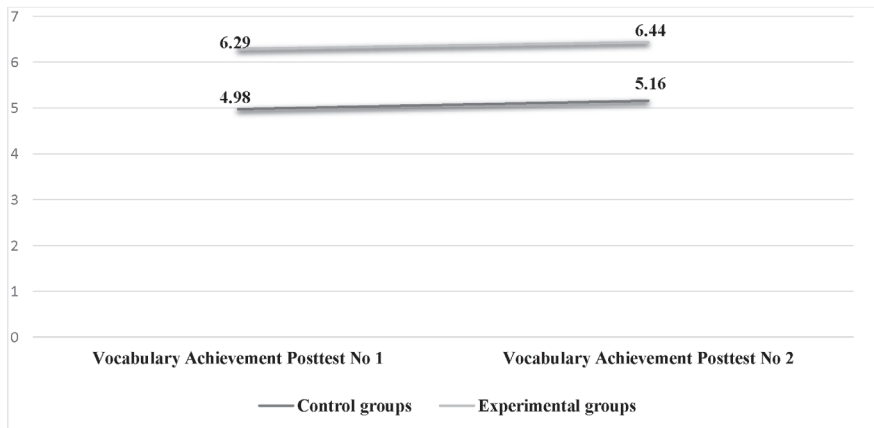


Figure 1. Variability in mean scores of vocabulary achievement posttests in experimental and control groups of in terms of the whole research

Results of ESP Reading Assignments (Posttests). To see whether the use of a Web 2.0 technology *CmapTools* in ESP studies in higher education had any effect on students' achievements in ESP reading comprehension, mean scores of two ESP reading assignments (posttests) involving the usage of *CmapTools* in experimental groups were analysed and compared.

Results of ESP Reading Assignments (Posttests) in Experimental and Control Groups at MRU. Null hypothesis H_0 : *there will be no statistically significant difference in the mean scores on ESP reading acquisition achievement assessment, as measured by ESP reading assignments between untreated control group and experimental group which received treatment* was tested. The decision rule was to reject H_0 if the p -value $< \alpha$, or to retain it if the p -value $\geq \alpha$. It was established that mean scores for both reading assignments in each group at Mykolas Romeris university were normally distributed: *reading assignment No 1* ($p=0.239$) and *reading assignment No 2* ($p=0.126$), therefore independent samples Student's t test was applied, and p -value < 0.05 was considered significant. The analysis of *reading assignment 1* assessment indicated that the mean scores for experimental group ($n=27$) and control group ($n=21$) at Mykolas Romeris university were 7.78 ± 1.805 and 7.38 ± 1.564 respectively. As a rule, before applying Student t test, the assumption of homogeneity of variance was tested using *Levene's Test of Equality of Variances*. The decision rule was to reject H_0 if the p -value $< \alpha$, or to retain it if the p -value $\geq \alpha$. In this current case p -value $= 0.376$ ($p > \alpha$), which indicated the population variances were equal, i.e. homogeneity of

variances assumption was not violated. Independent samples *t*-test was in turn conducted to determine whether there existed any statistical difference between the mean scores for experimental and control group with respect to evaluations of *reading assignment No 1*. In this current case $p=0.428>0.05$ which indicates that statistically significant difference in the mean scores between the two groups was not detected. The results of *reading assignment No 2* were successively analysed following the aforementioned principles of statistical data analysis. It was established that students in experimental group ($n=29$) slightly outperformed their counterparts in untreated control group ($n=22$) with means scores 7.34 ± 1.778 and 7.09 ± 1.875 respectively. The results of *t* test analysis revealed no statistically significant difference between the mean scores ($p=0.624>0.05$) either. Despite of the fact that the obvious increase in the mean scores of home reading assessments 1 and 2 can be observed within the experimental group, as contrasted to the control group at MRU, no statistically significant difference in the mean scores between the two groups was established.

Results of ESP Reading Assignments (Posttests) in Experimental and Control groups at VIKO. As it was determined that mean values for the assessment of both reading assignments in each group at VIKO were normally distributed ($p=0.129$ and $p=0.076$ respectively), independent samples *Student's t* test was used, and p -value <0.05 was considered significant. Null hypothesis H_{02} : **there will be no statistically significant difference in the mean scores on ESP reading acquisition assessment assignment as measured by ESP reading assignments between untreated control group and experimental group which received treatment** was tested. The analysis of *reading assignment No 1* results at VIKO revealed, that the mean values were (8.50 ± 1.766) for experimental group ($n=22$) and (7.60 ± 1.404) for control group ($n=15$). The assumption of homogeneity of variance was again tested using *Levene's Test of Equality of Variances*. In this particular case p -value $=0.165>0.05$, suggesting that the variances of the two groups were equal, i.e., the homogeneity of variances assumption was not violated. Independent samples *t*-test was in turn conducted to determine whether there existed any statistical difference between the mean scores for experimental and control group with respect to evaluations of *reading assignment No 1*. Even though the mean score in control was lower than in experimental group, the analysis yielded no statistically significant differences in the results between the groups ($p=0.108>0.05$). The analysis of mean scores for *reading assignment No 2* in each group at VIKO reported that the mean scores for treatment group ($n=23$) and control group ($n=15$) were 8.52 ± 1.855 and 8.13 ± 1.060 respectively. The results were found to be statistically insignificant in this case too ($p=0.418>0.05$). Despite of the fact that the obvious increase in the mean scores of ESP reading assignments No 1 and No 2 can be observed within the experimental group, as contrasted to the control group at VIKO, no statistically significant difference in the mean scores between the two groups was established.

Analysis of Variability of ESP Reading Assignment (Posttests) Scores between Experimental and Control Groups in Terms of Overall Research. It was established that mean scores of *reading assignment No 1* in both participating groups were normally distributed ($p=0.065$), therefore independent samples *Student's t* test was run accordingly and p -value <0.05 was considered significant. Null hypothesis H_{01} : **there will be no statistically significant difference in the mean scores on ESP reading posttest No 1 between untreated**

control groups and experimental groups which received treatment was tested. It was determined that the mean score for experimental groups (n=49) was 8.1 ± 1.806 , while for the untreated control groups (n=36) it was only 7.47 ± 1.483 . Even though the mean score in control groups was apparently lower than in experimental groups, no statistically significant difference in the results ($p=0.091 > 0.05$) was detected by *t* test. The results of *reading assignment No 2* were consecutively analysed following the same principles of statistical data analysis. As in this case the data set was not normally distributed ($p=0.014$), Mann-Whitney *U* test was performed. The null hypothesis H_{02} : **there will be no statistically significant difference in the distribution of ESP reading posttest 2 scores between untreated control groups and experimental groups which received treatment** was tested. It was established that the mean score for experimental groups (n=52) was 7.87, whereas for the control groups (n=37) it was 7.51. *Figure 2* represents the variability of mean scores in reading posttests No 1 and No 2 between experimental and control groups throughout the entire research:

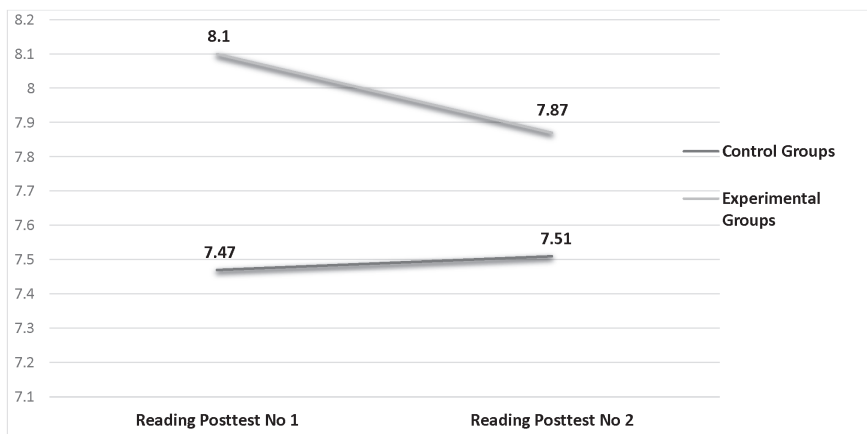


Figure 2. Variability in mean scores of reading posttests in experimental and control groups of in terms of overall research

The results repeatedly revealed that no statistically significant difference emerged between the performances in experimental and control groups ($p=0.305 > 0.05$). Thus, in this case the null hypothesis failed to be rejected. The analysis of mean scores for ESP reading posttest 1 and 2 in experimental and control groups at MRU and at VIKO did not identify any statistically significant differences in the results between the groups, therefore the initial hypothesis H_{02} : **there will be no statistically significant difference in the mean scores on ESP reading posttests assessment between untreated control groups and experimental groups which received treatment** failed to be rejected.

Chapter 6. Acceptance of Web 2.0 technology CmapTools in ESP studies in higher education. Results of Questionnaire.

To answer the third question of this research **RQ₃**, *what factors influence ESP students' acceptance of a Web 2.0 technology CmapTools in ESP studies in higher education ESP?* a structured paper-based attitudinal questionnaire was administered to all students assigned to experimental groups (n=60) in both institutions at the end of the semester. It was considered the fifth and the last phase of the previously discussed educational experiment.

Research Instrument. The questionnaire “*Students’ Attitudes towards the Usage of an Educational Web 2.0 Tool CmapTools for learning ESP at Mykolas Romeris University and Vilniaus kolegija/ University of Applied Sciences*” consisted of three main sections and incorporated a total of 27 close-ended items.

Section 1 introduced the purpose of the questionnaire and assisted in gaining the participants’ involvement into the survey.

Section 2 aimed at identifying basic individual and contextual attributes of the participants, including their *higher education institution, gender, native language, the language used for online activities, self-reported proficiency in general English, self-reported proficiency in using Web 2.0 technologies, self-reported proficiency in using CmapTools and self-reported attendance rate of ESP classes*. The answer format in this section employed both dichotomous and interval scales depending on the nature of the question.

Section 3 was based on Technology Acceptance Model (TAM) developed by Davis, Bagozzi and Warshaw (1989). To ensure content validity, a validated scale from previous research was adapted from Arshad, Tan and Hashim’s (2012) study “*Tertiary Students’ Application of Web 2.0 for English Language Learning*” and included in this section. This part of the questionnaire was pretested for relevance, accuracy, completeness and deficiencies in a pilot study. However, to fit the specific context of *CmapTools* usage in blended ESP studies in two higher education institutions in Lithuania, the necessary wording changes were made by removing focus from Web 2.0 tools in general to *CmapTools* in particular. As *CmapTools* was considered a mandatory tool, rather than optional one, a decision was made to discard TAM construct *Actual Usage*. Consequently the revised scale evolved in its final form incorporating 5 core TAM related constructs:

- *Awareness* (as an additional factor) (3 items),
- *Perceived usefulness*(6 items),
- *Perceived ease of use* (4 items),
- *Attitude toward usage* (3 items),
- *Behavioural intention to use* (2 items).

This theoretical part of the questionnaire used a 5-point *Likert* scale response format, where 5=*strongly agree*, 4=*agree*, 3=*neutral*, 2=*disagree* and 1=*strongly disagree*. To evaluate the internal consistency of the 18 statement items that made up this part of the questionnaire, *Cronbach’s alpha* reliability coefficient was computed. According to rules of thumb provided by Nunnally (1967), George and Mallery (2003) and Pukėnas (2009), a *Cronbach alpha* of 0.7 is considered an accepted standard for reliability. Each of the five TAM-related constructs produced values ranging from good to very high, all exceeding the value of 0.7, and thus indicating a strong instrument internal consistency.

Formulation of Hypotheses. 5 hypotheses related to interdependency of TAM variables were proposed:

H₁: Perceived ease of use of CmapTools has significant positive effect on perceived usefulness of CmapTools.

H₂: Perceived ease of use of CmapTools has a significant positive effect on ESP students' attitudes towards using CmapTools.

H₃: Perceived usefulness of CmapTools has a significant positive effect on ESP students' attitudes towards using CmapTools.

H₄: Perceived usefulness of CmapTools has a significant positive effect on ESP students' behavioural intention to use CmapTools.

H₅: ESP students' attitude towards using CmapTools has a significant positive effect on their intention to use CmapTools.

3 hypotheses predicting the effect of additional variable of Awareness were raised:

H₆: There is significant relationship between ESP students' awareness of CmapTools and their behavioural intention to use it.

H₇: ESP students' awareness of CmapTools mediates the relationship between perceived ease of use of CmapTools and attitude towards CmapTools.

H₈: ESP students' awareness of CmapTools mediates the relationship between perceived usefulness of CmapTools and attitude towards CmapTools.

2 hypotheses predicting the effect of individual and contextual variables were suggested:

H₉: Individual and contextual variables have a significant relationship with perceived usefulness of CmapTools.

H₁₀: Individual and contextual variables have a relationship with perceived ease of use of CmapTools.

In order to analyse the results of the questionnaire, *IBM SPSS Statistics version 22* was utilized. Descriptive statistics was used to show frequencies count and percent, while correlation analysis was employed to assess a possible linear association between two continuous variables. *Mann-Whitney U* test was used to assess for statistically significant differences between two independent groups; *Kruskal-Wallis* test was employed to assess for statistically significant differences between three or more independent groups. A value of $p < 0.05$ was considered significant throughout the research.

Descriptive statistics. As it was mentioned before, the sample of this survey was 60 students assigned to experimental groups of the previously discussed educational experiment. As the 9% (n=5) dropout rate in the experimental groups was documented at the end of the semester, 55 questionnaires were administered and received upon completion with a 100% return. Two questionnaires, however, were discarded due to being incomplete; consequently 53 usable data responses were yielded for subsequent statistical analysis. The analysis showed that out of 53 students involved into this current research 32 came from *Law and Customs Activities* study programme at MRU and 21 studied *Computer Systems* at VIKO. It was found that 62.3 % (n=33) of the respondents were male and (37.7%) (n=20) were female. One of the items asked the respondents to self-evaluate their English language

proficiency level, as suggested by *The Common European Framework of Reference for Languages: Learning, Teaching and Assessment*. Almost half of the respondents (47.2%, n=25) identified themselves as proficient users, 39.6% (n=21) – as independent users and only 13.2% (n=7) as basic users. It is not surprising that considering themselves as very good or good speakers of English, the slim majority of the respondents (52.8%, n= 28) reported English to be the most frequently used language for browsing the Internet. 37.7% (n=20) of the students indicated that they use Lithuanian, 7.50% (n=4) reported Russian and only 1.90% (n=1) specified that he or she used the Polish language for this purpose. The findings on students' *self-evaluations of their ability to use Web 2.0 technologies* revealed that they exhibited experience with and exposure to different Web 2.0 technologies. 47.2% (n=25) reported that they had moderate skills, 24.5% (n=13) – very good skills, 15.1 % (n=8) good skills, 11.3% (n=6) little skills and only 1.90 % (n=1) acknowledged having no skills at all. Very similar results were obtained as regards the respondents' *self-reported experience in using CmapTools*, as a total of 45.3% (n=25) of them reported to have moderate skills, 28.3% (n=15) – little skills, 11.3 % (n=6) – good skills, 7.50 % (n=4) reported to have very good skills and the same percentage 7.50 % (n=4) admitted they had no skills in working with *CmapTools*. The results show that the course of ESP was well attended by the respondents in both higher education institutions, as the major part of them (45.3, n=24) reported to have attended the majority of classes. There were some cases however, when students used to come only for tests or presentations (9.40, n=5), missed a lot of classes (15.1, n=8) or missed the majority of classes (1.90, n=1).

Correlation statistics

The hypothesis H_1 : *Perceived ease of use of CmapTools has a significant positive effect on perceived usefulness of CmapTools* was tested. Correlation analysis was conducted and Spearman's correlation coefficient (ρ) was used. A moderate positive relationship ($r=0.626, p=0.000$) was reported between *perceived ease of use* and *perceived usefulness of CmapTools*. This relationship is statistically significant, therefore, H_1 is supported.

The hypothesis H_2 : *Perceived ease of use of CmapTools has a significant positive effect on ESP students' attitudes towards using CmapTools* was tested. A high positive significant correlation ($r=0.754, p=0.000$) between the two constructs of TAM *perceived ease of use* and students' attitude towards *CmapTools* was identified, therefore H_2 is supported.

Hypothesis H_3 : *Perceived usefulness of CmapTools has a significant positive effect on ESP students' attitudes towards using CmapTools* was tested. A moderate positive relationship ($r=0.626, p=0.000$) between the two constructs of TAM: *Perceived usefulness* and *attitude towards usage* is observed. Moreover, it is statistically significant, therefore H_3 is supported.

Hypothesis H_4 : *Perceived usefulness of CmapTools has a significant positive effect on ESP students' behavioural intention to use CmapTools* was tested. A weak positive correlation ($r=0.491, p=0.000$) between the two core constructs of TAM: *perceived usefulness* and *behavioural intention to use CmapTools* is observed. This relationship is statistically significant; therefore, H_4 can be supported.

H_5 : *ESP students' attitude towards using CmapTools has a significant positive effect on*

their behavioural intention to use CmapTools was tested. A statistically significant moderate positive correlation ($r=0.669$, $p=0.000$) can be observed between the two core constructs of TAM: *attitude towards CmapTools* and *behavioural intention to use CmapTools*, therefore H_5 is supported.

The hypothesis H_6 : *ESP students' awareness of CmapTools has a significant positive effect on their intention to Use CmapTools* was tested. There is a positive relationship between *awareness* as the additional construct of TAM and students' *behavioural intention to use CmapTools*. Despite of the fact that the strength of this relation is low ($r=0.375$, $p=0.000$), it is statistically significant, therefore hypothesis H_6 failed to be rejected.

The hypothesis H_7 : *ESP students' awareness of CmapTools has a significant positive effect on perceived ease of use of CmapTools* was tested. We can observe that there is a positive correlation ($r=0.689$, $p=0.000$) between *awareness* and *perceived ease of use of CmapTools*. This relationship is statistically significant, therefore hypothesis H_7 is supported.

The hypothesis H_8 : *ESP students' awareness of CmapTools has a significant positive effect on perceived usefulness of CmapTools* was tested. We can observe that there is a positive relationship ($r=0.451$ $p=0.000$), between *awareness* and *perceived usefulness of CmapTools*. Although this relationship is weak, it is still statistically significant, for this reason we failed to reject hypothesis H_8 .

To test hypothesis H_9 on the relationships between the participants' *individual and contextual characteristics* and the construct of *perceived usefulness of Cmap Tools*, correlation analysis was conducted and Spearman's correlation coefficient (ρ) was used.

First of all the hypothesis H_{9A} : *The variable of higher education institution has a significant relationship with perceived usefulness of CmapTools* was tested. Correlation analysis was conducted to find out low positive significant relationship with three items of the construct *perceived usefulness* (PU): PU1 (*CmapTools helped me to improve my ESP knowledge*) ($r=0.346$, $p=0.011$), PU2 (*CmapTools helped me to improve ESP reading skills*) ($r=0.399$, $p=0.003$) and PU6 (*CmapTools helped me to enhance ESP terminology and concepts*) ($r=0.399$, $p=0.003$). No statistically significant relations, however, were identified with items PU3 (*CmapTools helped me to improve ESP writing*) and PU4 (*CmapTools helped me to improve ESP listening skills*). A Mann-Whitney U test was subsequently used to examine whether statistically significant differences existed between the two institutions regarding their respondents' attitudes towards the aforementioned 3 statements within the construct of *perceived usefulness*: PU1, PU2 and PU6. Answers related to item PU1 (*CmapTools helped me to improve my ESP knowledge*) provided by students from MRU (mean rank=31.05) were found to score statistically significantly higher ($U=26.500$, $p=0.013$) than answers provided by students from VIKO (mean rank=20.83). Similar results were obtained having analysed the answers related to items PU2 (*CmapTools helped me to improve ESP reading skills*) and PU6 (*CmapTools helped me to enhance ESP terminology and concepts*). The mean ranks for the answers given by MRU students (31.73 and 33.20 respectively) were higher than mean ranks for the answers provided by their counterparts at VIKO (19.79 and 17.55 respectively), suggesting a conclusion that the former had a stronger belief that image based Web 2.0 tool *CmapTools* was useful for learning ESP and for developing their ESP reading skills and enhancing ESP terminology and concepts. To sum up the results of cor-

relation analysis, it can be observed that there is a positive correlation ($r=0.473$, $p=0.000$) between the independent variable *higher education institution* and *perceived usefulness of CmapTools*. Although this correlation is low, we still can support hypothesis H_{9A} .

The hypothesis H_{9B} : ***The variable of gender has a significant relationship with perceived usefulness of CmapTools*** was tested. This demographic variable was significantly negatively correlated only with item *PU6 (CmapTools helped me to enhance ESP terminology and concepts)* ($r=-0.298$, $p=0.030$). To find out whether the perceptions regarding the usefulness of the tool were stronger with male or with female students, a *Mann-Whitney U* test was conducted. It indicated that male respondents were more likely to report that the tool had been useful for enhancing their ESP terminology and concepts than female respondents, as the mean rank ratings for male respondents (32.60) were higher than those for females (23.61) (*Mann-Whitney U* $z = -2.001$, $p = 0.0432$). To sum up the findings of correlation analysis we can observe a negative correlation between *gender* and the construct of *perceived usefulness* ($r=-0.287$, $p=0.037$) which suggests that compared to female participants of this current experiment, males' decision to use Web 2.0 tool *CmapTools* in the future was more strongly influenced by their perception of usefulness of the tool. The correlation is weak, but still statistically significant; therefore the hypothesis H_{9B} is supported.

The two hypotheses H_{9C} : ***Students' native language has a relationship with perceived use of CmapTools*** and H_{9D} : ***The language students most frequently use for online activities has a relationship with perceived use of CmapTools*** were tested. As no significant correlations between the demographic variable of *native language* with the construct of *perceived usefulness of CmapTools* were detected, hypothesis H_{9C} is rejected. Still, it can be observed that there exists a negative correlation ($r=-0.350$, $p=0.010$) between the independent variable *the language students most frequently use for online activities* and *perceived usefulness of CmapTools*. Although this relationship is very weak, we can still support H_{9D} .

The three hypotheses H_{9F} : ***students' self-reported experience in using Web 2.0 tools has a relationship with perceived usefulness of CmapTools***, H_{9G} : ***students' self-reported experience in using CmapTools has a relationship with perceived usefulness of CmapTools*** and H_{9H} : ***students' self-reported attendance of ESP classes has a significant relationship with perceived usefulness of CmapTools*** were tested. No statistically significant relations were identified between the respondents' *self-reported proficiency in using Web 2.0 tools (CmapTools included)*, their *attendance with their perceived usefulness of CmapTools*, therefore the hypotheses H_{9E} , H_{9F} and H_{9H} have to be rejected.

The hypothesis H_{10} : ***the demographic variables have a relationship with perceived ease of using CmapTools*** was tested. It was detected that students' perceptions regarding the *ease of use of CmapTools* were influenced only by their *self-reported proficiency in using Web 2.0 tools* only ($r=-0.284$, $p=0.039$) and their *higher education institution* ($r=-0.350$, $p=0.010$), therefore only hypotheses H_{10F} and H_{10A} are supported. The *Mann-Whitney U* test additionally indicated that *perceived ease of use of CmapTools* was greater for students from MRU (32.63) than for their counterparts from VIKO (18.43) (*Mann-Whitney U* $z = -3.305$, $p = 0.001$).

No significant correlations between the remaining demographic variables of the respondents: their *gender*, *native language*, *language most frequently used for Internet activities*, *self-reported evaluations regarding their level of English*, *self-reported evaluations regarding their ability to use CmapTools*, *attendance of the course* and the construct of *perceived ease of use* were found. Thus, hypotheses H_{10B} , H_{10C} , H_{10D} , H_{10E} , H_{10G} and H_{10H} are rejected.

Chapter 7. Discussion. The aim of this present research was to expand the existing body of knowledge about the significance of Web 2.0 technologies in higher education (the sphere of ESP included), their role in supporting the improvement of ESP students' learning achievements and the factors influencing the acceptance of these technologies used in ESP classrooms in higher education. We can see that the dissertation falls into two clear domains: *the effectiveness* and *the acceptance* of Web 2.0 technologies in ESP studies in higher education. The Web 2.0 effectiveness part focused on the role of Web 2.0 technologies in higher education, including the sphere of teaching and learning ESP and tried to answer the first research question: RQ_1 . *What effect (if any) does the use of a Web 2.0 technology CmapTools in ESP studies in higher education have on students' achievements in ESP vocabulary acquisition?*

The analysis of mean scores for *vocabulary achievement posttests No1* and *No2* in experimental and control groups in terms of the whole research, allows us to declare that the strategy of using image-based Web 2.0 technology *CmapTools* was highly effective: the findings demonstrated that experimental groups which practiced learning ESP vocabulary through the use of *CmapTools* procedures in blended settings outperformed the control groups who received conventional instructions. It is fairly apparent that the means of experimental group scores were higher in both posttests, and this difference was statistically significant. Means et al. (2009) warns that better results of blended learning, as was the case of this current research, sometimes may be attributed to the fact that such settings often tend to involve more learning time and additional instructional resources. On the other hand, we cannot underestimate the fact that alongside with these extra instructions, a heavier working and cognitive load is always imposed on students, exposed to technologies. In our case, along with the subject matter to learn, the students in experimental groups not only had to master their technical skills of working with *CmapTools*, but also had to develop concept mapping skills and to learn how to read graphics. Many students claimed to have never used graphic organizers before; therefore they received a lot of support from the teachers. For example, a *"fill-in-a-cmap"* activity was frequently employed, leveraging a teacher-generated concept map as an element of necessary *scaffolding*. On the other hand, the *"create-a-cmap"* technique required completely individual efforts, and was rather challenging for the students, especially at the beginning of the treatment. Moreover, by stating that their counterparts in control groups received "traditional" or "conventional" instructions, we may underestimate the experience and efforts of their ESP teachers, delivering the very same content using their preferred teaching methods, styles and techniques.

