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ATTITUDES OF SLOVENIAN STUDENTS TOWARDS INFORMATION TECHNOLOGY IN EDUCATION

Ljubljana, July 2021 NEJRA PLIVČIĆ

AUTHORSHIP STATEMENT

The undersigned Nejra Plivčić, a student at the University of Ljubljana, School of Economics and Business, (hereafter: SEB LU), author of this written final work of studies with the title Attitudes of Slovenian Students Towards Information Technology in Education, prepared under supervision of assoc. prof. Tamara Pavasović Trošt, PhD.

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LIST OF ABBREVIATIONS

sl. – Slovene

ITEA – (sl. Mednarodno združenje za tehnološko izobraževanje); International Technology Education Association

IT – (sl. Informacijske tehnologije); Information Technology

TAM – (sl. Model sprejemljivosti tehnologije); Technology Acceptance Model

ICT – (sl. Internet in komunikacijske tehnologije); Internet and Communication Technologies

HEI – (sl. Visokošolski zavod); Higher Education Institution

UK – (sl. Združeno kraljevstvo); United Kingdom

USA – (sl. Združene države Amerike); United States of America

BA – (sl. Dodiplomski študij); Bachelor studies

MA – (sl. Poddipolomski študij); Master studies

PhD – (sl. Doktorski študij); Doctoral studies

DiKUL – (sl. Digitalna knjižnica Univerze v Ljubljani); Digital Library of Ljubljana University

COBISS – (sl. Kooperativni online bibliografski sistem in servisi); Cooperative online bibliographic system and services

ATT – (sl. Odnos); Attitude

CSE – (sl. Računalniška lastna učinkovitost); Computer Self Efficacy

ANX – (sl. Računalniška tesnoba); Computer Anxiety

EXP – (sl. Računalniška izkušnja); Computer experience

RA – (sl. Relativna prednost); Relative advantage

CMBTLY – (sl. Kompatibilnost); Compatibility

EBP – (sl. Na dokazih temelječe prakse); Evidence-based practices

ASD – (sl. Motnja spektra avtizma); Autism Spectrum Disorder

ID – (sl. Intelektualna okvara); Intellectual disability

LMS – (sl. Sistemi za upravljanje učenja); Learning management systems

DL – (sl. Globoko učenje); Deep learning

ML – (sl. Strojno učenje) Machine learning

ANN – (sl. Umetna nevronska omrežja) Artificial Neural Networks

VR – (sl. Navidezna resničnost); Virtual Reality

AR – (sl. Povečana resničnost); Augmented Reality

AI – (sl. Umetna inteligenca); Artificial Intelligence

INTRODUCTION

Universities are facing enormous changes today and are grappling with a turbulent future (Stearns, 2009). Today's education process is quite different than before. At most universities, students have more freedom than in the past to study various subjects and courses in which they are interested in, to gain knowledge in their field of interest, and to combine their studies with extensive extracurricular, study exchange, and internship experiences. The only right direction the education needs to take in order to help students is to their guide to become digitally literate citizens who will be able to go hand in hand with dynamics and complexities in today's world (Fraillon, Ainley, Schulz, Friedman & Gebhardt, 2014). But what has most radically changed is the environment in which the university, professors and students exist, and the infrastructure they use in the educational process. If we look back to last two decades period, it can be clearly seen that information technologies had an immense growth (Albirini, 2006) especially when it comes to education. But, technology also brings a completely different set of challenges which are making pressure to educational institutions (Romeo, Lloyd & Downes, 2012). This growth and rapid changes are posing many challenges to university faculty members as well as institutions themselves.

The development of information technology (hereinafter: IT) has completely remodeled the business strategies and practices of different industries. The higher education field is not an exception to this case (John, 2015). Universities and faculties all over the globe are funding and acquiring IT resources to create an IT infrastructure that meets their students' and faculty's needs (Alexander, 2001). At the same time, universities are expected to teach students technological competence, while also implementing novel practices of teaching that improve the students' learning processes and experiences and are adapted to the increasingly technologically-savvy students of today (Ellis, Goodyear, O'Hara & Prosser, 2007). For instance, in order to switch the students role from being a passive receiver to become an active participant, the university teachers should prepare their courses in a way that will stimulate the digital-based learning, especially when it comes to individual or group assignments where the usage of IT resources should be desirable and rewarded, after all (Roblyer, 2006).

Additionally, using evolving technology already during university studies can equip students to be better problem-solvers in their future workplace, which will also be faced by an uncertain and constantly technologically evolving future. Increasing value is given to integrating university obtained skills and knowledge within a business needs in order to be able to solve the real problems which they will be facing at a working place (Bowen & Drysdale, 2017). In the world of rapid technological advancement and globalization, the value of creating opportunities to examine and test what is learned in the classroom within messy real-life work contexts is more urgent than ever before (Fullan & Scott, 2014). When learning is integrated with exploring a career or profession through hands-on experiences

(Bowen & Drysdale, 2017), the potential lies not just in the application of skills and knowledge, but also in the individual's opportunity to test how their disposition, attitudes and "human qualities" affect how they apply skills and knowledge in cooperation with others toward achieving a common goal. This, in turn, relates to preparing students learn for an unknown future (Bowen & Drysdale, 2017).

Because of the importance of tackling IT in education, there has been a large growth in studies and research examining the use of IT for educational purposes. In this literature, when defining IT in education researchers emphasize the connection and combination between processes, tools and problem-solving skills (Ball & Levy, 2008; Roblyer, 2006). Examples of enforcement of IT technology in education are mainly referred as "education technologies" (Bernard et al., 2004; Lock & Kingsley, 2007). Many of these studies have pointed the value that the student will have if the new technologies will be more present in their learning experience (Ginns & Ellis, 2007).

Studies have highlighted the **positive benefits of incorporating IT** into the learning process: for example, while researching students' perception of virtual learning environment of accounting course students, Wells, de Lange and Fieger (2008) demonstrated the positive connection between the use of technology in learning process and the learning outcomes. Those conclusions can be found in numerous studies. For instance, while analysing and comparing the flexible, hybrid method with a traditional face-to-face lectures, Verhoeven and Rudchenko (2013) pointed to the positive shift in student grades when the two approaches were combined, while extensively using multi-media resources. In order to improve learning processes, strengthening approaches to learning and providing better access to various resources, it is needed to use information and communication technology in combination with modern available assets as well as face-teaching methods. Applying these approaches, both students and teachers benefit and get the best out of the available technology in the field of