It is important to mention that having contrasted the results of *vocabulary achievement posttest No 1* and *vocabulary achievement posttest No 2*, a favourable change in the mean scores can be witnessed in both groups as a result of the learning process. Still, the signifi-

cant difference between the gained mean scores in both vocabulary achievement posttests for the two groups confirms the outperformance of experimental groups and allows us to state that there definitely exists causal relationship between the use of an image-based tool *CmapTools* in ESP studies in higher education and students' achievements in ESP vocabulary. This finding is in line with the insights of Ellis (2004), who is convinced that the use of any type of graphic organizers can contribute to the improvement of both classroom and achievement test scores, and the results of this current research confirmed this to be the case. The author believes that classroom test scores may increase for several reasons. First, he suggests, "the graphics help students understand and learn the subject. Second, they help students focus their energies on studying the essential information. Third, they serve as effective devices for helping students focus on the relationships between main ideas and details, main ideas and other main ideas, and so forth" (Ellis, 2004, p. 3).

This segment of empirical research was also guided by the second research question **RQ₂**: *What effect (if any) does the use of a Web 2.0 technology CmapTools in ESP studies in higher education have on students' achievements in ESP reading comprehension?* The first thing that strikes our attention about the findings is that the mean scores of the two ESP reading assignments in both participating institutions are obviously higher in experimental groups which received treatment with *CmapTools* and were required to apply the strategy of using *CmapTools* than in untreated control groups, which were obliged to use summarizing techniques. We can again assume that this difference in the results favouring the experimental group is related to the use of *CmapTools*, especially having in mind that the findings bear a close resemblance to the results of previous studies in the field. The two studies, conducted by Roy (2017) and Soleimani and Rostami abu Saeedi (2016), investigating the effects of applying *CmapTools*-supported concept mapping strategies on ESP learners' reading achievements, can serve as close examples. The analysis of reading posttest results in both studies indicated that students in experimental group outperformed their counterparts in control group. Furthermore, independent samples *t*-tests detected that there was a significant difference in the scores of the two groups, therefore a conclusion was made that *CmapTools*-assisted language learning had a significant effect on learners' ESP reading achievements in both cases. However, contrary to the results of these studies, the analysis of mean scores for both ESP reading posttests in this current thesis did not identify any statistically significant differences in the results between experimental and control groups (regardless of the previously mentioned fact that the mean scores of both assignments in both participating institutions were obviously higher in experimental groups).

Another unexpected finding was obtained having compared the dynamics of mean scores for *ESP reading assignment No 1* to those for successive *ESP reading assignment No 2* between experimental and control groups in terms of overall research. Improved achievement scores in the assignments were anticipated from participants in experimental groups assuming that at the end of the course they would have already mastered the principles of using of graphics to structure, comprehend and represent the information obtained from authentic texts. However, a slight improvement can only be observed within the performance of the untreated control groups. By contrast, the participants in experimental groups ended up showing no improvement at all. Findings in this respect do not appear to

corroborate previous empirical research in this area. To illustrate, in the similar research conducted by Omar (2015), the students' mean score in reading comprehension tests has increased at the end of a similar treatment. Moreover, the *t*-test results revealed a significant difference between the levels of performance in both tests, thus verifying the efficacy of this technique. Although the analysis of data in this current research reveals opposite to what was obtained by Omar (2015), it suggests some meaningful insights into the effectiveness of *CmapTools*-based concept mapping strategies used for developing ESP reading skills. First, they turn our attention to the importance of teacher and student collaboration and to the necessity of *scaffolding* instruction in *CmapTools*-supported ESP reading activities, emphasized by several authors within the field (Soleimani, & Rostami abu Saeedi, 2016; Balula, Martins, & Marques, 2014). Second, considering Vygotsky's (1978) assertion that internalization or "the transformation of an interpersonal process into an intrapersonal one is the result of a long series of developmental events" (Vygotsky, 1978, p. 57), it can be assumed that one semester can simply be too short a period for the mastery in *CmapTools*-supported concept mapping to develop. The third possible explanation regarding the present results could be the challenge and risk caused by introducing authentic materials and concept mapping as tasks in ESP studies.

If improved learning achievements are indicators of the effectiveness of an educational technology, then the conclusions regarding the effectiveness of *CmapTools* on ESP students' achievements in this current empirical research are definitely mixed. The technology proved to be highly effective for developing the participants' ESP vocabulary acquisition: the experimental groups who were learning through the use of *CmapTools* procedures, improved their results at the end of the treatment. Moreover, they outperformed the control groups who received conventional instructions. However, when using the technology for developing their ESP reading comprehension, the students in experimental groups ended up showing no improvement at all. Did they accept the technology as user-friendly or complicated, useful or not? But most importantly, as asked by *RQ₃*, *what factors influenced ESP students' acceptance of a Web 2.0 technology CmapTools in ESP studies in higher education ESP?* These questions direct us to the second dimension of this dissertation, i.e. the acceptance of Web 2.0 technologies in ESP studies in higher education. Technology Acceptance Model (TAM) (Davis, Bagozzi & Warshaw, 1989) was employed as a theoretical framework in this segment of empirical research. According to TAM, *actual usage* of any technology is determined by potential user's *behavioural intention* to use it, which is determined by his or her overall *attitude* towards the technology. *Attitude*, in turn, is a function of two major beliefs: *perceived usefulness* and *perceived ease of use* of the given technology. *Perceived ease of use* is also assumed to have an effect on *perceived usefulness*. TAM also theorizes that the two major beliefs (*perceived usefulness* and *perceived ease of use*) are as a rule affected by *external variables*. The literature analysis showed that TAM is a rule employed by researchers (Tarhini et al., 2015; Yea-Ru Tsai, 2015; Cakir & Solak, 2014; Yu-Li, 2014; Ramazani et al., 2013), seeking to predict or explain the acceptance of various Web 2.0 technologies within the sphere of ESP. Most of the authors verify the interrelations between the core constructs of TAM; however, depending on the educational setting and the technology used, they suggest complementing the model with additional variables. The findings of

literature analysis were helpful when formulating the hypotheses for this current research: 5 hypotheses related to interdependency of TAM variables were proposed; 3 hypotheses predicted the effect of an additional variable of *awareness*, while 2 hypotheses predicted the effect of individual and contextual variables. Findings of correlation analysis indicated that all the hypotheses related to the original constructs of TAM were largely supported by the data. It seems that participants of educational experiment perceived an image-based Web 2.0 technology *CmapTools* as user-friendly software, just as it was intended by its designers Novak and Cañas. The majority of the respondents agreed that *it was easy for them to become skilful in using the CmapTools tool*, that *it was easy for them to use the tool* and that *learning ESP through the use of it was easy*. There is no doubt that these positive attitudes influenced students' perceptions regarding the *usefulness* of it, hence supporting hypothesis H_1 . This finding once again reinforces the generally accepted axiom that the less complicated the user finds technology-related activities, the more likely he or she will consider a technology to be useful, as confirmed repeatedly both in primary sources (Davis, 1985; Davis, Bagozzi & Warshaw, 1989; Venkatesh et al., 2003) and in research conducted within the sphere of ESP (Gamble, 2017; Van de Bogard & Wichadee, 2015; Afshari et al., 2013; Tajuddin et al., 2012). Just as postulated by TAM, the evidence found through correlational analysis also points to the conclusion that *perceived usefulness* and *perceived ease of use* of *CmapTools* did jointly exert positive significant influence on ESP students' overall *attitudes* towards using the software, thus supporting hypotheses H_2 and H_3 . These results correlate fairly well with theoretical arguments provided earlier by Davis (1989) as well as with the findings of previous ESP research reported by Yu-Li Chen (2014) and Afshari et al (2013), although related to different Web 2.0 technologies. As it was expected, *perceived usefulness of CmapTools* was also found to be a significant determinant in influencing ESP students' *behavioural intention* to use it in the future, thus the hypothesis H_4 is supported. It is clear that students *intend* to use *CmapTools* in the future to improve their English or plan to add it as another medium in their future studies. Their *behavioural intention* to use a technology was also found to be determined by students' positive *attitude* towards it and their *awareness* regarding the tool; therefore the hypotheses H_5 and H_6 are supported. These findings are in a good agreement with Bates (2015), who stated that the more users know about the functions of the proposed technology and the more positive attitudes they own, the more they are likely to use it in the future. Students' familiarity regarding the tool was also found to have positive significant correlations with *perceived ease of use* and *perceived usefulness of CmapTools*. Hence hypotheses H_7 and H_8 were supported.

Correlation analysis also tried to explore which of 8 *individual and contextual characteristics* suggested, i. e., their *gender*, *native language*, *language most frequently used for Internet activities*, *self-reported evaluations regarding their level of English*, *self-reported proficiency in using Web 2.0 tools*, *self-reported evaluations regarding their ability to use CmapTools* and *attendance of the course* could possibly have influenced the two major constructs of belief (*perceived usefulness* and *perceived ease of use*). It appeared that only 3 of them did really exert influence on users' personal perceptions regarding the attributes of the tool. To illustrate, *gender* of the respondents was found to have very low although still significant negative correlation with the construct of *perceived usefulness*. It appeared that these were

male students, whose perceptions regarding the *usefulness* of *CmapTools* were stronger, compared to their female counterparts. Hence, hypothesis H_{9B} was supported. The results corroborate with those of Venkatesh and Morris (2000) who discovered that men, more than women, were more strongly influenced by their perceptions regarding usefulness of the technology. On the contrary, women's technology usage decisions were more strongly influenced by perceptions regarding the ease of use of the technology. Another external factor which proved to have a moderating effect on *perceived usefulness* of *CmapTools* was the *language students most frequently used for online activities*. A negative correlation between these two variables was detected, allowing us to assume that the more ESP students tended to use their native languages for everyday browsing activities, the less they perceived the usefulness of *CmapTools* for learning ESP. As English was reported to be the most frequently used language for Internet activities, we may twist the conclusion by stating that the more students tended to use English for their routine activities on the Internet, the easier for them was to grasp the usefulness of *CmapTools* used for their ESP activities. Thus we can support hypothesis H_{9D} . However, the analysis did not provide any evidence that ESP students' *native language*, their *self-evaluations regarding their English language level*, their *experience in using Web 2.0 tools and in using CmapTools* or their *attendance rate of ESP classes* affected their perceptions regarding the *usefulness* of the software. Hence the hypotheses H_{9C} , H_{9E} , H_{9F} and H_{9H} are to be rejected.

With respect to TAM construct of *perceived ease of use*, it can be observed that this construct is significantly influenced only by students' *self-reported proficiency in using Web 2.0 tools*, therefore hypothesis H_{10F} was supported. No significant correlations, however, were detected between the remaining demographic variables of the respondents, namely between *their gender*, *native language*, *language most frequently used for Internet activities*, *self-reported evaluations regarding their level of English*, *self-reported evaluations regarding their ability to use CmapTools*, *attendance of the course* and the construct of *perceived ease of use* (PEOU). Thus, hypotheses H_{10B} , H_{10C} , H_{10D} , H_{10E} , H_{10G} and H_{10H} were rejected. The findings presuppose, however that any users, no matter whether these were males or females, whether their English language record was good or poor, no matter which language was their mother tongue and which was used for the Internet activities, all of them had similar perceptions regarding the ease of use of *CmapTools*.

It should be mentioned, however, that there was one contextual variable, which did exhibit significant influence on both constructs of belief: *perceived usefulness* and *perceived ease of use*. It was the variable of *higher education institution*. It was also detected that perceptions regarding both *ease of use* and *usefulness* of the tool were stronger with the students coming from MRU as compared to their peers at VIKO. Perhaps this difference may account to the fact that the treatment was conducted in diverse settings, and although preventive measures were taken to have them as homogeneous as possible, certain differences inevitably remained. Moreover, in contrast to the teacher at VIKO, ESP teacher at MRU was also simultaneously playing the role of the experimenter. Again, although precautions were taken to avoid the problem of unconscious influence, also known as *experimenter expectancy* or *experimenter bias* effect, the ESP students at MRU may still have subtly been influenced by the researcher. This in fact can be admitted as one of the limitations of this research.

Limitations and directions for future research. The research questions of this dissertation were addressed by taking advantage of a quasi-experiment, incorporating a *static-group comparison* or *posttest only* design. The most important feature in this type of design is the absence of pretest measures, which may imply that any posttest differences between the groups could have been ascribed either to a treatment effect or to selection differences between the groups. In fact, sample size and sample selection could be admitted as the second limitation of this research, as participants of the aforementioned quasi-experiment were only 107 students from two higher education institutions in Lithuania. Moreover, they were selected using non-random sampling techniques. Therefore, future research should try employing stronger experimental designs with an increased sample size and if possible, involve random sampling techniques. Third, future studies should also look towards more longitudinal research to further explore the effectiveness of *CmapTools* on ESP learners' achievements. Fourth, as it was previously mentioned, this dissertation holder simultaneously played the role of both: an ESP teacher of the experimenter, which means that the problem of unconscious influence could have arisen. For this reason future researchers should try to avoid these double roles to reduce the risk of experimenter expectancy. And finally, the acceptance part of this research employed *Technology Acceptance model* and analysed the interdependency of its internal, external and additional constructs through the use of correlation analysis. The latter measures relationship and association, however, it does not define thorough explanation on the outcome. To gain deeper insights and understanding on underlying reasons regarding the acceptance of *CmapTools*, future research should preferably involve qualitative data collection methods, such as interviews, focus groups or observations.

Recommendations for practitioners. Before integrating *CmapTools* into your ESP course, several important issues should be considered:

- ask yourself, what you and your students need and what you want to accomplish. If your course is focused on developing ESP listening or speaking skills, the tool may be considered not feasible. Go for it if you want to help your students build better understanding of the content they are going to learn and the texts they are going to read.
- *CmapTools* is definitely a user-friendly Web 2.0 technology. Still, its functions and possibilities are endless, so be advised to carefully study the help files provided by *CmapTools* on their official page and the tutorials on working with the tool available on the *YouTube*.
- be ready that your students may not be familiar with concept mapping method and techniques before they start using the software. Make sure you devote enough time for the introductory sessions to help them get familiar with the basics of concept mapping. You may initially opt to start with paper-and-pencil format. You will see that determining key concepts and establishing relations between them may be both complicated and time consuming at least for some of the learners.
- as a novice teacher will probably find that designing *CmapTools* supported classroom activities requires a significant amount of time and efforts. It is obviously time consuming at the beginning, especially when you get involved in arranging “bones” on expert “skeleton” maps. Finally you will master the technique and this investment will pay off in the long run.

Conclusions:

1. Web 2.0 has developed as a result of an array of historical, scientific and technological events of the 20th century. It is conceptualized as second generation of *World Wide Web* as well as its numerous technologies that enable interaction, collaboration and sharing between users. Driven by these unique characteristics Web 2.0 changed the ways of how people communicate and interact with each other through technologies, but most importantly, of how they construct knowledge and learn. It was with the advent of Web 2.0 that new alternatives related to traditional teacher-directed classrooms in higher education emerged, including *synchronous distributed courses*, *Web-enhanced courses*, *blended (hybrid) classroom courses*, *blended (hybrid) online courses*, *fully online courses* or *flexible mode* and in fact have almost supplanted routine *face-to-face* teaching and learning experiences. It allowed free access to huge amount of information which can be copied, modified, extended, published and shared among all the participants of educational process. It showed that learning can occur at any time and location and that teachers can no longer be treated as the sole fount of knowledge. As a consequence, educational theories have gradually moved away from using behavioural and cognitive viewpoints and opinions to using constructivist or even connectivist approaches to learning. The last one is considered the most adequate philosophy of education for the digital age and is thus beginning to be recognized by educators. However, as research suggests, it is usually associated with the third generation pedagogy of *distance* education and receives a lot of criticism for being unable to fully explain how knowledge is built and learning occurs in connected environment.
2. In this dissertation ESP is defined as teaching English as a second or foreign language to students in higher education, where the goal of the learners is to use English in a particular occupation or profession. Web 2.0 technologies are increasingly being used for teaching and learning this discipline, allowing ESP students to engage in authentic practices closely related to their areas of study and future work. To clarify the peculiarities of using these technologies in the sphere of ESP, to summarize evidence of their effectiveness and to identify the areas where a plethora in research exists, a review of recent empirical research was conducted. It identified the following trends:
 - only a small number of available types of Web 2.0 technologies from their diverse spectrum have received attention from practitioners and researchers within the field. These as a rule are the most prevalent types of Web 2.0 technologies: *blogs*, *social networking tools*, *wikis* and *virtual worlds*. Instances of apparently neglected types of Web 2.0 technologies, which need a deeper investigation, include *image-based tools*, *audio tools*, *multimodal production tools*, *digital story telling tools*, *knowledge organization and sharing tools*, *data analysis tools*, *timeline tools* and *assessment tools*.
 - the major drawback arising from the reviewed studies is that researchers' emphasis given to different ESP skills developed through the use of Web 2.0 technologies is diversified. The centre of their attention in more cases than not is *ESP writing*. Numerous studies witness that it can be taught effectively (usually in segregation) through the use of several popular (if not overused) Web 2.0 technologies: *wikis*, *blogs* and *social networking tools*. Other language skills and knowledge areas (reading, listen-

ing, speaking and vocabulary) receive far less attention, although e.g. ESP vocabulary learning is considered to be one of the major linguistic obstacles as reported by relevant literature and the results of a pilot study of this dissertation.

- the review showed that research on the use of Web 2.0 technologies in ESP instruction may be driven by *constructivist*, *socio-constructivist* and in solitary examples by *connectivist* approaches, may be grounded by *Krashen's Input hypothesis*, *Content and Language Integrated Learning (CLIL)* as well as the theories of *metacognition* and *genre analysis*. Surprisingly, in many cases researchers do not provide any clear theoretical foundation for planning and conducting Web 2.0 related activities in their ESP courses. It means that there is a huge lack of verified instructional strategies, techniques and theoretical guidance explaining how Web 2.0 technologies can effectively support the development of ESP learners' skills and consequently improve their learning outcomes.
3. Acceptance of Web 2.0 technologies in this current study was defined as students' behavioural interaction with a particular Web 2.0 tool over time within a specific educational setting and his or her psychological willingness to use or continue using the tool. The results of literature analysis show that *Technology acceptance model (TAM)* (Davis, Bagozzi and Warshaw, 1989) has been frequently applied to determine the acceptance of Web 2.0 technologies utilized within different fields of teaching and learning ESP. The majority of researchers within the sphere confirm positive and significant relationships between core constructs of TAM in Web 2.0 enhanced ESP courses. They suggest that *perceived usefulness* and *perceived ease of use* of a certain Web 2.0 technology may jointly exert influence on the formation of students' overall *attitudes* towards using the technology and eventually may lead towards *the actual use* of it. However many of the authors agree that despite of its high validity, the model can be extended by adding complimentary variables, depending on a Web 2.0 technology researched, for more clarity. The two major drawbacks arising from the literature review are that ESP studies, utilizing TAM, pay little attention to moderating effects of individual and contextual factor. Moreover, the majority of authors within the sphere use only descriptive statistics without explicit hypotheses as a tool to analyse the data or investigate causal relationship between external and internal variables of TAM.
 4. *CmapTools* is a Web 2.0 technology, defined as a client-server based software kit empowering users, individually or collaboratively, to visually represent their knowledge using concept maps, to share them with peers and colleagues, and to publish them. Assuming these affordances, it may be attributed to the cluster of *image-based* tools within the typology of educational Web 2.0 technologies (Bower, 2015) or to the category of knowledge organization applications (as suggested Orehoваčki, Bubaš, Kovačić, 2012). Research suggests that the use of *CmapTools* can be supported by cognitivist approach, especially by Ausubel's (1969) *assimilation theory of learning*. Also, it may be guided by constructivist philosophical approach, especially by Vygotsky's (1978) *socio-cultural theory* of human learning. The former seems to be more applicable effectively when the tool is being applied for solitary concept mapping practices and individual knowledge building purposes, while the latter can serve a solid theoretical basis when social inter-

- action, collaboration and teacher scaffolding is involved. Resting on both approaches it was integrated to two ESP courses in two higher education institutions in Lithuania.
5. The effectiveness of *CmapTools* in this particular research was operationalized as whether or not it had a positive effect on participants' achievements in ESP vocabulary acquisition and reading comprehension, and, if so, how large this effect was. It should be noted that namely learning achievements (*outputs*) in a particular subject attained through the use of certain resources, methods or practices (*inputs*) is considered the most important indicator of educational effectiveness and thus the most prevalent criterion in educational effectiveness research. The analysis of mean scores for ESP vocabulary achievement posttests in experimental and control groups in terms of the whole research, allows us to declare that the strategy of using an image-based Web 2.0 technology *CmapTools* in ESP courses was highly effective: the findings demonstrated that experimental groups which practiced learning ESP vocabulary through the use of *scaffolded CmapTools* procedures in blended (hybrid) settings in both participating institutions, outperformed the control groups who received routine instructions. It is fairly apparent that the means of experimental groups' scores were higher in both posttests, and this difference was statistically significant. Moreover, the quasi-experiment was conducted in two study programmes representing two completely different areas of studies: *social sciences* and *technological sciences*. The fact that the use of Web 2.0 technology *CmapTools* proved to be effective in supporting the acquisition of ESP vocabulary related to the area of *customs and law* as well as *computer systems* indicates that it is suitable to be used in different spheres of ESP. Still for any type of technology to be effective in education, its affordances must be relevant to the teaching and learning context, delivery mode, students' needs and preferences, and it is a responsibility of teachers to harness it in the most appropriate way, preferably following already verified instructional strategies and theoretical guidance. In this particular segment of research a great amount of teacher *scaffolding*, associated with Vygotsky's *sociocultural theory*, is believed to have had an effect for the achieved favourable results.
 6. The analysis of mean scores for ESP reading assignments in experimental and control groups in terms of the whole research show that the results in both participating institutions were obviously higher in experimental groups which received treatment and were required to apply the strategy of using *CmapTools* than in untreated control groups. It may seem as a clear signal of effectiveness of the technology, however, despite of this favourable finding, the analysis did not identify any statistically significant differences in the results between the groups in both participating institutions. Besides, the comparison of dynamics of mean scores for ESP reading assignment No1 (with elements of *scaffolding* in experimental groups) and those for successive ESP reading assignment No 2 (with *scaffolding* removed in experimental groups) between experimental and control groups in terms of overall research, revealed a slight improvement only within the performance of the untreated control groups. By contrast, the participants in experimental groups ended up showing no improvement at all. In fact, their mean scores (although still higher than in control group) decreased, once teacher assistance was deliberately removed. This again proves that teacher and student collaboration as well as *scaffolded*

instruction in *CmapTools*-supported ESP reading activities are extremely important determinants and probably prerequisites regarding the effective use of *CmapTools* in this particular activity.

7. Resting on *Technology Acceptance Model*, three types of factors, exerting influence on ESP students' behavioural intention to use the technology were identified. They were related to TAM constructs, additional construct of awareness and contextual/ individual factors:
 - ESP students' *awareness* of *CmapTools* makes influence on their perceptions regarding the *ease of use* and *usefulness* of the tool. In other words, the more knowledge ESP students have about this particular technology, the more likely they will recognize its user-friendly nature and potential value.
 - ESP students' perceptions on the *ease of use* of *CmapTools* exert direct influence on their perceptions regarding its *usefulness*. In other words, the less complicated an ESP student finds *CmapTools*-related activities, the more likely he or she will consider it to be useful.
 - *Perceived ease of use* and *perceived usefulness* of *CmapTools* jointly determine ESP students' overall *attitudes* towards the technology, suggesting that it is necessary to introduce ESP students with sufficient training on working with ESP and to clearly communicate the aim for doing this.
 - *Perceived usefulness*, *positive attitude* and *awareness* of *CmapTools* make direct influence on ESP students' *behavioural intention* to use the tools, suggesting that the more information ESP students have about *CmapTools* and the more positive attitude is developed out of this knowledge, the stronger their intentions will be to use it in the future
 - ESP students' *gender* and *language they most frequently use for online activities* correlate negatively with their perceptions regarding the *usefulness* of the tool. It appears that male students are more strongly influenced by their perceptions regarding usefulness of the technology than their female counterparts. Moreover, the more ESP students tend to use their native languages for everyday browsing activities, the less they tend to perceive the usefulness of *CmapTools* for learning ESP;
 - ESP students' self-reported proficiency in using Web 2.0 tools correlated significantly with their perceptions on the *ease of use* tool, suggesting that students who have technical skills related to other Web 2.0 technologies, can engage themselves better in the use of *CmapTools* than those who do not have those skills.

Aprobation of research results

Publications on the dissertation topic:

1. Selevičienė, E. & Burkšaitienė, N. (2018). A Study of tertiary teachers' attitudes towards Web 2.0 technologies and their use for teaching EFL and ESP. In N. Stojković & N. Burkšaitienė (Eds.), *Establishing predominance of English for specific purposes within adult English language teaching*, (pp. 94 – 118). Cambridge Scholars Publishing.
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Scientific Interests Teaching and learning ESP, Web 2.0 technology-enhanced teaching of English, teaching English pronunciation, phonetics and phonology.

MYKOLO ROMERIO UNIVERSITETAS

Eglė Selevičienė

ANTROSIOS KARTOS
SAITYNO TECHNOLOGIJOS
PROFESINĖS ANGLŲ KALBOS
AUKŠTOJO MOKSLO STUDIJOSE:
EFEKTYVUMAS IR PRIĖMIMAS

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Socialiniai mokslai, edukologija (S 007)

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DAKTARO DISERTACIJOS SANTRAUKA

Tyrimo aktualumas. Profesinė (kitaip – *specialioji, specialybės, specializuota, dalykinė*) anglų kalba yra profesinėje ar dalykinėje aplinkoje vartojama bendrosios anglų kalbos atmaina. Technologijos šios disciplinos mokyme ir tyrimuose visuomet vaidino svarbų vaidmenį. Radijas ir televizija, kasetiniai, juostiniai ar kompaktinių diskų grotuvai, CD-ROM ir DVD laikmenos, nešiojamieji kompiuteriai, išmanieji telefonai, įvairių kartų saityno įrankiai – visos šios technologijos viename ar kitame profesinės anglų kalbos raidos etape buvo ar tebėra aktyviai naudojamos, siekiant kuo labiau atliepti besimokančiųjų poreikius. Kai kurioms jų, pavyzdžiui, kasetiniams grotuvams, technologijų evoliucijos procese buvo lemta pasitraukti į užmarštį „natūraliosios atrankos“ būdu, kai kitos, tokios kaip antrosios kartos saityno technologijos, yra taikomos labai plačiai, siekiant kuo labiau praturtinti mokymo(si) procesą.

Sąvoka „*profesinė anglų kalba*“ apibrėžiama kaip į specifinius besimokančiųjų poreikius orientuotas anglų kalbos mokymas aukštojoje mokykloje arba įmonėje, siekiantis ugdyti su konkrečia profesija ar specialybe susijusius anglų kalbos įgūdžius (Gatehouse, 2001; Paltridge & Starfield, 2013; Lesiak-Bielawska, 2015). Hutchinson ir Waters (1991) teigia, kad šios disciplinos atsiradimui įtakos turėjo kelios svarbios priežastys. Spartus mokslo, ekonomikos ir technologijų vystymasis visame pasaulyje pasibaigus Antrajam pasauliniam karui padiktavo globalios kalbos, kuria būtų galima komunikuoti mokslo, komercijos ar technologijų srityse, poreikį. Profesinės anglų kalbos iškilimą paskatino ir pokyčiai užsienio kalbų mokymo bei lingvistikos tyrimų srityse. Jei tradiciškai mokant užsienio kalbos buvo akcentuojama formalių lingvistinių kompetencijų, ypač gramatikos ugdymo svarba, tai mokant kalbos realiuose, aktualių turinių paremtuose kontekstuose, pradėta labiau orientuotis į konkrečius besimokančiųjų poreikius ir kuo prasmingesnę komunikaciją. Be abejo, pokyčiai lingvistikos tyrimų srityje sietini ir su nuolat besivystančiomis technologijomis. Kompiuteriai užsienio kalbų mokymo srityje (įskaitant ir profesinę anglų kalbą) pradėti naudoti dar 1960-aisiais, kai IBM kompanija pristatė pirmuosius elektroninius masinės gamybos kompiuterius. Pastarųjų potencialas užsienio kalbų mokymo(si) srityje sulaukė tyrėjų dėmesio visame pasaulyje ir lėmė naujos tyrimų srities – kalbų mokymo(si) naudojantis kompiuteriais (angl. CALL) atsiradimą. Šią tyrimų sritį Levy (1997) apibūdino kaip „*kompiuterinių programų, skirtų kalbų mokymui ir mokymuisi, paiešką ir studijas*“ (Levy, 1997, p. 1) ir kaip tam tikro technologijų vystymosi etapo atspindį kalbų mokymo(si) srityje. Warschauer (1996) ir Stockwell (2010) pastebi, kad CALL visuomet atliepia ir vyraujančias teorines, ir metodologines tendencijas bei skiria tris jo raidos etapus: *bibehavioristinį, komunikacinį ir integruotąjį*. Pirmasis etapas, kuris tęsėsi maždaug nuo 1960-ųjų iki 1970-ųjų, daugiausia vadovavosi bibehavioristiniu požiūriu paremtais užsienio kalbų mokymo metodais: *audiolingvaliniu* (angl. *Audio-Lingual Method*), *fizinio atsako* (angl. *Total Physical Response*) ar *situaciniu* (angl. *the Structural-Situational Approach*). Naudotos pirmos kartos kompiuterinės užsienio kalbų mokymo programos jau siūlė kalbos pratybų ir praktikos pratimus, vertimo ir savitikros testus, bet iš esmės, kaip pastebi Warschauer (1996), rėmėsi objektyvistiniu mokymo modeliu, kurio ašis – „mokytojas“, t. y. kompiuteris, ir nuostata,

kad svarbiausias dalykas mokant(is) svetimos kalbos yra nuolatinis tos pačios mokomosios medžiagos kartojimas. Šį, ankstyvąjį, CALL etapą pamažu keitė kitas – komunikacinis etapas, kuriame dominuojančios užsienio kalbų mokymo teorijos (pvz., *Krashen monitoriaus teorija*) akcentavo ne kalbėjimo formas, bet jo informacinio turinio svarbą. Kompiuteris ir kitos technologijos pradėtos traktuoti ne kaip niekuomet nepavargstantis mokytojas, bet kaip alternatyvi mokymo priemonė ar stimulus. 1980-aisiais prasideda integruotasis etapas, kai mokymo institucijos užsienio kalbų mokymo tikslais pradeda naudoti multimedijas, o svarbiausia – saityną (angl. *World Wide Web*). Multimedijos suteikė užsienio kalbų mokytojams ir dėstytojams galimybę integruoti autentiškus tekstus, garsus ar vaizdus, tačiau šios technologijos nebuvo interaktyvios, t. y. neįtraukė studentų. Tik atsiradus pirmosios kartos internetui (ankstyvajai saityno fazei) besimokantieji, nors ir būdami pasyvūs interneto vartotojai, pagaliau galėjo iš tiesų pasinerti į autentišką mokymosi aplinką ir pasiekti tuos šaltinius, kurie labiausiai pateisino jų profesinius interesus ir specifinius poreikius. Visgi neabejotinai pats reikšmingiausias įvykis integruotame CALL etape yra antrosios kartos saityno ir jo technologijų atsiradimas, sukėlęs proveržį ne tik įvairiose visuomenės srityse, bet ir švietime, bei ir atvėręs visiškai naujus horizontus mokant(is) užsienio kalbų. Socialiniai tinklai, diskusijų forumai, tinklaraščiai, vaizdo ir garso dalijimosi įrankiai, įvairios mokymosi platformos ir kt., tapo neatsiejama užsienio kalbų mokymo(si), dalimi dėl savo lankstumo, prieinamumo, aplinkų paprastumo, bendravimo ir bendradarbiavimo galimybių. Būtent dėl šių unikalių savybių antrosios kartos saityno technologijos yra plačiai taikomos ir profesinės anglų kalbos mokymo(si) srityje.

Tyrimo problema. Nepaisant visuotinio susidomėjimo antrosios kartos saityno technologijomis, analizuojant CALL literatūrą (Dashtestani & Stojković, 2015; Golonka et al., 2014; Luo, 2013; Wang & Vásquez, 2012) pastebima tendencija, kad intensyviausiai tyrėjų analizuojamos antrosios kartos technologijos užsienio kalbų mokymo(si) kontekste, įskaitant ir profesinę anglų kalbą, yra tinklaraščiai, socialiniai tinklai ir vikiai. Visos minėtos technologijos yra orientuotos į rašytinę vartotojų komunikaciją, todėl natūralu, kad jų teikiama nauda dažniausiai yra sietina su profesinės anglų kalbos rašymo įgūdžių lavinimu. Kitų kalbinių veiklų ir sričių (kalbėjimo, klausymo, skaitymo ar žodyno, kurį tyrėjai įvardija kaip vieną problemiškesniųjų profesinės anglų kalbos sričių) ugdymas, pasitelkus antrosios kartos saityno technologijas, sulaukia daug mažiau tyrėjų ir praktikų dėmesio. Stokojama tyrimų, ne tik aptariančių kaip profesinės anglų kalbos studijose aukštosios mokyklose naudojamos mažiau tirtos ar populiarios technologijos, bet ir liudijančių jų *efektyvumą*, t. y. vertinančių, kokios įtakos jos turi profesinės anglų kalbos studentų pasiekimams. Efektyvumo sąvoka šioje disertacijoje operacionalizuojama remiantis autoriais Agodini, Dynarski, Honey ir Levin (2003), kurie pastebi, kad diskutuojant apie technologijų efektyvumą moksle, „dažniausiai klausiama, ar jos pagerina studentų rezultatus“ (Agodini, Dynarski, Honey & Levin, 2003, p. 4). Panašiai efektyvumą moksle (nors tai ir platesnis terminas) apibrėžia tyrinėtojai Lockheed ir Hanushek (1994), teigdami, kai tai yra vertinimas „ar tam tikrų išteklių rinkinys turi teigiamos įtakos pasiekimams, o jei taip, tai kokio dydžio ta įtaka yra“ (Lockheed & Hanushek, 1994, p. 2). Kalbėdami apie išteklius (tiek materialiuosius, tiek nematerialiuosius), autoriai vartoja terminą *indėlis* (angl. *input*), kai

tuometu *pasiekimai* yra siejami su apčiuopiamais studijų rezultatais (angl. *outputs*). Kaip jau minėta, CALL literatūros analizė rodo, kad sritys, kuriose reikalinga daugiau aiškumo, yra antrosios kartos saityno technologijų (*input*) įtaka studentų pasiekimams įsisavinant profesinės anglų kalbos žodyną (*outputs*), (Behjat, 2013; Ventura & Martín-Monje, 2016; Dashtestani, 2018), taip pat skaitant autentiškus profesinės anglų kalbos tekstus (Chew & Lee, 2013; Tananuraksakul, 2015; Seiradakis & Spantidakis, 2018).

Kitas ryškus probleminis aspektas yra tas, kad nors antrosios kartos saityno technologijos yra integruojamos į mokslą (ir į profesinės anglų kalbos studijas), tikintis, kad jos pateisins vadinamosios skaitmeninės kartos lūkesčius, realybė gali būti kiek kitokia. Vartotojams šios technologijos yra kasdienio gyvenimo ir laisvės simbolis. Kiekvienas turime galimybę nuspręsti, kokiais socialiniais tinklais norime naudotis (ar nesinaudoti visai), kokį turinį juose viešinti, ką komentuoti, o ko – ne. Kai technologijos yra integruojamos į mokymo(si) erdvę aukštojoje mokykloje, jos visuomet įneša tam tikro apribojimo ir suvaržymo prieskonį. Reiškinių, kai dėstytojai bruka „karštas“ antrosios kartos saityno technologijas, o studentai aktyviai ar pasyviai joms priešinasi, Stein (2008) vadina *baimę keliančio namelio medyje sindromu* (angl. *creepy tree house syndrome*). Tyrimų, nagrinėjančių tokio technologijų atstūmimo, arba atvirkščiai, jų *priėmimo* priežastis profesinės anglų kalbos srityje, yra stebėtina nedaug. Šie argumentai skatina poreikį panagrinėti įvairius veiksnius (tiek išorinius, tiek vidinius), kurie daro įtaką antrosios kartos saityno technologijų *priėmimui* profesinės anglų kalbos studijose, t. y. *studento nuostatoms ir apsisprendimui pradėti naudoti naują technologiją, arba tęsti jau išbandytos technologijos naudojimą*. Matome, kad tyrimo problema yra dvilypė, todėl struktūros požiūriu disertacija susideda iš dviejų skirtingus probleminius laukus nagrinėjančių dimensijų: antrosios kartos technologijų *efektyvumo* ir jų *priėmimo* aukštojo mokslo profesinės anglų kalbos studijose. Pirmoji, *efektyvumo* dimensija, išryškina antrosios kartos saityno technologijų vaidmenį aukštajame moksle, įskaitant profesinės anglų kalbos studijas. Vėliau tyrimo sritis siaurinama, siekiant ištirti konkrečios antrosios kartos saityno technologijos, t. y. *IHMC CmapTools* (toliau *CmapTools*) efektyvumą studentų profesinės anglų kalbos žodyno įsisavinimo ir teksto suvokimo pasiekimams. Antroji orientuojasi į minėtų technologijų *priėmimo* problemą profesinės anglų kalbos studijose ir gilinasi, kaip studentai priima studijų metu taikytą įrankį *CmapTools*.

Tyrimo klausimai:

1. Kokią įtaką profesinės anglų kalbos studijose naudota antrosios kartos saityno technologija *CmapTools* daro studentų profesinės anglų kalbos žodyno įsisavinimo pasiekimams?
2. Kokią įtaką profesinės anglų kalbos studijose naudota antrosios kartos saityno technologija *CmapTools* daro studentų profesinės anglų kalbos teksto suvokimo pasiekimams?
3. Kokie veiksniai turi įtakos profesinės anglų kalbos studijose naudotos antrosios kartos saityno technologijos *CmapTools* priėmimui?

Tyrimo objektas. Antrosios kartos saityno įrankių naudojimas profesinės anglų kalbos studijose.

Disertacinio darbo tikslas – atskleisti antrosios kartos saityno technologijų svarbą aukštajame moksle, įvertinti pasirinktos technologijos vaidmenį profesinės anglų kalbos studentų kalbiniais pasiekimams bei nustatyti veiksnius, darančius įtaką šios technologijos priėmimui.

Uždaviniai:

1. išryškinti antrosios kartos saityno technologijų naudojimo svarbą aukštajame moksle;
2. iširti antrosios kartos saityno technologijų naudojimo ypatumus aukštojo mokslo profesinės anglų kalbos studijų kontekste;
3. iširti antrosios kartos saityno technologijų priėmimo ypatumus aukštojo mokslo profesinės anglų kalbos studijų kontekste;
4. išnagrinėti pasirinktos antrosios kartos saityno technologijos charakteristikas ir integruoti ją į pasirinktų studijų programų privalomojo profesinės anglų kalbos dalyko studijas;
5. įvertinti profesinės anglų kalbos dalyko studijose naudoto antrosios kartos saityno įrankio įtaką studentų profesinės anglų kalbos žodyno įsisavinimo pasiekimams;
6. įvertinti profesinės anglų kalbos dalyko studijose naudoto antrosios kartos saityno įrankio įtaką studentų profesinės anglų kalbos teksto suvokimo pasiekimams;
7. nustatyti veiksnius, darančius įtaką studentų pasirinkimui naudotis arba nesinaudoti profesinės užsienio kalbos dalyko studijose taikytu antrosios kartos saityno įrankiu at-eityje.

Tyrimo metodologinės nuostatos. Tyrimui atlikti pasirinkta kiekybinė prieiga ir kvazi-eksperimentinis dizainas. Įvertinus žymiausių eksperimento metodo autorių (Campbell ir Stanley, 1963; Cook ir Campbell, 1979; Martella et al, 2013) siūlomus 14 įmanomų eksperimentų tipų, pasirinktas *static-group comparison* dizainas, kuris pasižymi tuo, kad jame nėra vadinamojo pre-testo. Kaip jau buvo minėta, empirinis tyrimas atliekamas aukštojo mokslo kontekste, kur profesinės anglų kalbos diskursas studijas dar tik pradėjusiems studentams yra visiškai naujas dalykas, skirtingai nei darbovietėse, kur besimokantieji bent dalinai yra susipažinę su savo srities profesine leksika. Empiriniame tyrime dalyvavo 107 pirmo kurso nuolatinųjų studijų studentai iš 2 Lietuvos aukštųjų mokyklų: Mykolo Romerio universiteto ir Vilniaus kolegijos. Dalyviai iš Mykolo Romerio universiteto mokėsi *teisės ir muitinės veiklos* bakalauro studijų programoje, dalyviai iš Vilniaus kolegijos – *kompiuterių sistemų* studijų programoje. Visi jie studijavo privalomąjį profesinės anglų kalbos studijų dalyką ir buvo suskirstyti į dvi eksperimentines ir dvi kontrolines grupes. Tyrimo imtis – nerandomizuota, t. y. sudaryta patogiosios atrankos būdu (dėl aukštojo mokslo praktikoje vyraujančios grupės-paskaitos sistemos). Tyrimo metu vieno semestro profesinės anglų kalbos dalyko studijų metu eksperimentinėse grupėse buvo naudojamas antrosios kartos saityno įrankis *CmapTools*, remiantis Vygotskio *sociokultūrine* teorija bei vadovaujantis Novak bei Ausubel *asimiliacijos* teorijos nuostatomis, kuriant internetinius sąvokų žemėlapius. Kon-

trolinėse grupėse dalyko studijos vyko įprasta tvarka. Siekiant atsakyti į pirmuosius du tyrimo klausimus ir įvertinti aptariamą technologijos efektyvumą, buvo lyginami visų dalyvių rašytų dviejų profesinės anglų kalbos žodyno testų bei dviejų profesinės anglų kalbos teksto skaitymo užduočių rezultatai. Siekiant atsakyti į trečiąjį tyrimo klausimą, empirinio tyrimo pabaigoje vykdyta anketinė apklausa ir naudotas klausimynas, paremtas teoriniu *Technologijų priėmimo modeliu* (Davis, Bagozzi & Warshaw, 1989).

Disertacijos turinio apžvalga:

1 skyrius. *Trijų saityno kartų konceptualizavimas.* Norint suvokti antrosios kartos saityno vaidmenį profesinės anglų kalbos studijose ir apskritai aukštajame moksle, svarbu aptarti svarbiausius saityno raidos etapus. Pradėti reikėtų nuo to, kad patį saityną mokslininkai Berners-Lee, Cailiau ir komanda sukūrė 1989 m. Berners-Lee (2000) saityną apibrėžia kaip „visuotinės informacijos rinkinį, pasiekiamą kompiuterių ar tinklų pagalba, informaciją identifikuojant pagal jos unikalųjį adresą internete (URL)“ (Berners-Lee, 2000, p. 239). Iš esmės ši definicija tinka ir apibūdinant pirmosios kartos saityną. Pastarasis buvo pasyvus, skirtas tik informacijos priėmimui (angl. *read-only*), tačiau įnešė daug naujovių į švietimo sritį, ir ypač pasitarnavo profesinės anglų kalbos mokymo(si) proceso dalyviams. Tiek dėstytojai, tiek studentai galėjo pasiekti internete publikuojamus įvairių profesinės anglų kalbos sričių tekstus, garso ir video įrašus ir pan. Ši ankstyvoji saityno fazė sutampa su integruotuoju CALL etapu, kai mokant(is) kalbų naudotos CD-ROM laikmenos, kurios vėlgi besimokančiam leido tik gauti informaciją (pvz., žodyno pavidalu), bet ne ją modifikuoti ar dalintis. Svarbiausias momentas šiame etape yra tas, kad mokomajai informacijai atsiradus internete, atsiranda ir naujos mokymo(si) formos: *e-mokymas(is)*, *nuotolinis mokymas(is)*, *mišrus mokymas(is)* (Massie, 1997; Cross, 2004).

2004 m. O'Reilly ir Media Live International organizuotoje konferencijoje Web 2.0 Summit pirmą kartą buvo pavartotas terminas „*antrosios kartos saitynas*“. Medijų ideologas O'Reilly (2005) jį apibrėžia kaip *procesą*, kurio metu dauguma paslaugų, anksčiau veikusių kompiuteryje, perkeliama į internetą, o paslaugų ir kompiuterinės įrangos kontrolė perleidžiama vartotojams. Jie turi galimybę nevaržomai naudotis saityno informacija, ją modifikuoti, dalintis, pritaikyti savais tikslais ir pan. Kiti autoriai antrosios kartos saityną apibūdina labai įvairiai. Freedman (2006) jį vadina *priemone*, leidžiančia kiekvienam gauti informaciją ir tuo pat metu skleisti ją kitiems. Witts (2008) teigia, kad tai *programinė įranga*, leidžianti vartotojui tapti ir informacijos kūrėju, ir jos transliuotoju. Grosseck (2009) ir Redecker et al. (2009) nuomone, tai *saityno naudojimas socialiniais tikslais* įvairių internetinių įrankių pagalba. Wilson et al. (2011) įvardija jį kaip *naują žiniatinklio kartą*, leidžiančią asmenims ir organizacijoms keistis informacija, bendrauti, bendradarbiauti ir t. t. Kaip matome, antrosios kartos saityno apibrėžimai varijuoja. Jis įvardijamas kaip *procesas*, *priemonė*, *programinė įranga*, *saityno naudojimas socialiniais tikslais internetinių įrankių pagalba* ar *nauja žiniatinklio karta*. Visgi visuose siūlomuose apibrėžimuose galime išvelgti demokratijos, atvirumo, bendrystės ir bendradarbiavimo potekstę (kiekvienas galime būti jo vartotojas ir turinio kūrėjas). Šioje disertacijoje antrosios kartos saitynas apibrėžiamas kaip antros kartos žiniatinklis ir jo technologijos, leidžiančios vartotojams interaktyviai

bendrauti, bendradarbiauti ir dalintis informacija. Nuo pat 2004-ųjų šios technologijos (pvz., socialiniai tinklai, vaizdų ar nuotraukų dalijimosi svetainės, tinklaraščiai ir pan.) tapo neatsiejama mūsų asmeninio ir profesinio gyvenimo dalimi, ir nors nė viena jų nebuvo skurta edukaciniais tikslais, švietime jos puikiai prigijo. Pop (2010) pastebi, kad užsienio kalbų mokytojai ir dėstytojai vieni pirmųjų išvelgė potencialią šių technologijų teikiamą naudą. Wang ir Vásquez (2012) teigimu, būtent dėl antrosios kartos saityno technologijų įtakos užsienio kalbų tyrimuose stebima paradigmos kaita: kognityvinę perspektyvą keičia socialinė, auditorinė aplinka virsta natūralesne terpe, žinių įgijimo procese atsiranda būtinas „dalyvavimo“ elementas. Visa tai skatina domėtis, ar egzistuojančios mokymosi teorijos atitinka besimokančiųjų poreikius, ypač tų, kurie gimę skaitmeniniame amžiuje ir mokymą(si) supranta kiek kitaip nei jų pirmtakai. Be to, nuo 2010 m. jau pradėta kalbėti ir apie trečiąją saityno kartą. Balaji et al. (2018) ją apibūdina kaip 2010–2020 m. vykstančią saityno technologijų plėtotę, orientuotą į semantinių ryšių paiešką, išnaudojančią kolektyvinio intelekto potencialą ir siekiančią mašinas paversti intelektualiais įrenginiais, gebančiais kuo efektyviau pasitarnauti žmogui.

Trijų saityno kartų sąsajos su mokymosi teorijomis. Lygindami konceptualiuosius pastovaus pirmosios kartos ir dinamiško antrosios kartos saitynų modelius, Talandis (2008), Mc Loughlin ir Lee (2008), Dede (2008), Enonbun (2010), Hicks ir Graber (2010), Crompton (2012) bei Pascoe et al. (2018) pastebi jų sąsajas su keliomis mokymosi filosofijų paradigmomis. Autoriai nurodo, kad atvaizdavus grafiškai, pirmosios kartos saityno schema stebėtinai primena tradicinį didaktinį mokytojo–mokinio mokymo(si) modelį, kurį Palmer (2005) vadina *objektyviu tiesos pažinimu*. Tiesą pažįstant objektyviai, žinotojas (pvz., užsienio kalbos dėstytojas) informaciją perduoda jos neturintiems (pvz., užsienio kalbos studentams). Pastarieji ją priima, kartoja ir įsisavina, bet nekvėstionuoja jos tikrumo, nesikeičia idėjomis. Informacija dažniausiai pateikiama pirminiuose šaltiniuose: žodynuose, enciklopedijose, vadovėliuose. Toks žinių perdavimo procesas primena pirmos kartos saityno platformą, kur informacija iš centralizuotų šaltinių perduodama vartotojams. Jie gali ją skaityti, bet neturi korekcijos, redakcijos ir sklaidos priemonių ir galimybių. O antros kartos saitynas leidžia vartotojui tapti ne tik aktyviu informacijos kūrėju ir sklaidėju, bet suteikia galimybę bendrauti ir žiniomis dalintis su bendraminčiais. Tokių bendraminčių grupes Wenger-Trayner ir Wenger-Trayner (2015) vadina *veiklos bendruomenėmis* (angl. *communities of practice*), t. y. žmonėmis, kuriuos vienija koks nors bendras interesas ar veikla, kurios mokomasi reguliariai bendraujant ir veikiant kartu. Veiklos bendruomenėse, kaip pastebi Martin (2011), visi besimokantieji yra lygūs: kiekvieno žinios, patirtys ir istorijos yra vienodai svarbios. Būtent empirinės žinios ir vertybės, o ne autoritetas čia yra svarbiausias elementas ir žvelgiant iš šios perspektyvos antrosios kartos saityno modelis savotiškai atkartoja Palmer (2005) aprašytą *tiesos pažinimą bendruomenėje*. Kai kurie mokslininkai (Pascoe et al., 2018; Mattar, 2018; Imathi, 2018; Echeng & Usoro, 2016; Foroughi, 2015; Crompton, 2012; Enonbun, 2010; Hicks & Graber, 2010; Gunawardena et al., 2009; Mc Loughlin & Lee, 2008; Talandis, 2008; Dede, 2008) yra įsitikinę, kad antrosios kartos saityno paradigma pati savaime linksta prie *konstruktyvistinės epistemologijos* ir mokymo(si) teorijos, kuri teigia, kad besimokantieji savo žinojimą aktyviai konstruoja patys, savo turimas

žinias siedami su naujomis asmeninėmis patirtimis. Mokytojai ar dėstytojai šiame procese yra partneriai, teisinga linkme nukreipiantys vedliai. Martín-Monje (2014), Lei et al. (2012), Crompton, (2012), Gunawardena et al. (2009) tikslina, kad integruojant antrosios kartos saityno technologijas į mokslą, turėtume remtis *socialinio konstruktyvizmo* epistemologija, pabrėžiančia visų mokymo(si) proceso dalyvių sąveikos svarbą. Mokymas(is) yra socialinis procesas, vykstantis tarp žmonių. Šiame procese ypač svarbus kontekstas ir jo charakteristikos: socialinės, fizinės, istorinės ar kultūrinės. Ypatingą vaidmenį čia vaidina kalba, leidžianti dalytis patirtimis ir žiniomis. Downes (2007), Siemens (2005) ir Bell (2011) argumentuoja, kad tiek konstruktyvizmo, tiek socialinio konstruktyvizmo idėjos susiformavo dar prieš atsirandant saityno technologijoms, todėl mokymas(is) tinklaveikos eroje turėtų remtis *konektyvistiniu* požiūriu. *Konektyvizmas* mokymą(si) traktuoja kaip gebėjimą skirtinguose tinkluose patalpintą decentralizuotą informaciją susikonstruoti į savo specifinius poreikius atliepiantį žinių rinkinį, kuriuo vėl būtų galima dalintis tinkle. Tinklą Siemens (2005) apibrėžia tiesiog kaip jungtį tarp subjektų (kitaip mazgų). Būtent tokios jungtys tarp mazgų: žmonių, jų grupių sistemų ar informacinio turinio, autoriaus nuomone, ir yra visų kompiuterinių ar socialinių tinklų pagrindas. Kiekvienas tinklo mazgas, kiekviena jo jungtis yra unikali, tačiau jų vertę konkretūs vartotojai gali suvokti skirtingai, nelygu, kokie yra jų tikslai, įsitikinimai ar pažiūros. Konektyvistiniu požiūriu paremtą mokymą(si) Al-Dahdouh, Osório ir Caires (2015) įvardija kaip *tiesos pažinimą įtinklintoje bendruomenėje*. Besimokantieji čia stovi toje pačioje gretoje kaip ir mokslininkai, savarankiškai ieškantys tiesos, o mokytojas vaizduojamas kaip partneris, mazgas, jau prisijungęs prie besimokančiam aktualių mazgų (žmonių, internetinių svetainių, programų, duomenų bazių). Daugybė mokslininkų (Montebello & Camilleri, 2018; Wang, Anderson & Chen, 2018; Zulkifley, Nor Hasbiah & Siti, 2017; Tinmaz, 2012; Anderson & Dron, 2011; Shriram & Warner, 2010; Pop, 2010) mano, kad antrosios kartos saitynas tiksliai atkartoja šį modelį. Visgi reikia paminėti, kad konektyvistinį mokymą(si) jie dažniausiai sieja su nuotolinio, mišraus nuotolinio arba mobiliojo mokymo(si) formomis. Balaji et al. (2018), Foroughi (2015), Hussain (2013), Loureiro, Messias ir Barbas (2012), Anderson ir Dron (2011) bei Wheeler (2009) kritikuoja šį požiūrį ir, be kita ko, teigia, kad konektyvistinio mokymo(si) principai labiau sietini ne su antrosios, bet su trečiosios kartos saityno naudojimu. Nepaisant savo patrauklumo, tiek konektyvizmo, tiek trečiosios kartos saityno vaidmuo aukštajame moksle, autorių nuomone, kol kas yra hipotetinis. Neaišku, ar studentai yra pasirengę visiškam autonomiškumui taip, kaip jis suvokiamas konektyvistinio mokymo(si) požiūriu, kokia yra dėstytojų atsakomybė, kur yra ribos tarp laisvės, kuri suteikiama tokio mokymo(si) proceso dalyviams, ir galbūt chaoso. Atsižvelgiant į šią kritiką ir turint omenyje, kad šios disertacijos empirinis tyrimas planuojamas mišrių studijų kontekste, naudojant pasirinktą antrosios kartos saityno technologiją, renkamasi remtis konstruktyvistine epistemologija.

Antrosios kartos saityno technologijos ir jų klasifikacijos. Kaip jau minėta, visas antrosios kartos saityno technologijas vienija demokratijos, atvirumo, bendrystės ir bendradarbiavimo principai, kurie ypač aktualūs šiandiniame moksle. Visgi turint omenyje šių technologijų gausą ir jų siūlomų funkcijų įvairovę, svarbu gebėti identifikuoti, kurios jų galėtų prasmingai pasitarnauti konkrečioje švietimo srityje ar dalyko studijose. Crook et

al. (2008), McLoughlin ir Lee (2008), Dohn (2009) ir Bower (2017) perspėja, kad pernelyg dažnai antrosios kartos saityno technologijos traktuojamos kaip panacėja, vaistas nuo visų švietimo ligų. Priešingai, nekompetentingas technologijų naudojimas besimokantiems gali atnešti daugiau žalos nei naudos. Siekdami išryškinti unikaliąsias antrosios kartos saityno technologijų charakteristikas, į kurias dėstytojai galėtų (ir turėtų) atsižvelgti prieš integruodami jas į konkretaus dalyko studijas, įvairūs autoriai (Mejias, 2005; Franklin & van Harmelen, 2007; Churches, 2008; Crook et al., 2008; Grosseck, 2009; Light & Polin, 2010; Orehovački, Bubaš, & Kovačić, 2012; Bower, 2015) siūlo remtis jų sudarytomis antrosios kartos saityno technologijų klasifikacijomis. Disertacijoje apžvelgiamos trys skirtingus antrosios kartos saityno raidos etapus atspindinčios edukacinių technologijų klasifikacijos: Churches (2008) *taksonomija* (labiau žinoma kaip *Skaitmeninė Bloom taksonomija*), Orehovački, Bubaš ir Kovačić (2012) *trijų dimensijų edukacinių antrosios kartos saityno technologijų modelis* ir Bower (2015) *edukacinių antrosios kartos saityno tipologija*. Kadangi paskutiniosios dvi yra išsamiausios ir labiausiai sietinos su dabartiniu CALL etapu, jomis remtasi atliekant sisteminę literatūros analizę bei charakterizuojant pasirinktą antrosios kartos saityno įrankį planuojamam empiriniam tyrimui.

Antras skyrius. Antrosios kartos saityno technologijų taikymo ypatumai profesinės anglų kalbos studijose. Sisteminė literatūros analizė. Vienas šio skyriaus tikslų buvo apžvelgti naujausius empirinius tyrimus, pateikiančius konkrečių pavyzdžių apie efektyvų antrosios kartos saityno technologijų naudojimą profesinės anglų kalbos studijose aukštajame moksle, įvertinti esamą padėtį bei metodologiškai pagrįsti planuojamą empirinę tyrimo dalį. Siekta išsiaiškinti, kokie antrosios kartos saityno technologijų tipai yra dažniausiai integruojami į šios srities studijas, kokios kalbinės veiklos rūšys ir sritys yra efektyviausiai ugdomos šių technologijų pagalba, ir kokiomis teorinėmis priegomis remiasi praktikai bei tyrėjai. Išanalizuoti 29 viso teksto šaltiniai, 2013-2018m. laikotarpiu publikuoti tarptautiniuose aptariamose srityse žurnaluose ir atitinkantys iš anksto suformuluotus kriterijus.

2015 m. pasirodžiusioje Bower edukacinių antrosios kartos saityno tipologijoje identifikuojami mažiausiai 37 edukacinių antrosios kartos saityno technologijų, tipai. Literatūros analizė parodė, kad profesinės anglų kalbos studijų kontekste išsamiai analizuoti vos 9 šių technologijų tipai. Be kita ko, šios technologijos sulaukia daugiausia praktikų ir tyrėjų dėmesio ir kitose švietimo srityse. Kalba eina apie *tinklaraščius*, *socialinius tinklus*, *vikius* ir *virtualiosios realybės* įrankius. Įdomu, kad visais analizuotais atvejais į profesinės anglų kalbos studijas renkamas integruoti bendrojo pobūdžio technologiją (pvz. socialinį tinklą *Facebook*), nors egzistuoja nemenkas pasirinkimas ir specializuotų jos versijų (pvz. socialinių tinklų, skirtų būtent užsienio kalbų mokymui(si): *Englishtown*; *Open English*; *Global English*; *EnglishCentral* ir pan.). Šios literatūros analizės duomenis palyginus su ankstesnių aptariamose srityse literatūros apžvalgų rezultatais (Dashtestani & Stojković, 2015; Golonka et al., 2014; Luo, 2013; Wang & Vásquez, 2012), peršasi išvada, kad labiausiai stokojama išsamių tyrimų, liudijančių apie *grafinių vaizdų įrankių*, *audio įrankių*, *daugiarežimio kūrimo įrankių*, žinių valdymo ir dalijimosi įrankių, *duomenų analizės įrankių*, *laiko juostų* bei *įsivertinimo įrankių* efektyvumą profesinės anglų kalbos studijose aukštajame moksle (remtasi Bower (2015) klasifikacija). Daugelyje apžvelgtų empirinių tyrimų diskutuojama

apie antrosios kartos saityno technologijų efektyvumą profesinės anglų kalbos studentų rašymo įgūdžių ugdymui, ir, kaip rodo ankstesnių tyrimų rezultatai, ši tendencija nesikeičia jau daugelį metų. Kitos kalbinės veiklos ir sritys, sėkmingai ugdomos šių technologijų pagalba, tačiau tirtos daug rečiau, yra *skaitymas*, žodyno įsisavinimas, *klausymas* ir *kalbėjimas*. Tik keliuose tyrimuose šios veiklos ugdomos segreguotai; daugeliu atvejų konkreti antrosios saityno technologija pasitelkiama siekiant ugdyti kelias kalbines veiklas, taip pat profesinės anglų kalbos studentų komunikacinę ir tarpkultūrinę kompetenciją, žanro suvokimą ir pan. Gana netikėtas atradimas buvo tai, kad beveik pusės analizuotų publikacijų autoriai, dalindamiesi patirtimi apie vienos ar kitos saityno technologijos efektyvumą profesinės anglų kalbos studijose, nepateikia jokie teorinio pagrindimo. Tą pačią tendenciją pastebi ir jau anksčiau minėti autoriai Wang ir Vásquez (2012). Likusi analizuotų tyrimų dalis daugiausia remiasi *konstruktyvizmo* arba *socialinio konstruktyvizmo* paradigmomis, pavieniauose tyrimuose aptinkame nuorodų į *konektyvizmo* mokymo(si) teoriją, *Krashen Ivesties hipotezę*, minimas *Turinio ir kalbos integruotas mokymas* (CLIL).

Sisteminės literatūros analizės radiniai buvo vertingi, planuojant empirinę šios disertacijos dalį. Jie nurodė labai aiškias gaires ir renkantis antrosios kartos saityno technologiją, planuojamam tyrimui. Tapo aišku, kad siekiant į edukologijos tyrimų erdvę įnešti naujumo, reikėtų orientuotis į antrosios kartos saityno technologiją, kuri dar nesulaukė perteklinio tyrėjų dėmesio ir nėra tirta Lietuvos aukštojo mokslo kontekste. Tad akivaizdu, kad reikėtų rinktis technologiją, kuri galėtų prisidėti prie profesinės anglų kalbos studentų žodyno įsisavinimo bei skaitymo gebėjimų ugdymo ir tam turėtų aiškų teorinį ir metodologinį pagrindą.

Antrosios kartos saityno įrankis CmapTools. 2016 m. vykusios doktorantūros stažuotės Aveiro universitete (Portugalija) metu autorei teko galimybė stebėti, kaip profesinės (verslo) anglų kalbos užsiėmimuose buvo integruota ir praktiškai taikoma antrosios kartos saityno technologija *CmapTools*. Stažuotės metu atlikta literatūros analizė leido įsigilinti į šios technologijos teorines ištakas, technines charakteristikas, užsienio autorių išvalgas. Įgyta pakankamai praktinių žinių ją naudotis, todėl nuspręsta jos efektyvumą ir priėmimą profesinės anglų kalbos studijose patyrinėti ir Lietuvos aukštojo mokslo kontekste. Taigi *CmapTools* yra kompiuterinė programa, apie 2000 m. sukurta Floridos Žmogaus ir mašinių instituto (IHMC) mokslininkų Novak ir Cañas atliktų tyrimų pagrindu. Anot Novak, tiek popieriuje, tiek įrankio *CmapTools* pagalba kuriami sąvokų žemėlapiai konstruojami panašiu principu: juose vaizduojamos naujos arba išskirtinės sąvokos, parodant jų prasminius ryšius su kitomis sąvokomis ir šių ryšių hierarchinę struktūrą. *CmapTools* nėra įtrauktas į Bower (2015) sudarytą edukacinių antrosios kartos saityno technologijų klasifikaciją, jo nerasime ir Orehovački, Bubaš ir Kovačić (2012) trijų dimensijų edukacinių antrosios kartos saityno technologijų modelyje, tačiau įvertinę technologijos charakteristikas, Selevičienė ir Burksaitienė (2016) siūlo ją priskirti sinchroninių grafinių vaizdų kūrimo įrankių tipui, papildant jį sąvokų žemėlapių kūrimo kategorija. Šioje kategorijoje taip pat galėtų atsidurti tokie komerciniai ir atviros prieigos sąvokų žemėlapių kūrimo įrankiai kaip *Inspiration*, *Kidinspiration*, *EDGE Diagrammer*, *SemNet*, *SmartIdeas*, *MACOSOFT* ar *Visual Understanding Environment* (VUE).

CmapTools charakteristikos. Visų pirma, dera paminėti, kad ši programinė įranga yra nemokama. Bet kuris vartotojas ją gali parsisiųsti ir lengvai įsidięgti į asmeninį kompiuterį. Suformulavus probleminį klausimą (angl. *focus question*), keliais pelės spustelėjimais ekrane konstruojamas sąvokų žemėlapis (angl. *cmap*), sudarytas iš vadinamųjų „mazgų“ ir jungčių. „Mazgus“ galima papildyti nuorodomis į įvairiausių dokumentus, paveikslėlius ar nuotraukas, garso rinkmenas bei vaizdo medžiagą. Sąvokų žemėlapi (cmap) vienu metu gali sinchroniškai redaguoti keli prie programos prisijungę vartotojai. Užbaigus darbą, jį galima išsisaugoti asmeniniame kompiuteryje arba cmap serveryje, eksportuoti įvairiais formatais (HTML, PDF ir kt.), bendrinti internete, bendradarbiaujant su kitais vartotojais. Galimas teorinis technologijos naudojimo pagrindas – *sociokultūrinė teorija* (Vygotsky, 1978), *asimiliacijos mokymosi teorija* (Ausubel, Novak, 1970). Literatūroje galima rasti užsienio mokslininkų tyrimų, nagrinėjančių *CampTools* naudojimo ypatumus ir efektyvumą profesinės anglų kalbos aukštojo mokslo studijose (Dias, 2010, 2011; Hunter, 2013; Balula, Martins, & Marques, 2014; Omar Abdul-Majeed, 2015; Soleimani & Rostami abu Saeedi, 2016), tačiau tokio tipo tyrimų Lietuvos kontekste aptikti nepavyko.

Trečias skyrius. Antrosios kartos saityno technologijų priėmimo ypatumai profesinės anglų kalbos studijose. Technologijų priėmimo konceptualizacija. Technologijų priėmimą Gattiker (1984, 1987) įvardija kaip asmens psichologinę būseną, nulemtą jo(-s) suvokimo apie konkrečios technologijos daromą įtaką darbinei veiklai, įgūdžiams ar karjeros perspektyvoms. Hiltz ir Johnson (1989) teigia, kad technologijų priėmimas yra vienas svarbiausių informacinės sistemos sėkmės indikatorių. Jų tyrime, analizuojančiame kompiuterinių ryšių sistemų (CMCS) ir valdymo informacinių sistemų (MIS) efektyvumą, technologijų priėmimas apibrėžiamas kaip „sėkmingas CMCS ir MIS įdiegimas bei įsisavinimas“ (Hiltz & Johnson, 1989, p. 387). Technologijų priėmimas arba sėkmė, kaip teigia autoriai, yra daugiaplanė sąvoka, apimanti technologijos naudojimą, technologijos teikiamą pasitenkinimą, jos atnešamą naudą. Šios dvi definicijos suponuoja, kad technologijų priėmimas yra visuomet sietinas su pozityviu jausmu ar požiūriu į naudotą technologiją. Schwarz ir Chin (2007) yra taip pat įsitikinę, kad psichologinis nusiteikimas naudotis inovatyvia technologija yra daugiapakopio proceso pasekmė. Tai reiškiny, kuris neapsiriboja vien tik asmens teigiamu požiūriu į technologiją. Anot jų, jis apima išsistą veiksmų virtinę: ilgalaikę asmens sąveiką su informacine technologija ir iš jos kylantį suvokimą, norą naudotis ir atmetimą arba priėmimą, kuris susiformuoja konkrečioje aplinkoje. Įvertinus įvairių autorių siūlomus technologijų priėmimo apibrėžimus, šioje disertacijoje *antrosios kartos saityno technologijų priėmimas* operacionalizuojamas kaip *vartotojų sąveika su konkrečia antrosios kartos saityno technologija ir jų psichologinis nusiteikimas ta technologija naudotis ateityje*. Galiausiai pasirinktos technologijos *CmapTools* priėmimas profesinės anglų kalbos studijose apibrėžiamas kaip *besimokančiųjų sąveika su antrosios kartos saityno technologija CmapTools profesinės anglų kalbos dalyko studijų metu ir jų psichologinis nusiteikimas naudotis technologija ateityje*.

Šios disertacijos dalies teorinis pagrindas – *Technologijų priėmimo modelis* (angl. *Technology Acceptance Model*) (TAM) (Davis, Bagozzi & Warshaw, 1989). Daugybė tyrimų parodė, kad modelis nuosekliai paaiškina didelę dalį priežasčių apie vartotojų naudojimo

elgsenos kėtinimus ir pateikia gerus rezultatus. Technologijų priėmimo modelis operuoja penkiaais kintamaisiais: *suvokiamos naudos*, *suvokiamo naudojimo paprastumo*, *požiūrio į naudojimą*, *ketinimo naudoti ateityje* ir *faktinio naudojimo*. *Suvokiamą naudą* modelio autoriai apibrėžia kaip asmens suvokimą, kad naudodamas tam tikrą sistemą, jis/ji padidins darbo efektyvumą. *Suvokiamas naudojimo paprastumas* – tai asmens suvokimas, kad tam tikros sistemos naudojimas bus nesudėtingas ir nepareikalaus papildomų pastangų. *Požiūris į naudojimą* – tai asmens teigiamas arba neigiamas jausmas (vertinimas) technologijos atžvilgiu. *Ketinimas naudoti ateityje* – tai asmens nusiteikimas atlikti tam tikrą veiksmą, t. y. naudotis technologija ateityje. Kai vartotojas suvokia, kad nauja technologija nėra sudėtinga naudotis, formuojasi palankus jo(-s) požiūris į teikiamą tos technologijos naudą. Ši pozityvi patirtis gali daryti įtaką optimistinėms ateities perspektyvomis, technologijos naudojimo atžvilgiu. Priešingai, neigiama patirtis, kildinama iš labai sudėtingo technologijos naudojimo, nepasiteisinusių lūkesčių, gali paskatinti vartotoją atmesti galimybę technologija naudotis toliau. Teigiamam ar neigiamam apsisprendimui įtakos gali turėti ir individualūs ar išorinės aplinkos veiksniai.

Literatūros analizė. Atlikus aptariamąs srities tyrimų, publikuotų 2010-2017 m. analizę, paaiškėjo, kad tirdami profesinės anglų kalbos studijose taikytų technologijų priėmimą, teorinį *Technologijų priėmimo modelį* taiko nemažai užsienio mokslininkų (Gamble, 2017; Madini & Alshaihi, 2017; Van de Bogard & Wichadee, 2015; Afshari et al., 2013; Yu-Li, 2014; Tajuddin et al., 2012; Arshad et al., 2012). Modelis pasitelkiamas tiriant pačių įvairiausių antrosios kartos saityno technologijų tipų (*interneto svetainių kūrimo*, *3D modeliavimo*, *teksto kūrimo*, *socialinio rašymo*, *video įrankių*) priėmimą įvairių profesinės anglų kalbos sričių (*komercijos*, *verslo*, *ekonomikos*, *bankininkystės*, *teisės*, *profesinio konsultavimo* ir *orientavimo*, *komunikacijos* ir t. t.) studijose. Visgi galime pastebėti, kad stojama mokslo darbų, nagrinėjančių *skaitmeninių istorijų kūrimo*, *audio*, *grafinių vaizdų* technologijų priėmimą profesinės anglų kalbos studijose aukštajame moksle. Tyrimų apie pasirinktos antrosios kartos saityno technologijos *CmapTools* priėmimą profesinės anglų kalbos studijose aptikti taip pat nepavyko. Remiantis mokslinės literatūros analizės rezultatais matome, kad dauguma autorių patvirtino ryšius tarp Technologijų priėmimo modelio kintamųjų *suvokiamo naudojimo paprastumo*, *suvokiamo naudingumo*, *požiūrio* ir *ketinimo naudotis* antrosios kartos saityno technologijomis ateityje. Literatūros analizė taip pat padėjo atskleisti, kad dauguma tyrėjų sutinka, kad modelį būtina praplėsti ir siūlo įvesti papildomus kintamuosius. Pavyzdžiui, tirdami *Virtualiosios realybės* priėmimą, Madini ir Alshaihi (2017) pristato tris papildomus kintamuosius: *sąveiką su VR goglais*, *žiūrint 3D vaizdo medžiagą*, *vaizduotę* bei *įsitraukimą*; Yu-Li Chen (2014) – *savi-veiksmingumą*; nagrinėdami veiksnius, darančius įtaką *tinklaraščių* priėmimui, Tajuddin et al. (2012) modelį siūlo papildyti *suvokiamo žaismingumo* elementu. Gana netikėtą elementą – *socialinių tinklų*, kuriais naudojasi studentai, *skaičių* siūlo Van de Bogard ir Wichadee (2015). Visgi reikia paminėti, kad dauguma tyrėjų, taikydami Technologijų priėmimo modelį profesinės anglų kalbos studijose, dažniausiai nagrinėja sąsajas tik tarp vidinių jo konstrukčių (ir papildomai įvestų kintamųjų), tačiau išsamiai netiria išorinių veiksnių (demografinių ar kontekstinių) ir vidinių konstrukčių ryšių. Šio empirinio tyrimo reikšmingumas būtų, kad

tai pirmas tyrimas, nagrinėjantis konkrečios edukacinės antrosios kartos technologijos priėmimą aukštojo mokslo profesinės anglų kalbos studijose Lietuvoje.

Ketvirtas skyrius. Tyrimo metodologija.

Pilotinis tyrimas. Sisteminė literatūros analizė padėjo suprasti, kaip antrosios kartos saityno technologijas naudoja ir kaip jų efektyvumą profesinės anglų kalbos studijose mato tyrėjai ir dėstytojai praktikai. Siekiant sužinoti, kokie yra kitų mokymo(si) proceso dalyvių, t. y. profesinės anglų kalbos studentų, poreikiai, nuomonė ir įpročiai, susiję su įvairių antrosios kartos saityno įrankių naudojimu kasdieninėje veikloje ir mokantis profesinės užsienio kalbos, 2015 m. buvo atliktas pilotinis tyrimas – anketinė apklausa „*Universiteto studentų nuomonė apie antrosios kartos saityno technologijų naudojimą profesinės anglų kalbos studijose*“. Pilotinis tyrimas taip pat buvo skirtas išbandyti tyrimo instrumentą-klausimyną, skirtą planuojamam disertacijos empiriniam tyrimui. Klausimynui naudotas Malaizijos mokslininkų Arshad, Tan ir Hashim (2012) tyrimo „*Tertiary Students' Application of Web 2.0 for English Language Learning*“ instrumento turinys, grindžiamas Technologijų priėmimo modeliu (Davis, Bagozzi & Warshaw, 1989). Visgi matavimo priemonė buvo modifikuota, įvedant kelis tyrimo temą atspindinčius papildomus teiginius bei parengiant demografinę klausimyno dalį (žr. 1 priedą). Teorinėje dalyje respondentų buvo prašoma nurodyti savo sutikimo ar nesutikimo su kiekvienu iš teiginių laipsnį, kuriam išreikšti buvo taikyta 5 rangų *Likerto skalė* nuo „visiškai pritariu“ iki „visiškai nepritariu“. Tyrimo imties dydis – 101 respondentas. Tiriamųjų grupė buvo formuojama taikant vieną netikimybinės atrankos būdų: patogiąją atranką (angl. *availability sampling*), kai į imtį yra įtraukiami tie generalinės imties vienetai, kurie yra labiausiai prieinami tyrėjui. Visi tiriamieji buvo Mykolo Romerio universiteto I kurso nuolatinių studijų studentai, studijuojantys privalomąjį studijų dalyką *Profesinė anglų kalba*. Tiriamieji studijavo keturiuose Mykolo Romerio universiteto fakultetuose: teisės, politikos ir vadybos, ekonomikos ir finansų valdymo bei socialinių technologijų. Statistinė duomenų analizė buvo atlikta naudojant IBM SPSS statistinių programų rinkinio (angl. *Statistical Package for Social Sciences*) 22 versiją. Kintamiesiems charakterizuoti buvo taikomi keli aprašomosios ir analitinės statistikos metodai: *Cronbach Alpha* kriterijus, procentinių dažnių skaičiavimo metodas bei koreliacinė analizė. Išanalizavus gautus rezultatus paaiškėjo, kad respondentai yra tipiški „skaitmeninio pasaulio čia buvusių kartos“ atstovai, save įvardijantys įgudusiais antrosios kartos saityno įrankių vartotojais, internete kasdien praleidžiančiais po 3–5 valandas. Didžiąją šio laiko dalį jie skiria socializacijai *socialiniuose tinkluose*, kurie drauge su *YouTube*, *vikiomis* ir *tinklaraščiais* tyrimo dalyvių buvo pripažinti kaip labiausiai taikytini saityno įrankiai, mokantis profesinės užsienio kalbos, ypatingai profesinės terminologijos. Svarbu paminėti, kad būtent šią sritį studentai įvardija kaip problemiškesnę kalbinę veiklą dalyko studijose. Tyrimas rėmėsi nuostata, jog individualūs veiksniai: studentų lytis, valandų skaičius praleidžiamas naršant internete, studijų programa bei gebėjimas naudotis antrosios kartos saityno technologijomis gali turėti įtakos technologijų priėmimui, mokantis profesinės užsienio kalbos. Visgi koreliacinės analizės rezultatai parodė, kad nė vienas šių individualių veiksnių, išskyrus studentų gebėjimą naudotis antrosios kartos saityno technologijomis statistiškai reikšmingo ryšio nėra su vienu Technologijų priėmimo modelio konstruktu neturėjo.

Pilotinio tyrimo ir sisteminės literatūros analizės rezultatai suteikė vertingos informacijos apie analizuojamą sritį ir leido padaryti išvadą, kad pasirinkta antrosios kartos saityno technologija (šiuo atveju *CmapTools*) turėtų būti integruojama siekiant padėti studentams įsisavinti profesinės anglų kalbos žodyną. Jų nuomone, tai pati problemiškesnė kalbinė sritis profesinės anglų kalbos dalyko studijose. Kaip rodo sisteminės literatūros rezultatai, tą patį tvirtina ir tyrėjai (Behjat, 2013; Ventura & Martín-Monje, 2016; Dashtestani, 2018), vertinę saityno įrankių įtaką būtent šiai sričiai.

Pedagoginis eksperimentas. Jenkinson (2009) pastebi, kad labai dažnai, norėdami įvertinti technologijos efektyvumą mokslui, tyrėjai renka lyginti technologinės inovacijos teikiamą naudą su tradicinės pedagogikos privalumais. Šios disertacijos empirinis tyrimas nėra išimtis, nes čia, siekiant atsakyti į pirmus du tyrimo klausimus, studentų profesinės anglų kalbos dalyko studijų rezultatai buvo vertinami, priklausomai nuo to, ar jie buvo pasiekti naudojant aukščiau aptartą antrosios kartos saityno įrankį *CmapTools*, ar mokant(is) įprastu būdu. Tyrimui atlikti pasirinkta kiekybinė prieiga ir kvazi-eksperimentinis dizainas. Įvertinus žymiausių eksperimento metodo autorių (Campbell ir Stanley, 1963; Cook ir Campbell, 1979 bei Martella et al, 2013) siūlomus 14 įmanomų eksperimentų tipus, pasirinktas *static-group comparison* dizainas, kuris pasižymi tuo, kad jame nėra vadinamojo pre-testo. Tyrime dalyvavo 107 tiriamieji: 61 Mykolo Romerio universiteto *Teisės ir muitinės veiklos* bakalauro nuolatinųjų studijų programos I kurso studentas bei 46 Vilniaus kolegijos *Kompiuterių sistemų* nuolatinųjų studijų programos I kurso studentai, studijuojantys privalomąjį profesinės anglų kalbos studijų dalyką. Atsižvelgiant į tai, kad atliekant edukacinius tyrimus organizuoti randomizuotą eksperimentą labai sudėtinga dėl aukštojo mokslo ugdymo kontekste įprastos studentų grupės bei paskaitos sistemos, nepriklausančios nuo dėstytojo valios, šio tyrimo imtis buvo nerandomizuota, t. y. sudaryta patogiosios atrankos būdu, kai į tyrimą yra įtraukiami tie generalinės imties vienetai, kurie yra labiausiai prieinami tyrėjui. Visgi anot Campbell ir Stanley (1963) kvazi-eksperimentiniai tyrimai dažniausiai atliekami realioje gyvenimiškoje aplinkoje, todėl ir mokomajame kontekste toks tyrimas gali būti laikomas realybės atspindžiu. Tiriamuoju atveju populiacijos dydis nebuvo žinomas: tikslų duomenų apie Lietuvos aukštųjų mokyklų pirmo kurso nuolatinųjų studijų studentų, studijuojančių profesinės anglų kalbos studijų dalyką (skirtingose aukštojo mokslo institucijose šis dalykas gali būti įvardijamas kaip *Specialybinė anglų kalba*, *Dalykinė anglų kalba*, *Specialioji anglų kalba*, *anglų kalba* ir pan.) skaičių neteikia nei Lietuvos Statistikos departamentas, nei pačios aukštosios mokyklos. Todėl imties dydis buvo nustatytas remiantis formule, taikoma tais atvejais, kai žinių apie populiacijas stokojama stokojama $n = \frac{z^2 \cdot s^2}{d^2}$ (Kardelis, 2005, p. 312), kur n – atvejų skaičius atrankinėje grupėje; z – koeficientas, surandamas iš vadinamųjų Stjudento pasiskirstymo lentelių ir pasirenkamas pagal tai, kokį patikimumą norima gauti. Pavyzdžiui, kai patikimumas 95 proc. ($p=0.05$, $z=1.96$); s – imties vidutinis standartinis nuokrypis, Δ – leistinas netikslumas (Kardelis, 2005, p. 312). Šiuo atveju $s=1.752$, $\Delta=0.35$. Tokia $\Delta=0.35$ buvo pasirinkta todėl, kad iš ankstesnių tyrimų patirties yra žinoma, kad profesinės anglų kalbos dalyko pažymių vidurkis profesinės anglų kalbos aukštojo mokslo studijose paprastai būna 7 balai su nedideliais nuokrypiais. Buvo pasirinkta 5 procentų paklaida, todėl $\Delta=7 \times 0.05=0.35$. Įterpus reikšmes į formulę, gautas tyrimui reikalingas atvejų skaičius: $n = (1.96^2 \times 1.752^2) / 0.35^2 = 92.78$. Šio

tyrimo imtis – 107 tiriamieji yra pakankama ir reprezentatyvi. Tiek Mykolo Romerio universitete, tiek Vilniaus kolegijoje buvo suformuotos dvi eksperimentinės ir dvi kontrolinės grupės, sudarytos iš studentų, kuriems privalomąjį studijų profesinės anglų kalbos studijų dalyką tyrimo metu dėstė autorė bei 3 kiti dalyko dėstytojai. Sudarant tyrimo dalyvių grupes, laikytasi tiriamųjų amžiaus, anglų kalbos mokėjimo lygmens, taip pat ugdymo sąlygų bei aplinkos panašumo principų. Visų tyrime dalyvavusių studentų amžiaus vidurkis – 19 m. Studijų dalyko užsiėmimai jiems vykdavo 2 kartus per savaitę. Pagal studijų dalyko apraše numatytus išankstinius reikalavimus studijuojantiems, visų tiriamųjų bendrosios anglų kalbos žinios teoriškai atitiko B2 lygį pagal CEFRB2. Kadangi jau pačioje tyrimo pradžioje išryškėjo lyčių nelygybės apraiškos (susiklosčius natūralioms aplinkybėms pagrindinį tiriamųjų srautą sudarė vaikinai), bet kokios analizės iš lyčių perspektyvos efektyvumo tyrimo dalyje nuspręsta atsisakyti.

Pedagoginė intervencija. Vienas specifinių elementų, kuris skiria eksperimentinio tipo tyrimus nuo kitų tyrimo metodų, yra vadinamoji intervencija: nepriklausomo kokio nors reiškinio požymio daromos įtakos kitam (priklausomam) požymiui kitimo stebėjimas. Šiame tyrime veiklos, naudojant antrosios kartos saityno technologiją *CmapTools* profesinės anglų kalbos dalyko studijose eksperimentinėse grupėse, buvo laikomos *nepriklausomu kintamuoju*, o dalyvių pasiekimai, apibūrinami kaip profesinės anglų kalbos pažangos testų ir autentiškų tekstų apžvalgų pažymių vidurkiai, buvo traktuojami kaip *priklausomas kintamasis*. Pedagoginė intervencija buvo vykdoma penkiais etapais.

Parengiamajame etape (2017 m. sausio mėn.) vyko tyrėjos ir kitų trijų, tyrime sutikusių dalyvauti dėstytojų susitikimai. Jiems pristatyta tyrimo idėja, tikslai ir metodika, tačiau neatskleidžiamos numatomos hipotezės. Dėstytojai supažindinti su įrankiu *CmapTools*, jo charakteristikomis, teoriniais ir metodologiniais aspektais. Eksperimentinėse Vilniaus kolegijos grupėse dirbanti dėstytoja mokoma įsidiesti jį į asmeninį kompiuterį, juo naudotis, taikyti pasirinktai dėstomo dalyko temai, jai pateikiama atmintinė įrankio vartotojams, nuorodos į susijusias publikacijas. Pakartotinio susitikimo metu išklausomi jos pastebėjimai, siūlymai, klausimai. Gavus abiejų institucijų administracijos leidimus, informacinių jų centrų darbuotojai įdiegia programinę įrangą į numatytų auditorijų kompiuterius.

Įvadiniamame etape (1 semestro savaitės metu) tyrimo dalyviai (studentai) supažindinami su tyrimo tikslu ir metodika, aptariama tyrimo etika. Siekiant užtikrinti kontrolinių ir projektinių grupių homogeniškumą, visi tyrimo dalyviai rašo diagnostinį bendrinės anglų kalbos testą. Užtikrinama, kad jo rezultatai neturės įtakos galutinių dalyvių pasiekimų vertinimams.

Mokomajame etape (1 semestro savaitės metu) eksperimentinių grupių studentai supažindinami su sąvokų žemėlapiu metodu, mokomi braižyti jį popieriuje. Pristatomas įrankis *CmapTools*, jo techninės charakteristikos, mokoma juo naudotis: konstruoti žemėlapius individualiai ar bendradarbiaujant, papildyti jį internetiniais resursais, koreguoti, pabaigtą darbą išsaugoti, dalintis juo su kitais.

Intervencija (1–14 semestro savaitės) eksperimentinėse grupėse vykdyta keliomis formomis: seminarų ir savarankiško darbo metu. Seminarų metu, jei jie nebūdavo skirti atsiskaitymams, pateikčių pristatymams ir pan., ir eksperimentinėse, ir kontrolinėse grupėse būdavo analizuojamos dalykų aprašuose numatytos temos, skaitant tekstus, atliekant jų suvokimo, klausymo, rašymo, kalbėjimo užduotis. Eksperimentinėse grupėse papildomai įvedamas sąvokų žemėlapių metodas, naudojant įrankį *CmapTools*. Jo pagalba tekstai būdavo analizuojami, aiškinantis svarbiausias sąvokas ir terminologiją, juos reziumuojant ir atkuriant. Remiantis Vygotskio *sociokultūrinės mokymo(si) teorijos* principais, kuri teigia, kad mokymas(is) turi būti suprantamas kaip socialus procesas, darbas su technologija seminarų metu vykdavo bendradarbiaujant, tariantis, lyginant, siūlant dėstytojų paramą (angl. *scaffolding*): tinkamai suformuluotus įvadinius klausimus (angl. *focus questions*), sąvokų žemėlapių „skeletus“, kuriuos studentai turėdavo užpildyti trūkstamomis sąvokomis, trūkstamų sąvokų ir (ar) jungiamųjų žodžių sąrašus ir pan. Tikėtasi, kad semestro metu studentų žodyno įsisavinimo rezultatai pagerės ir pranoks tuos, kuriuos jie būtų pasiekę vien savo jėgomis. Per semestrą visi tyrimo dalyviai rašė du dalyko aprašuose numatytus pasiekimų testus, kurių rezultatai padėjo išsiaiškinti, ar pasirinkta technologija ir metodika buvo efektyvi, t. y., ar ji turėjo teigiamos įtakos eksperimentinių grupių studentų profesinės anglų kalbos žodyno įsisavinimo pažangai.

Studijų dalyko aprašai numato ir individualiai studentų atliekamas užduotis: per du semestrus savarankiškai perskaitytų autentiško profesinės anglų kalbos teksto apžvalgą, kitaip dar vadinamas „namų skaitymu“. Kadangi tiriamųjų grupių dalyviai studijavo dviejose aukštojo mokslo institucijose ir dviejose skirtingose studijų programose, kiekvienoje institucijoje autentiški tekstai individualiam studentų darbui buvo atrinkti, atsižvelgiant į konkrečios studijų programos specifiką. Mykolo Romerio universitete orientuotasi į teisės ir maitinės veiklos sritį. Vilniaus kolegijos dėstytoja atrinko tekstus, susijusius su kompiuterių sistemų sfera. Už pirmą savarankiškai perskaityto teksto apžvalgą atsiskaityta semestro viduryje, kai eksperimentinių grupių studentai jau buvo susipažinę su įrankiu *CmapTools* ir jo naudojimo specifiką. Perskaitytam tekstui apžvelgti eksperimentinių grupių studentai naudojo sąvokų žemėlapių metodu, taikant įrankį *CmapTools*. Jiems buvo pasiūlyta ir dėstytojo parama: svarbiausių teksto sąvokų sąrašas. Atsiskaitymas už antrąją teksto apžvalgą vyko semestro pabaigoje. Eksperimentinių grupių studentams išliko reikalavimas sukurti sąvokų žemėlapi, naudojantis antrosios kartos saityno įrankiu *CmapTools*, tačiau dėstytojo paramos elementas buvo eliminuotas. Kontrolinėse grupėse atsiskaitymai vyko įprasta tvarka, parengiant perskaitytų tekstų apžvalgą ir pristatant jas seminarų metu. Apžvalgų rezultatai abiejose grupėse buvo analizuojami ir lyginami siekiant išsiaiškinti, ar pasirinkta technologija ir jos naudojimo metodika turėjo teigiamos įtakos eksperimentinių grupių studentų profesinės anglų kalbos tekstų suvokimo pažangai.

Baigiamajame intervencijos etape (15 semestro savaitė) eksperimentinėse tyrimo dalyvių grupėse vykdyta anketinė apklausa ir naudotas klausimynas, paremtas teoriniu *Technologijų priėmimo modeli* (Davis, Bagozzi & Warshaw, 1989). Siekta išsiaiškinti, kaip dalyviai vertino semestro eigoje naudotą antrosios kartos saityno technologiją *CmapTools* ir kokie veiksniai turėjo įtakos jos priėmimui.

Penktas skyrius. Antrosios kartos technologijos CmapTools efektyvumo profesinės anglų kalbos studijose tyrimo rezultatai. Statistinė duomenų analizė buvo atlikta naudojant IBM SPSS statistinių programų rinkinio (angl. *Statistical Package for Social Sciences*) 22 versiją. Kokybiniai kintamieji buvo aprašomi pateikiant kintamųjų absoliučias reikšmes, tolydiems kintamiesiems aprašyti naudotos vidurkio ir vidutinio standartinio nuokrypio charakteristikos. Tolydžiųjų kintamųjų normalumas buvo tikrintas, naudojant *Kolmogorovo-Smirnovo* kriterijų. Kintamųjų, pasiskirsčiusių pagal normalųjį dėsnį, vidurkiai lyginti naudojant *Student t* kriterijų. Skirtumui tarp kintamųjų, nepasiskirsčiusių pagal normalųjį dėsnį, nustatyti buvo naudojamas neparametrinis *Mann-Whitney* kriterijus. Visame tyrime buvo laikoma, kad pasirinktas reikšmingumo lygmuo $\alpha=0.05$.

Diagnostinio testo rezultatai. Kadangi tyrimo rezultatų validumui ypač svarbu, kad visos grupės iki ugdomojo poveikio būtų homogeniškos, pedagoginio eksperimento pradžioje prieš planuojamą intervenciją visi tyrime dalyvavę studentai ($n=107$) rašė bendrosios anglų kalbos diagnostinį testą, kuris, kaip ir kiti semestro metu rašyti testai buvo įvertintas pažymiu dešimtbalėje sistemoje. Kaip jau minėta, tyrimo dalyviai buvo suskirstyti dvi grupes: eksperimentinę ir kontrolinę, todėl diagnostinio testo pažymių homogeniškumas tikrintas abiejose tiriamųjų grupėse. Pirmiausia *Kolmogorovo-Smirnovo* kriterijumi patikrinta, ar diagnostinio testo pažymiai buvo pasiskirstę pagal normalųjį dėsnį. Nustatyta, kad diagnostinio testo pažymių skirstiniai pagal normalųjį dėsnį pasiskirstę nebuvo ($p=0.008$), todėl abiejų grupių homogeniškumui patikrinti naudotas *Mann-Whitney U* testas. Tikrinta nulinė hipotezė H_0 , kad diagnostinio testo, rašyto abiejose tiriamųjų grupėse prieš pedagoginę intervenciją, visi pažymių skirstiniai yra vienodi. Laikytasi nuostatos, kad jeigu reikšmingumo lygmuo $\alpha=0.05$, o p -reikšmė yra mažesnė nei α , hipotezė H_0 (diagnostinio testo pažymių skirstiniai vienodi) atmetama. Priešingu atveju (jei p -reikšmė $\geq \alpha$), hipotezė priimama (Čekanavičius & Murauskas, 2001). Nustatyta, kad tyrime dalyvavusių eksperimentinių ir kontrolinių grupių diagnostinio testo rezultatai reikšmingai nesiskyrė ($p=0.283$) ($p>\alpha$). Kadangi tiriamųjų grupės buvo sukomplektuotos iš dviejų aukštojo mokslo institucijų, diagnostinio testo rezultatai buvo lyginami ir kiekvienoje institucijoje atskirai. Nustatyta, kad abiejose įstaigose eksperimentinėse ir kontrolinėse grupėse diagnostinio testo rezultatai taip pat reikšmingai nesiskyrė: Mykolo Romerio universitete $p=0.073$ ($p>\alpha$), Vilniaus kolegijoje $p=0.872$ ($p>\alpha$), todėl nulinės hipotezės apie skirstinių vienodumą atmeti nėra pagrindo. Tiriamųjų grupių diagnostinio testo rezultatai statistškai nesiskiria, t. y. prieš pedagoginę intervenciją eksperimentinės ir kontrolinės grupės buvo homogeniškos.

Pažangos testų rezultatai. Siekiant iširti, ar aukštojo mokslo profesinės anglų kalbos studijų metu taikytas įrankis *CmapTools* turi įtakos studentų profesinės anglų kalbos žodyno įsisavinimui, buvo lyginami abiejų institucijų eksperimentinių ir kontrolinių grupių atliktų dviejų profesinės anglų kalbos pažangos (žodyno įsisavinimo) testų rezultatai. Kadangi tiriamųjų grupės buvo suformuotos iš dviejų aukštojo mokslo institucijų studentų, iš pradžių pažangos testų rezultatai buvo analizuojami kiekvienoje institucijoje atskirai.

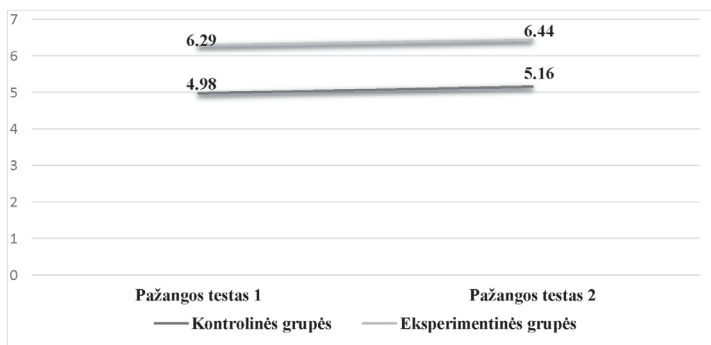
Pažangos testų rezultatai MRU eksperimentinėje ir kontrolinėje grupėje. Prieš lyginant pažangos testo 1 pažymių vidurkius Mykolo Romerio universitete, *Kolmogorovo-Smirnovo* kriterijumi pirmiausia patikrintas tolydžiųjų kintamųjų normalumas. Nustatyta, kad pažangos testo 1 pažymiai abiejose MRU tiriamųjų grupėse buvo pasiskirstę pagal normalųjį dėsnį ($p=0.419$), todėl taikytas *Student t* kriterijus vidurkių lygybei patikrinti. Tikrinta pradinė hipotezė H_0 , kad pažymių vidurkiai abiejose tiriamųjų grupėse yra lygūs. Pažangos testo 1 rezultatų analizė parodė, kad Mykolo Romerio universiteto eksperimentinėje grupėje ($n=32$) testo pažymių vidurkis buvo 5.19 ± 1.942 , o kontrolinėje grupėje ($n=24$) – tik 3.88 ± 2.173 . Prieš tikrinant hipotezę apie pažymių vidurkių lygybę *Student t* kriterijumi, paprastai yra patikrinama hipotezė apie dispersijų lygybę. Naudojamas *Levene* variacijos homogeniškumo kriterijus. Laikytasi nuostatos, kad jeigu reikšmingumo lygmuo $\alpha=0.05$, o p -reikšmė yra mažesnė nei α , hipotezę atmetame. Priešingu atveju jei p -reikšmė $\geq \alpha$, hipotezę priimame. Šiuo atveju kriterijaus p -reikšmė $=0.021 < 0.05$, vadinasi, pažymių vidurkiai eksperimentinėje ir kontrolinėje grupėse reikšmingai skiriasi, todėl hipotezę apie vidurkių lygybę atmetame.

Išanalizavus Mykolo Romerio universiteto studentų pažangos testo 2 rezultatus nustatyta, kad eksperimentinės grupės ($n=32$) pažymių vidurkis buvo 5.38 ± 1.827 . Kontrolinės grupės ($n=25$) rezultatų vidurkis buvo 4.60 ± 1.915 . Kadangi šio testo pažymių skirstiniai pagal normalųjį dėsnį pasiskirstę nebuvo ($p=0.027$), eksperimentinės ir kontrolinės grupės pažymių vidurkiams patikrinti naudotas *Mann-Whitney U* testas. Tikrinta nulinė hipotezė H_0 , kad visi pažangos testo 2 skirstiniai abiejose tiriamųjų grupėse yra vienodi. Nustatyta, kad nepaisant to, jog kontrolinėje grupėje pažymių vidurkis yra mažesnis (4.60) negu eksperimentinėje (5.38), šio testo rezultatai eksperimentinėje ir kontrolinėje grupėse reikšmingai nesiskyrė ($p=0.078 > 0.05$). Nulinės hipotezės atmesti nėra pagrindo.

Pažangos testų rezultatai VIKO eksperimentinėje ir kontrolinėje grupėje. Analogiška tvarka išanalizavus pažangos testų 1 ir 2 rezultatus Vilniaus kolegijos eksperimentinės ir kontrolinės grupėse paaiškėjo, kad ir šioje tyrime dalyvavusioje aukštojo mokslo institucijoje reikšmingai skiriasi abiejų pažangos testų rezultatai ($p=0.012 < \alpha$) ir ($p=0.000 < \alpha$), todėl nulinę hipotezę, kad pažymių vidurkiai abiejose tiriamųjų grupėse yra lygūs ir šiuo atveju galime atmesti.

Pažangos testų rezultatai eksperimentinėse ir kontrolinėse dalyvių grupėse bendrame tyrimo kontekste. Tikrinta kryptinga statistinė hipotezė H_0 , apie eksperimentinių ir kontrolinių grupių pažangos testo 1 pažymių vidurkių lygybę bendrame tyrimo kontekste. Patikrinus kintamųjų normalumą, nustatyta, kad pažangos testo 1 pažymiai abiejų institucijų tiriamųjų grupėse buvo pasiskirstę pagal normalųjį dėsnį ($p=0.247$), todėl vidurkių lygybei patikrinti taikytas *Student t* kriterijus. Pradinė hipotezė H_0 – pažangos testo 1 pažymių vidurkiai abiejose tiriamųjų grupėse yra lygūs. Gauta, kad eksperimentinių grupių ($n=56$) pažymių vidurkis yra 6.29 ± 2.432 , o kontrolinių ($n=43$) 4.98 ± 2.144 . Pagal *Studento* kriterijų vidurkiai reikšmingai skiriasi ($p=0.000$). Vadinasi, pradinę hipotezę (H_0) – pažymių vidurkiai abiejose tiriamųjų grupėse yra lygūs, galime atmesti. Eksperimentinės grupės pažangos testo 1 rezultatai yra aukštesni nei kontrolinės. Analogiška tvarka analizuoti pažangos testo

2 rezultatai abiejų institucijų tiriamųjų grupėse. Kadangi šio testo rezultatai nebuvo pasiskirstę pagal normalųjį dėsnį ($p=0.010$), taikytas *Mann-Whitney U* testas. Tikrinta nulinė hipotezė H_0 , kad pažangos testo 2, rašyto abiejose tiriamųjų grupėse, visi pažymių skirstiniai yra vienodi. Nustatyta, kad tyrime dalyvavusių eksperimentinių ir kontrolinių grupių pažangos testo 2 rezultatai reikšmingai skyrėsi ($p=0.011$) ($p<\alpha$) eksperimentinių grupių naudai. Vadinasi, pradinę hipotezę H_0 – pažymių vidurkiai abiejose tiriamųjų grupėse yra lygūs taip pat galime atmesti. Ir šiuo atveju testo rezultatai eksperimentinėje grupėje buvo aukštesni nei kontrolinėje. Abiejų pedagoginio eksperimento metu rašytų testų rezultatų dinamika eksperimentinėse ir kontrolinėse dalyvių grupėse bendrame tyrimo kontekste pateikiama pirmame paveiksle:



1 paveikslas. Abiejų pedagoginio eksperimento metu rašytų testų rezultatų dinamika eksperimentinėse ir kontrolinėse dalyvių grupėse bendrame tyrimo kontekste

Autentiškų tekstų apžvalgų rezultatai kiekvienoje tyrime dalyvavusioje institucijoje. Siekiant iširti, ar aukštojo mokslo profesinės anglų kalbos studijų metu taikytas įrankis *CmapTools* turi įtakos studentų profesinės anglų kalbos teksto suvokimo gebėjimams, buvo stebima dalyko studijų aprašuose numatytų 2 autentiškų profesinės anglų kalbos tekstų apžvalgų (vadinamojo „namų skaitymo“) rezultatų dinamika abiejų institucijų eksperimentinėse ir kontrolinėse grupėse.

Autentiškų tekstų apžvalgų rezultatai Mykolo Romerio universitete. Tikrinta statistinė hipotezė H_0 apie eksperimentinių ir kontrolinių grupių namų skaitymo užduoties pažymių vidurkių lygybę. Patikrinus kintamųjų skirstinių normalumą, nustatyta, kad šioje institucijoje abiejų užduočių pažymiai buvo pasiskirstę pagal normalųjį dėsnį: apžvalga 1 ($p=0.239$), apžvalga 2 – ($p=0.126$), todėl vidurkių lygybei patikrinti taikytas *Student t* kriterijus nepriklausomoms imtims. Išnagrinėjus apžvalgos 1 rezultatus Mykolo Romerio universitete paaiškėjo, kad eksperimentinėje grupėje ($n=27$), kurioje šios užduoties įvykdymui buvo keliamas reikalavimas pritaikyti įrankį *CmapTools*, pažymių vidurkis (7.78 ± 1.805) buvo nežymiai aukštesnis nei kontrolinėje ($n=21$), kurioje įrankis nebuvo taikomas: 7.38 ± 1.564 . Prieš tikrinant hipotezę apie abiejų populiacijų pažymių vidurkių lygybę, *Levene* dispersijų

lygybės kriterijumi įvertintas jų homogeniškumas. Laikytasi nuostatos, kad jeigu reikšmingumo lygmuo $\alpha=0.05$, o p -reikšmė yra mažesnė nei α , dispersijos statistiškai reikšmingai skiriasi. Priešingu atveju, jei p -reikšmė $\geq \alpha$, dispersijos yra vienodos. Šiuo atveju kriterijaus p -reikšmė $=0.376 > 0.05$, vadinasi, dispersijos buvo lygios. Siekiant nustatyti, ar tarp MRU eksperimentinės ir kontrolinės grupės apžvalgos 1 užduoties rezultatų vidurkių egzistuoja reikšmingas skirtumas, taip pat tikrinta dvipusio kriterijaus p reikšmė. Analizuojamu atveju $p=0.428 > 0.05$, vadinasi, apžvalgos 1 pažymių vidurkiai abiejose populiacijose statistiškai reikšmingai nesiskiria.

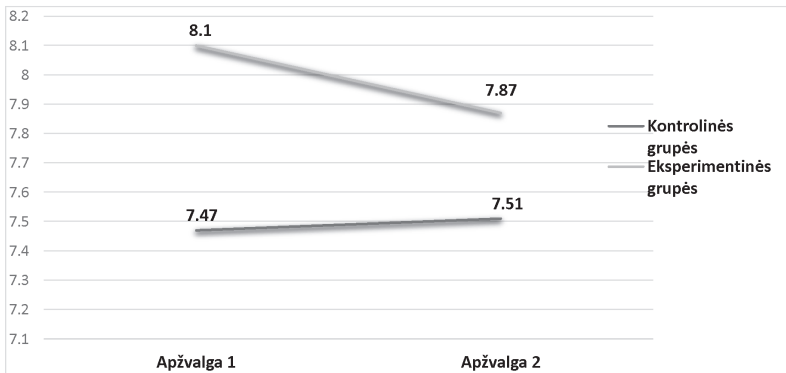
Analogiška tvarka išanalizavus apžvalgos 2 rezultatus Mykolo Romerio universitete paaiškėjo, eksperimentinės grupės ($n=29$) pažymių vidurkis buvo 7.34 ± 1.778 , o kontrolinės ($n=22$) buvo 7.09 ± 1.875 . Panaudojus *Student t* kriterijų, statistiškai reikšmingas skirtumas ir šiuo atveju negautas: ($p=0.624 > 0.05$). Nepaisant to, kad Mykolo Romerio universiteto eksperimentinėje grupėje aiškiai matoma autentiško teksto apžvalgos užduočių 1 ir 2 pažymių vidurkių didėjimo tendencija eksperimentinės grupės atžvilgiu, statistiškai reikšmingo skirtumo tarp jos ir kontrolinės grupės pažymių vidurkių nenustatyta. Pradinę hipotezę, H_0 – *pažymių vidurkiai abiejose tiriamųjų grupėse yra lygūs*, priimame.

Autentiško teksto skaitymo užduočių rezultatai Vilniaus kolegijoje. Tikrinta hipotezė H_0 apie Vilniaus kolegijos eksperimentinių ir kontrolinių grupių profesinės anglų kalbos namų skaitymo užduoties pažymių vidurkių lygybę. Nustačius, kad Vilniaus Kolegijoje abiejų namų skaitymo užduočių pažymiai buvo pasiskirstę pagal normalųjį dėsnį ($p=0.129$) ir ($p=0.076$), taikytas *Student t* kriterijus vidurkių lygybei patikrinti. Tikrinta pradinė hipotezė H_0 – *pažymių vidurkiai abiejose tiriamųjų grupėse yra lygūs*. Išnagrinėjus apžvalgos 1 rezultatus Vilniaus kolegijoje paaiškėjo, kad eksperimentinėje jos grupėje ($n=22$) šios užduoties pažymių vidurkis buvo 8.50 ± 1.766 , o kontrolinėje grupėje ($n=15$) – 7.60 ± 1.404 . Siekiant patikrinti dispersijų lygybę, išnagrinėti *Levene* testo rezultatai. Šiuo atveju kriterijaus p -reikšmė $=0.165 > 0.05$, vadinasi, dispersijos yra vienodos. Siekiant nustatyti, ar egzistuoja reikšmingas skirtumas tarp Vilniaus kolegijos eksperimentinės ir kontrolinės grupės apžvalgos 1 užduoties rezultatų vidurkių, tikrinta dvipusio kriterijaus p reikšmė. Nepaisant to, kad kontrolinėje grupėje pažymių vidurkis yra akivaizdžiai mažesnis, rezultatai reikšmingai nesiskiria ($p=0.108 > 0.05$). Analogiškai išanalizavus apžvalgos 2 rezultatus Vilniaus kolegijoje paaiškėjo, kad eksperimentinės grupės ($n=23$) pažymių vidurkis buvo 8.52 ± 1.855 , o kontrolinės ($n=15$) – 8.13 ± 1.060 . Rezultatai ir šiuo atveju reikšmingai nesiskiria ($p=0.418 > 0.05$).

Autentiškų tekstų apžvalgų 1 ir 2 rezultatų palyginimas eksperimentinėse ir kontrolinėse grupėse bendrame tyrimo kontekste. Tikrinta kryptinga statistinė hipotezė H_0 apie tyrimo eksperimentinių ir kontrolinių grupių autentiškų tekstų apžvalgų 1 ir 2 visų pažymių vidurkių lygybę. Nustačius, kad apžvalgos 1 pažymiai abiejų institucijų tiriamųjų grupėse buvo pasiskirstę pagal normalųjį dėsnį ($p=0.065$), vidurkių lygybei patikrinti taikytas *Student t* kriterijus nepriklausomoms imtims. Nustatyta, kad tyrime dalyvavusių eksperimentinių grupių ($n=49$) pažymių vidurkis buvo 8.1 ± 1.806 , kai kontrolinių grupių ($n=36$) – tik 7.47 ± 1.483 . Nors vidurkiai kontrolinėse grupėse yra akivaizdžiai žemesni nei ekspe-

rimentinėse, statistiškai reikšmingas skirtumas bendrame tyrimo kontekste nepastebėtas ($p=0.091>0.05$).

Analogiška tvarka išanalizavus apžvalgos 2 rezultatus ir nustatčius, kad pažymių skirstiniai nėra pagal normalųjį dėsnį ($p=0.014$), eksperimentinių ir kontrolinių grupės pažymių vidurkiams patikrinti naudotas *Mann-Whitney U* testas. Tikrinta nulinė hipotezė H_0 , kad *autentiško teksto apžvalgos 2 visi pažymių skirstiniai abiejose tiriamųjų grupėse yra vienodi*. Laikytasi nuostatos, kad jeigu reikšmingumo lygmuo $\alpha=0.05$, o p -reikšmė yra mažesnė nei α , hipotezę H_0 atmetame. Priešingu atveju (jei p -reikšmė $\geq \alpha$) hipotezę priimame. Nustatyta, kad eksperimentinėse grupėse ($n=52$) šios užduoties pažymių vidurkis buvo 7.87, o kontrolinėse ($n=37$) – 7.51 (žr. 2 paveikslą).



2 paveikslas. Abiejų autentiškų tekstų apžvalgų rezultatų dinamika eksperimentinėse ir kontrolinėse dalyvių grupėse bendrame tyrimo kontekste

Nustatyta, kad tyrime dalyvavusių eksperimentinių ir kontrolinių grupių abiejų autentiškų tekstų apžvalgų rezultatai statistiškai reikšmingai nesiskyrė, vadinasi, pradinės hipotezės H_0 – *autentiško teksto apžvalgos 2 visi pažymių skirstiniai abiejose tiriamųjų grupėse yra vienodi* atmeti pagrindo nėra.

Šeštas skyrius. *Antrosios kartos saityno technologijos CmapTools priėmimas profesinės anglų kalbos studijose aukštajame moksle. Anketinės apklausos rezultatai.*

Siekiant nustatyti, kaip studentai priėmė profesinės anglų kalbos studijose taikytą technologiją *CmapTools*, ir kokie veiksniai turėjo įtakos jų pasirinkimui naudotis (ar nesinaudoti) ja ateityje, paskutinės (penktosios) eksperimento fazės metu eksperimentinėse grupėse, kuriose buvo taikoma intervencija, vykdėta anketinė apklausa. Tyrimo imties dydis – 60 respondentų. Tiriamųjų grupė buvo formuojama taikant vieną netikimybinės atrankos būdą: tikslinę atranką (angl. *purposive sampling*), kai į imtį yra įtraukiami tik tie generalinės imties vienetai, kurie gali labiausiai pasitarnauti tyrėjui, nes yra geriausiai susipažinę su analizuojamu reiškiniu ir gali suteikti vertingiausios informacijos.

Tyrimo instrumentas. Tyrimo instrumentas – klausimynas „*Mykolo Romerio universiteto ir Vilniaus kolegijos studentų nuomonė apie profesinės anglų kalbos dalyko studijose taikytą antrosios kartos saityno įrankį CmapTools*“ (žr. 5 priedą), kurį sudaro trys struktūrinės dalys ir 27 uždarojo tipo klausimai.

1) Įžanginė klausimyno dalis supažindina tyrimo dalyvius su tyrimo tikslais;

2) Demografinėje dalyje tyrimo dalyvių prašoma pateikti savo demografinius duomenis, įskaitant *aukštojo mokslo instituciją, lytį, gimtąją kalbą, kalbą, dažniausiai vartojamą veikloms internete, bendrosios anglų kalbos lygio įsivertinimą, gebėjimo naudotis antrosios kartos saityno technologijomis įsivertinimą, gebėjimo naudotis įrankiu CmapTools įsivertinimą* bei dalyko *Profesinė anglų kalba lankomumo įsivertinimą*. Atsižvelgiant į skirtingą klausimų struktūrą, šios klausimyno dalies atsakymų formuluotėms naudotos dvi skalės: nominalinė ir intervalinė.

3) Teorinės tyrimo dalies pagrindas – *Technologijų priėmimo modelis* (Davis, Bagozzi & Warshaw, 1989). Siekiant užtikrinti klausimyno turinio validumą, šioje jo dalyje remiamasi Malaizijos mokslininkų Arshad, Tan ir Hashim (2012) tyrimo „*Tertiary Students' Application of Web 2.0 for English Language Learning*“ instrumento turiniu. Reikia pažymėti, kad teorinė klausimyno dalis buvo patikrinta ir išbandyta 2014 m. Mykolo Romerio universitete vykdyto pilotinio tyrimo metu. Visgi atsižvelgiant į specifinį aptariamo tyrimo kontekstą, atlikti būtini keitimai klausimyno tekste: dėmesys šiuo atveju sutelkiamas ne į antrosios kartos saityno technologijas, naudojamas profesinės anglų kalbos studijose aukštojoje mokykloje apskritai, o į vieną konkrečią technologiją, taikytą autorės vykdyto pedagoginio eksperimento metu, t. y. į *CmapTools*. Be to, turint omenyje kad studentai technologiją naudojo privalomąja, o ne pasirenkamąja tvarka, atsisakyta paskutiniojo TAM teiginių komplekso „*naudojimas*“. Modifikuotoje skalėje išskiriamos 5 Technologijų priėmimo modelį iliustruojančios teiginių poskalės (toliau konstruktai):

- *informuotumas* (papildomas konstruktas) (3 teiginiai);
- *suvokiama nauda* (6 teiginiai);
- *suvokiamas naudojimo paprastumas* (4 teiginiai);
- *požiūris* (3 teiginiai);
- *ketinimas naudoti ateityje* (2 teiginiai);

Šioje klausimyno dalyje studentų buvo prašoma nurodyti savo sutikimo ar nesutikimo su kiekvienu iš teiginių laipsnį, kuriam išreikšti buvo taikyta 5 rangų *Likerto* skalė. Dalyviams pateikti atsakymų variantai: „*visiškai pritariu*“, „*pritariu*“, „*neturiu nuomonės*“, „*nepritariu*“ ir „*visiškai nepritariu*“. Klausimyno pagalba surinktų duomenų apdorojimui, statistinei analizei bei rezultatų pateikimui buvo naudojamas SPSS statistinės analizės programų paketas. Kintamiesiems charakterizuoti buvo taikomi šie aprašomosios ir analitinės statistikos metodai:

- Cronbach Alpha kriterijus;
- procentinių dažnių skaičiavimo metodas;
- koreliacinė analizė;
- Mann-Whitney testas.

Kriterijų reikšmingumui patikrinti naudotas 0.05 reikšmingumo lygmuo. Tai reiškia, kad tyrimo metu užsibrėžta ne didesnė nei 5 % statistinių sprendimų paklaida. Tyrimo instrumento patikimumas patikrintas, pritaikius *Cronbach Alpha* kriterijų, „*kuris, remiasi atskirų klausimų, sudarančių klausimyną, koreliacija ir įvertina, ar visi skalės klausimai pakankamai atspindi tiriamąjį dydį bei įgalina patikslinti reikiamų klausimų skaičių skalėje*“ (Pukėnas, 2009, p. 24). Visų analizuotų konstruktyvų įverčiai svyruoja nuo gan aukšto (0.704) iki labai aukšto (0.856) ir patenka į rekomenduojamą ≥ 0.7 intervalą, todėl vidinis suderinamumas laikomas pakankamu klausimyno duomenų analizei.

Hipotezių formulavimas. Šiam empirinio tyrimo segmentui buvo suformuluotos 5 hipotezės, nagrinėjančios vidinius ryšius tarp Technologijų priėmimo modelio elementų:

H₁: studentų suvokimas apie įrankio CmapTools naudojimo paprastumą daro tiesioginę teigiamą įtaką jų suvokimui apie įrankio CmapTools naudą;

H₂: studentų suvokimas apie įrankio CmapTools naudojimo paprastumą daro tiesioginę teigiamą įtaką jų požiūriui į įrankį CmapTools;

H₃: studentų suvokimas apie įrankio CmapTools naudą daro tiesioginę teigiamą įtaką jų požiūriui į įrankį CmapTools;

H₄: suvokiamas įrankio CmapTools naudingumas daro tiesioginę teigiamą įtaką jų ketinimui naudotis įrankiu CmapTools tolimesnėse studijose;

H₅: studentų požiūris į įrankį CmapTools daro tiesioginę teigiamą įtaką jų ketinimui naudotis įrankiu CmapTools tolimesnėse studijose.

3 hipotezės, nagrinėjo papildomo konstrukto Informuotumas sąsajas su vidiniais TAM elementais:

H₆: profesinės anglų kalbos studentų informuotumas apie įrankį CmapTools daro tiesioginę teigiamą įtaką jų ketinimui naudotis įrankiu CmapTools tolimesnėse studijose;

H₇: profesinės anglų kalbos studentų informuotumas apie įrankį CmapTools daro tiesioginę teigiamą įtaką suvokiamam įrankio CmapTools naudojimo paprastumui;

H₈: profesinės anglų kalbos studentų informuotumas apie įrankį CmapTools tarpinėnkauja tarp suvokiamo įrankio CmapTools naudingumo ir ketinimo naudotis įrankiu CmapTools tolimesnėse studijose;

2 hipotezės analizavo ryšius tarp išorinių veiksnių, t. y. demografinių studentų charakteristikų ir kontekstinių indikatorių, bei dviejų svarbiausių TAM konstrukty: suvokiamos naudos ir suvokiamo naudojimo paprastumo:

H₉: demografiniai veiksniai daro įtaką studentų suvokimui apie įrankio CmapTools teikiamą naudą;

H₁₀: demografiniai veiksniai daro įtaką studentų suvokimui apie įrankio CmapTools naudojimo paprastumą.

Aprašomoji statistika. Kaip jau minėta, šio tyrimo imties dydis – 60 studentų iš eksperimentinių grupių. Eksperimento pabaigoje fiksuotas 9% (n=5) „nubyrėjimas“. Viso išdalyta 55 klausimynai su 100% grąža. Kadangi du iš jų nebuvo užpildyti visiškai, statistinei analizei naudoti 53 klausimynų duomenys. Išanalizavus rezultatus, paaiškėjo, kad tyrime dalyvavo 32 Mykolo Romerio universiteto *Teisės ir muitinės* bakalauro nuolatinųjų studijų programos I kurso studentai (60.4%) ir 21 Vilniaus Kolegijos *Kompiuterių sistemų* nuolatinųjų studijų programos I kurso studentas (39.6%). 62.3 % anketos respondentai buvo vaikinai (n=33), 37.7% – merginos (n=20). Paprašius įvardyti savo gimtąją kalbą, didžioji dauguma respondentų 79.2% (n=42) nurodė lietuvių kalbą, 13.2% (n=7 – rusų ir 7.5 % (n=4) nurodė lenkų kalbą. Visgi daugiau nei pusė respondentų (52.8%) (n=28) teigė internete dažniausiai vartojantys anglų kalbą, 37.7% (n=20) – lietuvių, 7.5% – rusų (n=4) ir 1.9% – lenkų kalbą (n=1). Paprašyti įvertinti savo anglų kalbos lygį, beveik pusė dalyvių 47.2% (n=25) nurodė, kad jie save įvardija kaip gerus vartotojus, 39.6% (n=21) – kaip savarankiškus vartotojus ir tik 13.2% (n=7) – kaip pradedančiuosius vartotojus. Respondentų gebėjimo naudotis antrosios kartos saityno technologijomis įsivertinimas pasiskirstė taip: beveik pusė jų, t. y. 47.2% (n=25), nurodė esantys pakankamai įgudę vartotojai, 24.5% (n=13) – puikiai įgudę vartotojai, 15.1% (n=8) – labai įgudę vartotojai, 11.3% (n=6) – nelabai įgudę vartotojai ir tik 1 respondentas (11.3%) prisipažino visai neturinti(-s) įgūdžių. Panašūs vertinimai gauti ir išanalizavus atsakymus į klausimą apie savo gebėjimą naudotis antrosios kartos saityno įrankiu *CmapTools*: 45.32% (n=24) studentų teigė esantys pakankamai įgudę vartotojai, 28.32% (n=15) – nelabai įgudę, 11.32% (n=6) – labai įgudę, po 7.50% respondentų (n=4) nurodė, kad save laiko puikiai įgudusiais arba visai neturinčiais įgūdžių vartotojais. Panašiai pasiskirstė ir studentų atsakymų, susijusių su dalyko Profesinė anglų kalba lankomumu, dažniai bei procentinė išraiška: 45.3% (n=24) sistemingai lankė didžiąją dalį užsiėmimų, 28.3% (n=15) sistemingai lankė visus užsiėmimus, 15.1% (n=8) praleido nemažai užsiėmimų, 9.40% (n=5) atvykdavo tik į tarpinius atsiskaitymus, ir tik 1.90% (n=1) praleido didžiąją dalį užsiėmimų.

Koreliacinė statistika.

Tikrinta hipotezė H_1 : *studentų suvokimas apie įrankio CmapTools naudojimo paprastumą daro teigiamą įtaką jų suvokimui apie įrankio CmapTools naudą*. Atlikta koreliacinė analizė ir naudotas Spearman koreliacijos koeficientas (ρ). Apibendrinus koreliacinės analizės rezultatus nustatyta, kad tarp esminių TAM konstruktų suvokiamo įrankio CmapTools naudojimo paprastumo ir suvokiamos jo naudos egzistuoja teigiama silpna koreliacija ($r=0.626, p<0.05$). Visgi ryšys yra statistiškai reikšmingas, todėl hipotezę H_1 priimame.

Tikrinta hipotezė H_2 : *studentų suvokimas apie įrankio CmapTools naudojimo paprastumą daro teigiamą įtaką studentų požiūriui į įrankį CmapTools*. Rasta, kad konstruktai suvokiamas įrankio CmapTools naudojimo paprastumas ir studentų požiūris į įrankį CmapTools susiję stipriu teigiamu statistiškai reikšmingu ryšiu ($r=0.754, p<0.05$), todėl hipotezę H_2 priimame.

Tikrinta hipotezė H_3 : *studentų suvokimas apie įrankio CmapTools naudą daro teigiamą įtaką jų požiūriui į įrankį CmapTools*. Nustatyta, kad tarp konstruktų suvokiama įrankio CmapTools nauda ir studentų požiūris į jį egzistuoja vidutinio stiprumo teigiamas statistiškai reikšmingas ryšys ($r=0.626, p<0.05$), todėl hipotezę H_3 priimame.

Tikrinta hipotezė H_4 : *suvokiamas įrankio CmapTools naudingumas daro teigiamą įtaką studentų ketinimui naudoti įrankį CmapTools tolimesnėse studijose*. Nustatyta, kad tarp konstruktų suvokiama įrankio CmapTools nauda ir studentų ketinimas naudoti įrankį CmapTools ateityje egzistuoja silpna teigiama koreliacija. Visgi šis ryšys yra statistiškai reikšmingas ($r=0.491, p<0.05$), todėl hipotezės H_4 atmesti taip pat nėra pagrindo.

Tikrinta hipotezė H_5 : *studentų požiūris į įrankį CmapTools daro teigiamą įtaką jų ketinimui naudotis įrankiu CmapTools tolimesnėse studijose*. Tarp konstruktų studentų požiūris į įrankį CmapTools ir studentų ketinimas naudoti įrankį CmapTools ateityje nustatyta vidutinė teigiama koreliacija ($r=0.669, p<0.05$), vadinasi, hipotezės H_5 atmesti taip pat nėra pagrindo.

Tikrinta hipotezė H_6 : *profesinės anglų kalbos studentų informuotumas apie įrankį CmapTools daro įtaką jų ketinimui naudotis įrankiu tolimesnėse studijose*. Nustatyta, kad tarp TAM papildančio konstrukto informuotumas apie įrankį CmapTools ir studentų ketinimo naudoti įrankį CmapTools ateityje egzistuoja statistiškai reikšmingas, nors ir silpnas ryšys ($r=0.375, p<0.05$), vadinasi, hipotezę H_6 priimame.

Tikrinta hipotezė H_7 : *profesinės anglų kalbos studentų informuotumas apie įrankį CmapTools daro įtaką suvokiamam įrankio naudojimo paprastumui*. Nustatyta, kad tarp konstruktų informuotumas apie įrankį CmapTools ir suvokiamas įrankio CmapTools naudojimo paprastumas egzistuoja vidutinis statistiškai reikšmingas teigiamas ryšys ($r=0.689, p<0.05$), vadinasi, hipotezę H_7 priimame.

Tikrinta hipotezė H_8 : *profesinės anglų kalbos studentų informuotumas apie įrankį CmapTools tarpininkauja tarp suvokiamo įrankio CmapTools naudingumo ir ketinimo naudotis įrankiu CmapTools tolimesnėse studijose*. Nustatyta, kad modelį papildantis elementas *informuotumas apie įrankį CmapTools* turi reikšmingų sąsajų su *studentų suvokimu apie įrankio teikiamą naudą, mokantis profesinės anglų kalbos, tobulinant profesinės anglų kalbos skaitymo įgūdžius bei mokantis profesinės anglų kalbos terminų bei sąvokų*. Visgi *informuotumas apie įrankį CmapTools* nedaro jokios įtakos studentų *profesinės anglų kalbos rašymo, kalbėjimo ir klausymo įgūdžių tobulinimui*. Apibendrinus rezultatus, matome, kad tarp konstrukto *informuotumas apie įrankį CmapTools* ir *suvokiama įrankio CmapTools teikiama nauda* egzistuoja vidutinis statistiškai reikšmingas teigiamas ryšys, ($r=0.451$, $p<0.05$), vadinasi, hipotezė H_8 priimame.

Tiriamųjų demografinių charakteristikų ir TPM konstrukto sąsajos.

Siekiant patikrinti hipotezes H_9 ir H_{10} apie sąsajas tarp tyrimo dalyvių individualaus konteksto veiksnių ir svarbiausių Technologijų priėmimo modelio konstrukto – *suvokiamo naudingumo ir suvokiamo naudojimo paprastumo*, atlikta koreliacinė analizė ir naudotas Spearman koreliacijos koeficientas (ρ). Siekiant nustatyti skalės įverčių skirtumus tarp dviejų respondentų grupių, buvo pritaikytas Mann-Whitney testas; trijų ir daugiau respondentų grupių atveju taikytas Kruskal-Wallis testas.

Tikrinta hipotezė H_{9A} : *aukštojo mokslo institucija turi ryšį su suvokiama įrankio CmapTools nauda*. Atlikus koreliacijos analizę, paaiškėjo, kad *aukštojo mokslo institucijos* veiksnys silpną teigiamą statistiškai reikšmingą ryšį turėjo su trimis suvokiamos naudos konstrukto teiginiais: *įrankis CmapTools padėjo man mokantis profesinės anglų kalbos* ($r=0.346$, $p=0.011$), *įrankis CmapTools padėjo man tobulinti skaitymo įgūdžius* ($r=0.399$, $p=0.003$) bei *įrankis CmapTools padėjo man mokytis terminų ir sąvokų*. Siekiant nustatyti, kurioje respondentų grupėje (Mykolo Romerio universitete ar Vilniaus kolegijoje) *suvokiamos naudos* konstrukto minėtų teiginių vertinimai yra stipriau išreikšti, buvo pritaikytas neparametrinis Mann-Whitney rangų sumų kriterijus dviems nepriklausomoms imtims ir palygintos rangų vidurkių reikšmės Ranks lentelėse. Nustatyta, kad Mykolo Romerio universiteto rangų vidurkis (31.05) teiginiui *įrankis CmapTools padėjo man mokantis profesinės anglų kalbos* yra didesnis nei Vilniaus kolegijos (20.83). Panašūs rezultatai gauti ir išanalizavus teiginių *įrankis CmapTools padėjo man tobulinti profesinės anglų kalbos skaitymo įgūdžius* bei *įrankis CmapTools padėjo man mokytis terminų ir sąvokų* atsakymus. Mykolo Romerio universiteto studentų atsakymų rangų vidurkiai (31.73 ir 33.20) ir šiais atvejais yra didesni nei Vilniaus kolegijos (19.79 ir 17.55). Matome, kad visais atvejais Mykolo Romerio universiteto respondentų atsakymų reikšmės yra didesnės nei Vilniaus kolegijos, todėl galima daryti išvadą, kad šios institucijos eksperimentinių grupių studentai buvo labiau linkę manyti, kad *įrankis CmapTools* jiems buvo naudingas mokantis profesinės anglų kalbos, tobulinant profesinės anglų kalbos skaitymo įgūdžius ir mokantis terminų ir sąvokų. Apibendrinus gautus rezultatus, nustatyta, kad tarp demografinio veiksnio *aukštojo mokslo institucija* ir *suvokiama įrankio CmapTools teikiama nauda* egzistuoja teigiamas statistiškai reikšmingas, tačiau silpnas ryšys, ($r=0.473$, $p<0.05$), vadinasi, hipotezės H_{9A} atmesti nėra pagrindo.

Tikrinta hipotezė H_{9B} : *tiriamųjų lytis turi ryšį su suvokiama įrankio CmapTools nauda*. Nustatyta, kad šis veiksnys turėjo reikšmingos įtakos, vertinant įrankio naudą tik mokantis profesinės anglų kalbos terminų ir sąvokų. Atlikus Mann-Whitney testą paaiškėjo, kad vaikinai buvo labiau linkę manyti, kad įrankis CmapTools buvo naudingas jų skaitymo išgūdziams tobulinti nei merginos (Mann-Whitney U $z=-2.001$, $p=0.0432$). Apibendrinus gautus rezultatus nustatyta, kad tarp demografinio veiksnio lytis ir suvokiama įrankio CmapTools teikiama nauda egzistuoja neigiamas statistiškai reikšmingas, tačiau silpnas ryšys, ($r=-0.287$, $p<0.05$), vadinasi, hipotezę H_{9B} priimame.

Tikrintos dvi hipotezės H_{9C} : *studentų gimtoji kalba turi ryšį su suvokiama įrankio CmapTools nauda* bei H_{9D} : *studentų vartojama kalba internete turi ryšį su suvokiama įrankio CmapTools nauda*. Statistiškai reikšmingų ryšių tarp studentų gimtosios kalbos ir jų suvokimo apie įrankio teigiamą naudą nerasta, vadinasi, hipotezę H_{9C} galime atmesti. Visgi nustatyta, kad tarp demografinio veiksnio kalba, kurią studentai dažniausiai vartoja internete ir suvokiama įrankio CmapTools teikiama nauda egzistuoja neigiamas, statistiškai reikšmingas, tačiau silpnas ryšys ($r=-0.350$, $p<0.05$), todėl hipotezę H_{9D} priimame.

Tikrintos trys hipotezės H_{9E} : *studentų gebėjimas naudotis antrosios kartos saityno įrankiais turi ryšį su suvokiama įrankio CmapTools nauda*, H_{9G} : *studentų gebėjimas naudotis įrankiu CmapTools turi ryšį su suvokiama įrankio CmapTools nauda* bei H_{9H} : *dalyko „Profesinė anglų kalba“ lankomumas turi ryšį su suvokiama įrankio CmapTools nauda*. Nė vienu atveju statistiškai reikšmingų ryšių tarp kintamųjų neaptikta, vadinasi, hipotezių H_{9E} , H_{9F} ir H_{9G} priimti negalime.

Tikrinta hipotezė H_{10} : *demografiniai veiksniai turi ryšį su suvokiamu įrankio CmapTools naudojimo paprastumu*. Nustatyta, kad studentų suvokimui apie įrankio CmapTools naudojimo paprastumą įtakos turėjo tik du demografiniai veiksniai, t. y. jų gebėjimas naudotis antrosios kartos saityno įrankiais ($r=0.284$, $p<0.05$), ir aukštojo mokslo institucija ($r=-0.350$, $p<0.05$), todėl priimti galime tik hipotezes H_{10F} ir H_{10A} . Siekiant nustatyti, kurioje respondentų grupėje (Mykolo Romerio universitete ar Vilniaus kolegijoje) suvokiamos naudojimo paprastumo konstrukto vertinimai yra stipriau išreikšti, buvo pritaikytas neparimetrinis Mann-Whitney kriterijus. Remdamiesi gautais rangais, galime teigti, kad Mykolo Romerio universiteto studentai (rangų vidurkis 32.63) labiau suvokė įrankio CmapTools naudojimo paprastumą nei Vilniaus kolegijos studentai (rangų vidurkis 18.43). Statistiškai reikšmingų sąsajų tarp likusių demografinių veiksnių: studentų lyties, jų gimtosios kalbos, kalbos, kurią jie vartoja internete, anglų kalbos žinių lygmens įsivertinimo, gebėjimo naudotis įrankiu CmapTools, dalyko lankomumo bei konstrukto suvokimas apie įrankio CmapTools naudojimosi paprastumą neaptikta. Vadinasi, hipotezių H_{10B} , H_{10C} , H_{10D} , H_{10E} , H_{10G} ir H_{10H} priimti negalime.

Septintas skyrius. Mokslinė diskusija. Šio disertacinio darbo tikslas buvo atskleisti antrosios kartos saityno technologijų svarbą aukštajame moksle, įvertinti pasirinktos technologijos (šiuo atveju CmapTools) įtaką profesinės anglų kalbos studentų kalbiniam pasie-

kimams bei nustatyti veiksnius, darančius įtaką šios technologijos priėmimui. Struktūros požiūriu disertacija susideda iš dviejų skirtingus probleminius laukus nagrinėjančių dimensijų: antrosios kartos technologijų efektyvumo ir jų priėmimo profesinės anglų kalbos studijose aukštajame moksle. Empirinio tyrimo dalis, nagrinėjanti antrosios kartos saityno technologijos *CmapTools* efektyvumą profesinės anglų kalbos studijose, siekė atsakyti į du klausimus. Vienas jų – *kokią įtaką ši technologija, naudojama profesinės anglų kalbos studijose, daro studentų profesinės anglų kalbos žodyno įsisavinimo pažangai?* Gauti rezultatai rodo labai pozityvią tendenciją, liudijančią apie technologijos efektyvumą, ugdant būtent šią probleminę profesinės anglų kalbos veiklą. Išanalizavus pažangos testų 1 ir 2 rezultatus eksperimentinėse ir kontrolinėse grupėse tiek bendrame tyrimo kontekste, tiek kiekvienoje tyrime dalyvavusioje aukštojo mokslo institucijoje atskirai, galime pagrįstai teigti, kad taikant pedagoginę intervenciją, kai studijų dalyko profesinė anglų kalba studijose buvo naudojama antrosios kartos saityno technologija *CmapTools*, pažangos testų rezultatai eksperimentinėje tyrimo dalyvių grupėje buvo akivaizdžiai aukštesni nei kontrolinėje, kur dalyko studijos vyko įprasta tvarka. Vadinas, galime daryti išvadą, kad egzistuoja priežastinis ryšys tarp antrosios kartos saityno technologijos *CmapTools* taikymo ir profesinės anglų kalbos studentų kalbinių (žodyno įsisavinimo) pasiekimų. Kartais, kaip pastebi Means et al. (2009), geresni rezultatai pasiekti mokantis mišrioje studijų aplinkoje (kaip ir šiuo aptariamu atveju), gali būti sietini su faktu, kad pati studijų aplinka dažnai reiškia papildomus mokymo(si) resursus, daugiau dėmesio konkrečiai veiklai, daugiau sąveikos tarp visų mokymo(si) proceso dalyvių. Tačiau neturėtume pamiršti, kad į studijų aplinką integravus naują, „nepažįstamą“ technologiją, studentams tenka ir didesnė kognityvinio krūvio našta, nei tiems, kurie su tokia technologija sąveikos neturi. Šiame konkrečiame tyrime eksperimentinių grupių studentai ne tik mokėsi profesinės anglų kalbos, bet ir turėjo išmokti kurti sąvokų žemėlapius (dauguma teigė to niekada nedarę anksčiau), juos interpretuoti, taip pat dirbti su programine įranga (su ja nė vienas dalyvis taip pat nebuvo susidūręs anksčiau). Be abejo, jiems buvo siūloma dėstytojo parama (pvz., pateikiant vadinamuosius sąvokų žemėlapių skeletus, kuriuos studentai turėdavo „aplipdyti“ trūkstamomis sąvokomis), tačiau dažnai studentai žemėlapius kūrė visiškai savarankiškai, ir tai galima pavadinti savotišku iššūkiu, ypač intervencijos pradžioje. Taip pat nesinorėtų nuvertinti kontrolinėse tyrimo grupėse dirbusių dėstytojų pastangų, teigiant kad jų taikoma „tradicinė“ metodika buvo blogesnė: tyrimo rezultatai rodo, kad teigiamas pokytis buvo pastebimas ir kontrolinių grupių rezultatuose. Visgi eksperimentinėse grupėse visais atvejais jie buvo akivaizdžiai aukštesni. Ellis (2004) teigia, kad yra net kelios priežastys, dėl kurių bet kokios rūšies grafinių įrankių (tiek mechaninių, tiek kompiuterinių) naudojimas mokymo(si) procese gali būti siejamas su aukštesniais testų vertinimais: pirma, grafinių vaizdų naudojimas dalyko studijose padeda studentams giliau suvokti dalyko turinį ir jį išmokti, antra, jie padeda studentams suvokti hierarchinius ryšius tarp kelių esminių idėjų arba tarp esminių idėjų ir jų detalių (Ellis, 2004, p. 3). Galime daryti išvadą, kad būtent šios priežastys lemia ir grafinio antrosios kartos saityno technologijos *CmapTools* efektyvumą profesinės anglų kalbos žodyno ugdymui, ypač, kai technologija yra naudojama bendradarbiaujant, dalijantis idėjomis, gaunant nuolatinę ir įvairiapusę dėstytojo paramą (angl. scaffolding), t. y. naudojant ją palankioje mokymo(si) aplinkoje.

Empiriniu tyrimu taip pat siekta atsakyti į klausimą, *kokią įtaką profesinės anglų kalbos studijose naudota antrosios kartos saityno technologija CmapTools daro studentų profesinės anglų kalbos teksto suvokimo pasiekimams*. Visų pirma, rezultatų analizė rodo, kad ir abiejų autentiško teksto apžvalgų rezultatai eksperimentinėse grupėse, kur buvo naudojama aptariama technologija, buvo aukštesni nei kontrolinėse, kur technologija naudojama nebuvo. Galėtume daryti pirminę išvadą apie technologijos efektyvumą ir ugdant profesinės anglų kalbos studentų autentiško teksto suvokimo gebėjimus, juo labiau, kad panašius rezultatus galime aptikti ir užsienio mokslininkų Roy (2017) bei Soleimani ir Rostami abu Saeedi (2016) eksperimentinėse studijose, tyrusiose technologijos *CmapTools* efektyvumą profesinės anglų kalbos studentų skaitymo pasiekimams. Abiem atvejais eksperimentinių grupių studentų rezultatai buvo aukštesni nei kontrolinių, ir šis skirtumas buvo statistiškai reikšmingas. Deja, toks skirtumas nepastebėtas analizuojant šiame empiriniame tyrime dalyvavusių eksperimentinių ir kontrolinių grupių rezultatus nei kiekvienoje aukštojo mokslo institucijose atskirai, nei bendrame tyrimo kontekste, vadinasi teigti, kad technologija buvo efektyvi autentiško teksto suvokimo ugdymui, negalime. Kitas gana netikėtas atradimas laukė įvertinus pirmos ir antros autentiško teksto apžvalgos rezultatų dinamiką bendrame tyrimo kontekste. Buvo viliamasi, kad intervencijos pabaigoje, kai eksperimentinių grupių studentai bus įvaldę darbo su *CmapTools* techniką ir gerai žinos sąvokų žemėlapių kūrimo ypatumus, atkuriant analizuojamą tekstą, šios užduoties rezultatų vidurkiai pagerės. Kitaip tariant, buvo tikimasi, kad intervencijos pabaigoje studentų galios bus pakankamai stiprios atlikti užduotis savarankiškai. Visgi, kaip matome antrame paveiksle, nedidelė pažanga pastebima tik gretinat kontrolinių grupių pirmos ir antros autentiško teksto apžvalgos rezultatus. Eksperimentinėse grupėse, priešingai, fiksuojamas rezultatų pablogėjimas. Šie radiniai prieštarauja užsienio mokslininkų tyrimų rezultatams. Pavyzdžiui, Omar (2015) atlikto kvazi-eksperimento tikslas buvo ištirti *CmapTools* pagalba kuriamų žemėlapių metodo įtaką vieno Saudo Arabijos karalystės universiteto profesinės anglų kalbos medicinos studentų teksto suvokimo įgūdžiams. Tyrimo rezultatai rodo, kad mokymosi strategija, kuomet pasitelkus *CmapTools* buvo kuriami sąvokų žemėlapiai perskaitytams profesinės srities tekstams atvaizduoti, buvo efektyvi ir turėjo teigiamos įtakos tyrime dalyvavusių studentų teksto suvokimo įgūdžiams. Nustatyta, kad eksperimentinės grupės studentų skaitymo testo pažymių vidurkis 20-balėje vertinimo sistemoje kito nuo 11.04 prieš taikant intervenciją iki 15.64 po intervencijos taikymo. Šios disertacijos empirinio tyrimo metu gauti visiškai kitokie rezultatai, tačiau nepaisant to, jie leidžia daryti tam tikras išvadas ir interpretacijas. Visų pirma, rezultatų pablogėjimas antros apžvalgos atveju gali būti sietinas su dėstytojo paramos elemento eliminavimu. Būtent šios paramos ir bendradarbiavimo dialogo svarbą akcentuoja užsienio autoriai (Soleimani, & Rostami abu Saeedi, 2016; Balula, Martins, & Marques, 2014), tyrę *CmapTools* efektyvumą įvairių profesinės anglų kalbos sričių tekstų skaitymo suvokimui. Antra, Vygotskio *sociokultūrinė teorija* teigia, kad internalizacija, t. y. besimokančiojo gebėjimas asmeniškai įprasminti iš sociokultūrinės aplinkos perimtą informaciją, ženklus ar simbolius, yra ilgalaikio, daugiapakopio proceso rezultatas. Gali būti, kad viena priežasčių, nulėmusių pablogėjimą aptariamose kalbinės veiklos rezultatuose buvo ta, kad intervencija, naudojant technologiją *CmapTools* truko vos vieną studijų semestrą. Gali būti, kad per tokį trumpą periodą tyrimo dalyviai tiesiog nespėjo at-

siskleisti ir parodyti stipriųjų savo galių. Trečia, neturėtume ignoruoti ir fakto, kad sudėtingo autentiško profesinės anglų kalbos teksto skaitymas ir analizavimas įrankio *CmapTools* pagalba iš studentų pareikalavo papildomų protinių pastangų.

Kaip matome, rezultatai, susiję su antrosios kartos saityno technologijos *CmapTools* efektyvumu profesinės anglų kalbos studijose yra dvejetaini. Technologijos naudojimas labai pasiteisino ugdant profesinės anglų kalbos studentų žodyno įsisavinimo gebėjimus, tačiau nebuvo toks efektyvus, ugdant autentiško teksto suvokimo gebėjimus. Kaip šią technologiją priėmė ir jos naudojimą dalyko studijoje įvertino patys studentai? Siekiant atsakyti į šiuos klausimus, o taip pat aiškinantis, *kokie veiksniai daro įtaką profesinės anglų kalbos studijose naudotos antrosios kartos saityno technologijos CmapTools priėmimui*, buvo atlikta eksperimentinių grupių studentų apklausa, remiantis teoriniu *Technologijų priėmimo modeliu* (TAM) (Davis, Bagozzi & Warshaw, 1989). Modelis teigia, kad bet kurios technologijos priėmimas yra lemiamas kelių svarbių glaudžiai susijusių veiksnių: vartotojo suvokimo apie technologijos teikiamą naudą ir jos naudojimo paprastumą, vartotojo požiūrio į technologijos naudojimą, ketinimo naudoti ją ateityje ir galiausiai faktinio naudojimo. Kai vartotojas suvokia, kad nauja technologija yra nesudėtinga ir paprasta naudotis, susiformuoja pozityvus jo(-s) požiūris į teikiamą tos technologijos naudą. Ši teigiama patirtis gali nulemti asmens ketinimą tęsti naujovės vartojimą. Priešingai, neigiama patirtis, kildinama iš labai sudėtingo technologijos naudojimo, nepasiteisinsiu lūkesčių, gali paskatinti vartotoją atmesti naujovę ir daugiau jos nebenaudoti. Vartotojo apsisprendimui įtakos gali turėti ir kiti: individualūs ar išorinės aplinkos veiksniai. Atlikus mokslinės literatūros analizę, matome, kad siekdami suprasti kaip profesinės anglų kalbos studijose naudojamas antrosios kartos saityno technologijas vertina studentai, teorinį Technologijų priėmimo modelį pasitelkia nemažai užsienio tyrėjų (Tarhini et al., 2015; Yea-Ru Tsai, 2015; Cakir & Solak, 2014; Yu-Li, 2014; Ramazani et al., 2013). Dauguma jų patvirtina ryšius tarp aukščiau aptartų modelio kintamųjų, tačiau, atsižvelgdami į tyrimo kontekstą, siūlo į jį įtraukti įvairius papildomus veiksnius.

Įvertinus atliktos mokslinės analizės radinius, šiam tyrimui suformuluotos 5 hipotezės, nagrinėjančios vidinius ryšius tarp Technologijų priėmimo modelio elementų, 3 hipotezės, nagrinėjančios papildomai įvesto veiksnio Informuotumas sąsajas su vidiniais modelio elementais ir 2 hipotezės analizuojančios ryšius tarp išorinių veiksnių, t.y., demografinių studentų charakteristikų ir kontekstinių indikatorių bei dviejų svarbiausių modelio konstrukčių: *suvokiamos naudos* ir *suvokiamo naudojimo paprastumo*. Statistinė rezultatų analizė pilnai patvirtino visas hipotezes, nagrinėjusias vidinius ryšius tarp esminių Technologijų priėmimo modelio konstrukčių. Matyti, kad tyrimo dalyviai antrosios kartos saityno technologiją *CmapTools* traktavo kaip vartotojams draugišką įrankį (taip, kaip ir numatė technologijos kūrėjai Novak ir Cañas), teigdami, kad jiems buvo paprasta įrankį įvaldyti, juo buvo nesunku naudotis ir kad jį pasitelkus, mokytis profesinės anglų kalbos buvo lengva. Šios teigiamos patirtys, be jokios abejonės, turėjo reikšmingos įtakos, formuojantis tyrimo dalyvių suvokimui apie įrankio teikiamą naudą ir leido patvirtinti hipotezę H₁. Tai, kad šis suvokimas ateina tuomet, kai pastebima, kad technologija nėra sudėtinga naudotis ir kad ji palengvina vartotojui svarbių veiklų atlikimą, patvirtino ir daugybė užsienio mokslininkų (Davis, 1985; Davis, Bagozzi & Warshaw, 1989; Venkatesh et al., 2003; Gamble, 2017; Van de Bogard &

Wichadee, 2015; Afshari et al., 2013; Tajuddin et al., 2012). Technologijų priėmimo modelis numato, kad abu aukščiau aptarti kintamieji: *suvokiama nauda* ir *suvokiamas naudojimo paprastumas* yra labai svarbūs formuojantis vartotojų *požiūriui* į naudojamą technologiją. Keičiantis jų nuomonei apie naudojamos technologijos savybes, keičiasi ir jų *požiūris* į šią technologiją. Koreliacinė analizė rezultatai rodo, kad ši taisyklė galioja ir antrosios kartos saityno technologijos *CmapTools* naudojimo profesinės anglų kalbos studijose atveju: patvirtintos hipotezės H_2 ir H_3 . Labai panašius rezultatus pateikia ir autoriai Yu-Li Chen (2014) bei Afshari et al. (2013), nustatę stiprų koreliacinį ryšį tarp suvokiamos naudos ir suvokiamo naudojimo paprastumo bei studentų *požiūrio* į profesinės anglų kalbos studijų metu taikytas įvairias antrosios kartos saityno technologijas. Kaip ir tikėtasi, *suvokiamos technologijos CmapTools naudos* veiksnys koreliavo su *studentų ketinimu ja naudotis ateityje*, todėl hipotezė H_4 taip pat priimama. Studentų atsakymai sufleruoja, kad jie ir toliau yra nusiteikę įrankį naudoti studijose, o tai yra vienas iš indikatorių, liudijančių naudotos technologijos sėkmę. Nustatyta, kad šiam ketinimui reikšmingos įtakos turėjo dar keli veiksniai, t. y. pozityvus studentų *požiūris* į įrankį *CmapTools* (priimama hipotezė H_5), taip pat jų *informuotumas* apie įrankį (priimama hipotezė H_6). Šie radiniai atliepia autoriaus Bates (2015) pastebėjimus, kad dėstytojams yra būtina iškomunikuoti technologijos integravimo tikslus studentams, taip pat pateikti kuo išsamesnės informacijos apie jos naudojimą. Kuo labiau pastarieji bus susipažinę su siūlomos technologijos funkcijomis ir charakteristikoms, tuo didesnė tikimybė, kad jie naudosis technologija ateityje. Nustatyta, kad *informuotumas* turėjo reikšmingų sąsajų ir su anksčiau aptartais *suvokiamos naudos* ir *suvokiamo naudojimo paprastumo* elementais. Kaip jau minėta, pastarieji yra atsakingi už pozityvaus vartotojo *požiūrio* į technologiją (šiuo atveju į *CmapTools*) formavimą. Patvirtintos dar dvi hipotezės: H_7 ir H_8 .

Tyrime tikrintos ir hipotezės apie sąsajas tarp demografinių studentų charakteristikų ir minėtų dviejų svarbiausių Technologijų priėmimo modelio konstrukčių: *suvokiamos naudos* ir *suvokiamo naudojimo paprastumo*. Nustatytas silpnas, bet visgi statistiškai reikšmingas ryšys tarp studentų *lyties* ir *suvokiamos* įrankio *CmapTools* naudos. Paaiškėjo, kad naudotos technologijos naudą dėl nežinomų priežasčių labiausiai įžvelgė vaikinai. Šiuos rezultatus veikiausiai būtų galima susieti su Venkatesh ir Morris (2000) tyrimo, paremto Technologijų priėmimo modeliu, rezultatais. Pastarieji atskleidė, kad vyrų ketinimus naudoti technologija ateityje apsprendė suvokiamos naudos veiksnys, o moterų ketinimams didesnę įtaką darė suvokiamo naudojimosi paprastumo veiksnys. Kitas svarbus demografinis veiksnys, turėjęs reikšmingos įtakos studentų suvokimui apie įrankio *CmapTools* teikiamą naudą profesinės anglų kalbos studijose buvo *kalba*, kurią jie paprastai vartoja individualioms veikloms internete. Gauta neigiama koreliacija leidžia daryti išvadą, kad studentai, kurie savo įprastinėms veikloms internete atlikti yra linkę internete vartoti anglų kalbą, labiau įžvelgia įrankio teikiamą naudą nei tie, kurie internete vartoja gimtąją (lietuvių, rusų ar lenkų kalbą). Tokia išvada peršasi todėl, kad įrankio darbinė aplinka bei gairės vartotojui yra pateikiamos ne jų gimtąja kalba ar kalba, kurią jie įprastomis sąlygomis vartoja internete, o anglų kalba. Visgi ryšių tarp studentų *gimtosios kalbos*, jų *anglų kalbos žinių lygio įsivertinimo*, *gebėjimo naudotis antrosios kartos saityno technologijomis įsivertinimo*, *gebėjimo naudotis įrankiu CmapTools įsivertinimo*, *dalyko Profesinė anglų kalba lan- komumo įsivertinimo* ir *suvokiamos technologijos CmapTools naudos* neaptikta.

Tik vienas demografinių veiksnių, t. y. *studentų gebėjimas naudotis antrosios kartos saityno technologijomis įsivertinimas*, turėjo reikšmingų sąsajų su *suvokiamo naudojimosi paprastumo* veiksmu. Darome išvadą, kad kuo labiau studentai buvo susipažinę su antrosios kartos saityno įrankiais ir jų naudojimosi ypatumais, tuo lengviau jiems sekėsi įvaldyti įrankį *CmapTools* profesinės anglų kalbos studijose. Tai, kad kiti demografiniai veiksniai sąsajų su šiuo konstruktu neturėjo, suponuoja išvadą, kad naudotis įrankiu *CmapTools* buvo vienodai paprasta ar sunku ir vaikinams, ir merginoms. Šiuo atveju studentams nepatogumų nekėlė ir faktas, kad įrankio darbinė aplinka buvo pateikiama ne jų gimtąja, o anglų kalba. Rezultatai taip pat rodo, kad įrankiu buvo vienodai lengva (arba sunku) naudotis tiek studentams, kurie savo anglų kalbos žinias įvertino aukštu balu, tiek tiems, kurie savo žinias vertino kritiškai. Didelės įtakos studentų suvokimui apie įrankio naudojimo paprastumą neturėjo ir dalyko *Profesinė anglų kalba* lankomumas. Vadinas, galime teigti, kad įrankiu vienodai paprasta buvo dirbti tiek bendradarbiaujant, tiek individualiai, pvz., atliekant namų skaitymo užduotis, ir tai tik įrodo jo universalumą.

Tiesa, derėtų paminėti, kad buvo dar vienas veiksnys, turėjęs reikšmingos įtakos aukščiau aptartiems *suvokiamos naudos* ir *suvokiamo naudojimo paprastumo* konstruktsams. Tai *aukštojo mokslo institucijos*, kurioms priklausė tyrimo dalyviai, veiksnys. Buvo nustatyta, kad įverčiai, susiję ir su *CmapTools teikiama nauda*, ir su *naudojimo paprastumu* buvo stipresni Mykolo Romerio universitete studijavusių dalyvių grupėje. Be abejo, planuojant tyrimą, buvo siekiama kiek įmanoma labiau suvienodinti sąlygas abiejose jame dalyvavusiose institucijose, visgi tam tikri skirtumai neišvengiamai išliko (pvz., skirtingos kryptių studijų programos, skirtingi studijų dalyko dėstytojai, didesnis vaikinių skaičius nei merginų). Be to, skirtingai nei tyrime dalyvavusi dėstytoja iš Vilniaus kolegijos, dalyko dėstytoja Mykolo Romerio universitete buvo dar ir šio tyrimo iniciatorė. Nors buvo imtasi visų įmanomų priemonių eliminuoti veiksnys, galėjusius kelti grėsmę išoriniam tyrimo validumui (pvz., kitiems tyrimo dalyviams nebuvo atskleistos tyrimo hipotezių formuluotės), gali būti, kad tebeišliko vadinamojo tyrėjo lūkesčio efekto (angl. *experimenter expectancy*) galimybės dalėlė. Dėl šios priežasties, šis radinys priskirtinas tyrimo ribotumams.

Tyrimo ribotumai. Siekiant atsakyti į šio tyrimo klausimus, pasirinkta kiekybinė priemonė ir kvazi-eksperimentinis tyrimo dizainas, o tiksliau – *static-group comparison* dizaino variantas, kuris pasižymi tuo, kad jame nėra vadinamojo pre-testo. Pre-testo nebuvimas apsunkina ugdomosios įtakos efektyvumo vertinimą, kadangi rezultatų kitimo priežastimi gali būti ir įvairūs šalutiniai veiksniai. Tyrimo kokybę lemia ne tik tinkamai pasirinkta metodologija ar instrumentas, bet ir tyrimo imties sudarymo strategijos pasirinkimas bei tyrimo imties dydis. Šio tyrimo imtis buvo nerandomizuota, t. y. sudaryta patogiosios atrankos būdu, kai į tyrimą yra įtraukiami tie generalinės imties vienetai, kurie yra labiausiai prieinami tyrėjui. Šiuo atveju imtis buvo gana nedidelė – 107 aukštųjų mokyklų studentai. Atsižvelgiant į šiuos argumentus, tolimesniuose panašaus pobūdžio tyrimuose derėtų rinktis stipresnį tyrimo dizainą. Esant galimybėms, tiriamųjų imtį patartina formuoti randomizuotai. Esant galimybėms, pasirinktos antrosios kartos saityno technologijos efektyvumui ir priėmimui tirti, patartina būtų rinktis ir ilgesnį nei vieno studijų semestro laiko tarpą. Be to, siekiant eliminuoti anksčiau minėto tyrėjo lūkesčio efekto (angl. *experimenter expectan-*

cy) galimybę, tyrėjams derėtų aiškiai apibrėžti savo vaidmenų ribas, t. y. vengti dėstytojo ir tyrėjo rolių dubliavimosi. Galiausiai, siekiant gauti giluminių žinių, pagrindžiančių kiekybinio tyrimo radinius apie antrosios kartos saityno technologijų priėmimą profesinės anglų kalbos studijose, būtų rekomenduotina pasitelkti ir su kokybine prieiga siejamus metodus, pavyzdžiui, interviu ar fokusuotos grupės metodą.

Rekomendacijos dėstytojams praktikams:

- prieš integruojant antrosios kartos saityno technologiją *CmapTools* į profesinės anglų kalbos dalyko studijas, rekomenduojama atidžiai įvertinti studijų proceso dalyvių poreikius ir studijų dalyko siekinius. Jei siekiate ugdyti studentų kalbėjimo ar klausymo įgūdžius, šios technologijos taikymas gali neatliepti jūsų lūkesčių. Rinkitės ją, jei turite tikslą padėti studentams įsisavinti profesinės anglų kalbos dalyko turinį bei žodyną, norite palengvinti dalykinės srities tekstų analizę.
- antrosios kartos saityno technologija *CmapTools*, be abejonės, traktuotina kaip vartotojams draugiškas įrankis. Visgi įvertinus jo techninių charakteristikų ir funkcijų gausą, būtų patartina išstudijuoti oficialioje *CmapTools* svetainėje pateikiamą atminčinę vartotojui bei peržiūrėti *YouTube* platformoje įkeltą mokomąją vaizdo medžiagą anglų kalba.
- gali būti, kad jūsų studentai neturės pakankamai žinių apie sąvokų žemėlapių metodą ir jų kūrimo specifiką. Tikėtina, kad prieš pradėdant naudoti programinę įrangą, jiems prireiks įvadinių užsiėmimų, skirtų ne tik susipažįstant su įrankiu, bet ir aiškinantis, kas yra sąvoka kuriant sąvokų žemėlapius popieriuje ir juos analizuojant, todėl kruopščiai įvertinkite laiko sąnaudas.
- tikėtina, kad mokantis dirbti su įrankiu, o ypač kuriant sąvokų žemėlapių „skeletus“ analizuojamai dalyko temai, nemažai laiko prireiks ir jums. Jūsų pastangos ir laiko investicijos tikrai atsipirks, kai įvaldysite įgūdžius ir kai savo sukurtą „produktą“ galėsite pritaikyti darbui ateityje.

Išvados:

1. Antros kartos saitynas, spartaus mokslo, ekonomikos ir technologijų vystymosi padarinys, apibrėžiamas kaip naujos kartos žiniatinklis bei jo technologijos, leidžiančios vartotojams interaktyviai bendrauti, bendradarbiauti ir dalytis informacija. Antrosios kartos saityno technologijų skvarba į mūsų gyvenimus pakeitė ne tik mūsų bendravimo ypatumus, bet ir mūsų žinių konstravimo modelius bei mokymo(si) proceso sampratą. Tradicinį mokytojo vadovaujamą mokymą(si) pamažu išstumia kitos, lankstesnės, nukreiptos į besimokantįjį jo alternatyvos: *sinchroniškai paskirstytas mokymas(is)*, *internetu grįstas mokymas(is)*, *mišrus/ hibridinis mokymas(is)*, *mišrus/ hibridinis nuotolinis mokymas(is)*, *distancinis mokymas(is)*, *lankstusis mokymas(is)*. Naudodami antrosios kartos saityno technologijas suvokiame, kad mokymas(is) iš esmės gali vykti bet kur ir bet kada, ir kad mokytojas jau niekada nebebus vienintelis žinių šaltinis: turime galimybę naudotis nevaržoma prieiga prie informacinės medžiagos; jos turinį galime kopijuoti, papildy-

- ti, koreguoti, publikuoti, juo dalytis galime su kitais mokymo(si) proceso dalyviais. Be to, esame mokymo (si) teorijų paradigimų kaitos liudininkai: matome, kad kognityvinių ar biheivoristinį požiūrį į mokymą(si) išstumia konstruktyvistinis ir konektyvistinis modelis. Pastarasis dažnai įvardijamas kaip požiūris, o kartais net ir kaip mokymo(si) teorija, labiausiai atspindinti skaitmeninio amžiaus naujoves. Visgi pastebime, kad ji dažniausiai siejama su trečiaja nuotolinio švietimo karta, be to, sulaukia kritikos dėl negebėjimo detalizuoti, kaip konstruojamos žinios ir mokoma(si) tinklaveikos procese.
2. Sąvoka „profesinė anglų kalba“ šioje disertacijoje apibrėžiama kaip į specifinius besimokančiųjų poreikius orientuotas anglų kalbos mokymas aukštojoje mokykloje, siekiantis ugdyti su konkrečia profesija ar specialybe susijusius anglų kalbos įgūdžius. Antrosios kartos saityno technologijos šios disciplinos studijose plačiai taikomos nuo pat jų atsiradimo. Visgi atlikus literatūros analizę, kuria siekta apžvelgti naujausius empirinius tyrimus, pateikiančius konkrečių pavyzdžių apie efektyvų šių technologijų naudojimą profesinės anglų kalbos studijose aukštajame moksle, buvo pastebėtos tokios tendencijos:
- labiausiai šioje srityje taikomi ir analizuojami yra *tinklaraščiai*, *socialiniai tinklai*, *vikiai* ir *virtualiosios realybės* įrankiai. Šios literatūros analizės duomenis palyginus su ankstesnių aptariamos srities literatūros apžvalgų rezultatais, peršasi išvada, kad labiausiai stokojama išsamių tyrimų, liudijančių apie *grafinių vaizdų įrankių*, *audio įrankių*, *daugiarežimio kūrimo* įrankių, žinių valdymo ir dalijimosi įrankių, *duomenų analizės įrankių*, *laiko juostų* bei įsivertinimo įrankių efektyvumą profesinės anglų kalbos studijose aukštajame moksle.
 - daugumoje apžvelgtų empirinių tyrimų diskutuojama apie antrosios kartos saityno technologijų efektyvumą profesinės anglų kalbos studentų *rašymo* įgūdžių ugdymui. Kitos kalbinės veiklos ir sritys, sėkmingai ugdomos šių technologijų pagalba, tačiau sulaukė daug mažesnio tyrėjų dėmesio, yra *skaitymas*, žodyno įsisavinimas, *klausymas* ir *kalbėjimas*. Tik keliuose tyrimuose šios veiklos ugdomos segreguotai; daugumoje atvejų konkreti antrosios saityno technologija pasitelkiama siekiant ugdyti kelias kalbines veiklas, taip pat profesinės anglų kalbos studentų komunikacinę ir tarpkultūrinę kompetenciją, žanro suvokimą ir pan.
 - daugiausia remiamasi *konstruktyvizmo* arba *socialinio konstruktyvizmo* paradigmos, pavieniuose tyrimuose aptinkame nuorodų į *konektyvizmo* mokymo (si) teoriją, *Krashen įvesties hipotezę*, minimas *Turinio ir kalbos integruotas mokymas* (CLIL). Visgi gana netikėtas atradimas yra tas, kad beveik pusės analizuotų publikacijų autoriai, dalindamiesi patirtimi apie vienos ar kitos saityno technologijos efektyvumą profesinės anglų kalbos studijose, nepateikia jokio teorinio pagrindimo. Vadinasi, stokojama stebėjimo faktais paremtų ir moksliško kriterijus atitinkančių strategijų, kuriomis vadovaujantis būtų galima efektyviai taikyti antrosios kartos saityno technologijas profesinės anglų kalbos studijose, tikintis, kad jos prisidės prie rezultatų gerinimo.
3. Antrosios kartos saityno technologijų *priėmimas* šioje disertacijoje apibrėžiamas kaip varotojų sąveika su konkrečia antrosios kartos saityno technologija ir jų psichologinis nusiuteikimas ta technologija naudotis ateityje. Literatūros analizė parodė, kad profesinės anglų kalbos mokymo(si) srityje antrosios kartos saityno technologijų priėmimas dažnai yra

tiriamas, pasitelkus teorinį *Technologijų priėmimo modelį* (angl. Technology Acceptance Model) (TAM) (Davis, Bagozzi & Warshaw, 1989). Analizuojamos srities tyrimų rezultatai parodė, kad modelis gali nuosekliai paaiškinti didelę dalį priežasčių apie studentų naudojimo elgsenos ketinimus vienos ar kitos antrosios kartos saityno technologijos atžvilgiu. Kai jie suvokia, kad technologija nėra sudėtinga naudotis, formuojasi palankus požiūris į teikiamą tos technologijos naudą. Ši pozityvi patirtis gali daryti įtaką optimistinėmis ateities perspektyvomis, technologijos naudojimo atžvilgiu. Teigiamam ar neigiamam apsisprendimui įtakos gali turėti ir individualūs ar išorinės aplinkos veiksniai, tačiau kaip rodo literatūros analizės rezultatai, duomenų apie šių veiksnių įtaką antrosios kartos saityno technologijų priėmimui profesinės anglų kalbos studijose stokojama.

4. *CmapTools* yra kompiuterinė programa, apie 2000 m. sukurta Floridos Žmogaus ir mašinių instituto (IHMC) mokslininkų Novak ir Cañas atliktų tyrimų pagrindu. *CmapTools* pagalba kuriami sąvokų žemėlapiai: juose vaizduojamos naujos arba išskirtinės sąvokos, parodant jų prasminius ryšius su kitomis sąvokomis ir šių ryšių hierarchinę struktūrą. *CmapTools* nėra įtrauktas į Bower (2015) sudarytą edukacinių antrosios kartos saityno technologijų klasifikaciją, jo nerasime ir Orehovački, Bubaš ir Kovačić (2012) trijų dimensijų edukacinių antrosios kartos saityno technologijų modelyje, tačiau įvertinus technologijos charakteristikas, ji priskirtina sinchroninių grafinių vaizdų kūrimo įrankių tipui Bower (2015) klasifikacijoje arba žinių valdymo įrankiams Orehovački, Bubaš ir Kovačić (2012) modelyje, papildant juos sąvokų žemėlapių kūrimo kategorija. Galimas teorinis technologijos naudojimo pagrindas – *sociokultūrinė teorija* (Vygotsky, 1978), *asimiliacijos mokymosi teorija* (Ausubel, Novak, 1970). Šios dvi teorijos neatsitiktinai pasirinktos ir integruojant technologiją į dvių studijų programų profesinės anglų kalbos dalyko turinį.
5. Antrosios kartos saityno technologijos *CmapTools efektyvumas* šioje disertacijoje apibrėžiamas kaip vertinimas, ar technologija turėjo teigiamos įtakos profesinės anglų kalbos studentų pasiekimams, o jei taip, tai kokio dydžio ta įtaka buvo. Gauti rezultatai parodė labai pozityvią tendenciją, liudijančią apie technologijos efektyvumą, ugdant profesinės anglų kalbos žodyno įsisavinimo gebėjimus. Išanalizavus pažangos testų rezultatus eksperimentinėse ir kontrolinėse grupėse tiek bendrame tyrimo kontekste, tiek kiekvienoje tyrime dalyvavusioje aukštojo mokslo institucijoje atskirai, galime pagrįstai teigti, kad taikant pedagoginę intervenciją, kai studijų dalyko profesinė anglų kalba studijose buvo naudojama antrosios kartos saityno technologija *CmapTools*, pažangos testų rezultatai eksperimentinėje tyrimo dalyvių grupėje buvo akivaizdžiai aukštesni nei kontrolinėje, kur dalyko studijos vyko įprasta tvarka. Vadinasi, galime daryti išvadą, kad egzistuoja priežastinis ryšys tarp antrosios kartos saityno technologijos *CmapTools* taikymo ir profesinės anglų kalbos studentų kalbinių (žodyno įsisavinimo) pasiekimų. Be to, pedagoginis eksperimentas buvo atliekamas dviejose skirtingas mokslo kryptis atstovaujančiose studijų programose. Tai, kad aptariama technologija buvo efektyvi tiek ugdant profesinės anglų kalbos žodyną teisės ir muitinės veiklos srityje (socialiniai mokslai), tiek kompiuterių sistemų kontekste (inžinerijos mokslai), įrodo jos universalumą ir tinkamumą naudoti įvairių profesinės anglų kalbos sričių studijose. Visgi *CmapTools* (kaip ir bet kurios kitos technologijos) naudojimas moksle negali būti savi-

tikslis. Prieš integruojant ją į dalyko studijas, būtina įvertinti studijų kontekstą, tikslus, studentų poreikius ir pageidavimus, pasirinkti tvirtą teorinį pagrindą ir patikrintas strategijas. Šiame tyrime vadovautasi Vygotskio *sociokultūrinės teorijos* elementais. Pastaroji akcentuoja dėstytojo paramos svarbą. Tikėtina, kad nuolatinė dėstytojo parama visos intervencijos metu taip pat vaidino reikšmingą vaidmenį ir prisidėjo prie technologijos efektyvumo, ugdant dalyvių profesinės anglų kalbos žodyno gebėjimus.

6. Statistinė duomenų analizė parodė, kad autentiško teksto apžvalgų rezultatai eksperimentinėse grupėse, kur buvo naudojama antrosios kartos saityno technologija *CmapTools*, buvo aukštesni nei kontrolinėse, kur technologija naudojama nebuvo. Visgi nei analizuojant šiame empiriniame tyrime dalyvavusių eksperimentinių ir kontrolinių grupių rezultatus kiekvienoje aukštojo mokslo institucijoje atskirai, nei bendrame tyrimo kontekste, statistiškai reikšmingų skirtumų nepastebėta, vadinasi, teigti, kad technologija buvo efektyvi profesinės anglų kalbos autentiško teksto suvokimo ugdymui, negalime. Be to, įvertinus pirmos autentiško teksto apžvalgos (su dėstytojo paramos elementu eksperimentinėse grupėse) ir antros autentiško teksto apžvalgos (be dėstytojo paramos elemento eksperimentinėse grupėse) rezultatų dinamiką bendrame tyrimo kontekste, nedidelė pažanga pastebėta tik gretinant kontrolinių grupių rezultatus. Eksperimentinėse grupėse, priešingai, fiksuotas rezultatų pablogėjimas. Rezultatų pablogėjimas antros apžvalgos atveju sietinas su dėstytojo paramos elemento eliminavimu. Vėlgi daroma išvada, kad dėstytojo pagalba ir bendradarbiavimo dialogas yra ypatingos svarbos veiksnys bei sąlyga efektyviam *CmapTools* naudojimui, dirbant su autentiškais profesinės anglų kalbos tekstais.
7. Pritaikius teorinį *Technologijų priėmimo modelį* (TAM) (Davis, Bagozzi & Warshaw, 1989), nustatyti 3 tipų veiksniai, turėję įtakos profesinės anglų kalbos studentų ketinimams antrosios kartos saityno technologijos *CmapTools atžvilgiu*: veiksniai, susaistyti vidiniais technologijų priėmimo modelyje apibrėžtais ryšiais, papildomai įvestas informuotumo veiksnys ir demografinės studentų charakteristikos (kontekstiniai indikatoriai). Daroma išvada, kad:
 - studentų *informuotumas* apie įrankį *CmapTools* turi įtakos jų *suvokimui apie įrankio naudojimo paprastumą* ir *teikiamą naudą*;
 - studentų *suvokimas apie technologijos CmapTools naudojimo paprastumą* daro tiesioginę įtaką jų *suvokimui apie jos teikiamą naudą*;
 - *studentų suvokimas apie įrankio CmapTools naudojimo paprastumą* bei *jo teikiamą naudą* daro tiesioginę teigiamą įtaką jų *požiūriui* į įrankį *CmapTools*;
 - susiformavęs teigiamas *požiūris* daro tiesioginę teigiamą įtaką jų *ketinimams naudotis įrankiu CmapTools* tolimesnėse studijose;
 - *studentų suvokimui apie technologijos CmapTools teikiamą naudą* reikšmės turi jų *lytis*. Nustatyta, kad naudingumą labiau išvelgia vaikinai nei merginos. Suvokiant technologijos naudą reikšminga pasirodė ir *kalba, kurią tyrimo dalyviai vartoja individualioms veikloms internete*. Kadangi technologijos darbinė aplinka bei gairės vartotojui yra pateikiamos anglų kalba, tie studentai, kurie ją nuolat vartoja internete, labiau suvokia įrankio teikiamą naudą nei tie, kurie internete vartoja gimtąją (lietuvių, rusų ar lenkų kalbą);

- *studentų gebėjimas naudotis antrosios kartos saityno technologijomis turi reikšmingos įtakos studentų suvokimui apie įrankio CmapTools naudojimo paprastumą. Kitaip tariant, kuo labiau studentai yra susipažinę su antrosios kartos saityno įrankiais ir jų naudojimosi ypatumais, tuo lengviau jiems sekasi įvaldyti įrankį CmapTools profesinės anglų kalbos studijose.*

Tyrimo rezultatų apibavimas

Disertacijos tema išleistos mokslinės publikacijos:

1. Selevičienė, E. & Burkšaitienė, N. (2018). A study of tertiary teachers' attitudes towards Web 2.0 technologies and their use for teaching EFL and ESP. In N. Stojković & N. Burkšaitienė (Eds.), *Establishing predominance of English for specific purposes within adult English language teaching*, (pp. 94 – 118). Cambridge Scholars Publishing.
2. Burkšaitienė, N. & Selevičienė, E. (2017). University and college teachers' attitudes towards Web 2.0 technologies and their use for teaching English for General and Specific Purposes. *Journal of Teaching English for Specific and Academic Purposes*, 5 (2), 231–240.
3. Selevičienė, E. & Burkšaitienė, N. (2016). CmapTools and its use in education. *Journal of teaching English for specific and academic purposes*, 4 (3), 631 – 640.
4. Selevičienė, E. & Burkšaitienė, N. (2015). University students' attitudes towards the usage of Web 2.0 tools for learning ESP. A preliminary investigation. *Socialinių mokslų studijos: mokslo darbai*, 7 (2), 270 – 291.
5. Selevičienė, E. (2015). Factors influencing university students' acceptance of WEB 2.0 tools for learning ESP. *Social technologies'15: Development of social technologies in the complex world: E-health: conference abstracts*, September 24 – 25, 2015.
6. Selevičienė, E. (2018). The impact of using an educational Web 2.0 tool CmapTools on the achievements of ESP Students. *9th Austrian UAS language instructors' conference ESP: A Multidimensional challenge*, University of applied sciences technikum Wien, (Austria), 25 – 26 May 2018. Conference Proceedings, p.16 – 26.
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Mokslinės konferencijos:

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2. Selevičienė, E. (2018). The impact of using an educational Web 2.0 tool CmapTools on the achievements of ESP students. *9th Austrian UAS language instructors' conference ESP: a multidimensional challenge*, University of applied sciences technikum Wien, (Vienna, Austrija), 2018 m. gegužės 25 – 26 d.

3. Burkšaitienė, N. & Selevičienė, E. (2017). University and college teachers' attitudes towards Web 2.0 technologies and their use for teaching English for general and specific purposes. *Third conference and summer school on English for specific purposes and language learning technologies, Establishing the predominant position of ESP within adult ELT*, University of Niš (Niš, Serbija), 2017 m. liepos 3 – 7 d.
4. Selevičienė, E. (2017). Web 2.0 technologies with educational potential. How to select one? *Tarptautinė mokslinė tarpdisciplininė konferencija „Discourse, technology and translation”*, Mykolo Romerio universitetas, Vilnius, 2017 m. spalio 12 – 13 d.
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6. Selevičienė, E. (2014). The role of current learning theories in designing foreign languages studies at the university. *Tarptautinė mokslinė konferencija „Kalbų studijos aukštojoje mokykloje”*. Kaunas, Lietuvos sveikatos mokslų universitetas, 2014 m. lapkričio 7 d.

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EFFECTIVENESS AND ACCEPTANCE OF WEB 2.0 TECHNOLOGIES IN THE STUDIES OF ENGLISH FOR SPECIFIC PURPOSES IN HIGHER EDUCATION: daktaro disertacija. – Vilnius: Mykolo Romerio universitetas, 2020. 304 P.

Bibliogr. 173–197 p.

The doctoral dissertation aims at expanding the existing body of knowledge about the significance of Web 2.0 technologies in higher education, including the sphere of teaching and learning English for Specific Purposes (ESP). It explores the peculiarities of their effective use in ESP studies and analyses drivers influencing the acceptance of these technologies from ESP students' perspective. The empirical part of the dissertation employs a quantitative research methodology and a quasi-experimental design to investigate the educational effectiveness of a selected Web 2.0 technology CmapTools on ESP students' achievements in vocabulary acquisition and reading comprehension in a blended-ESP course taught at two higher education institutions in Lithuania. It also tries to determine factors influencing the participants' behavioural intentions to use or not to use the technology in the future. Research findings imply that the technology proved to be highly effective for developing the participants' ESP vocabulary acquisition: the experimental groups who were learning through the use of scaffolded CmapTools procedures, improved their results at the end of the treatment and outperformed the control groups who received conventional instructions. However, when using it for developing their ESP reading comprehension, the students in experimental groups ended up showing no significant improvement. Resting on Technology Acceptance Model (TAM), three types of factors, exerting influence on ESP students' behavioural intention to use CmapTools were identified. They were related to TAM constructs, additional construct of awareness and several contextual/ individual factors.

Daktaro disertacijoje siekiama atskleisti antrosios kartos saityno technologijų svarbą aukštajame moksle, įskaitant profesinės anglų kalbos mokymo(si) sritį; analizuojami šių technologijų naudojimo ypatumai profesinės anglų kalbos studijų kontekste, aiškinamasi, kokie veiksniai daro įtaką jų priėmimui iš besimokančiųjų perspektyvos. Empiriniu tyrimu, kuriam atlikti pasirinkta kiekybinė prieiga ir kvazi-eksperimentinis dizainas, siekiama įvertinti pasirinktos antrosios kartos saityno technologijos CmapTools efektyvumą dviejų Lietuvos aukštųjų mokyklų studentų profesinės anglų kalbos žodyno įsivavinimo ir teksto suvokimo gebėjimams bei nustatyti veiksniai, darančius įtaką studentų pasirinkimui naudotis arba nesinaudoti šia technologija ateityje. Tyrimo rezultatai parodė, kad technologija buvo efektyvi, ugdant profesinės anglų kalbos žodyno įsivavinimo gebėjimus: taikant pedagoginę intervenciją, kai dalyko studijose buvo naudojamas CmapTools, pažangos testų rezultatai eksperimentinėse dalyvių grupėse gerėjo ir buvo aukštesni nei kontrolinėse, kur dalyko studijos vyko įprasta tvarka. Visgi, teigti kad technologija buvo tokia pat efektyvi profesinės anglų kalbos autentiško teksto suvokimo ugdymui, negalime: analizuojant eksperimentinių ir kontrolinių grupių rezultatus, statistiškai reikšmingų skirtumų nepastebėta. Pritaikius teorinį Technologijų priėmimo modelį (TAM), nustatyti 3 tipų veiksniai, turėję įtakos tyrimo dalyvių ketinimams CmapTools atžvilgiu: tai veiksniai, susaistyti vidiniais Technologijų priėmimo modelyje apibrėžtais ryšiais, papildomai įvestas informuotumo veiksnys, taip pat keli kontekstiniai indikatoriai ir individualios studentų charakteristikos.

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**EFFECTIVENESS AND ACCEPTANCE OF WEB 2.0 TECHNOLOGIES IN THE STUDIES
OF ENGLISH FOR SPECIFIC PURPOSES IN HIGHER EDUCATION**

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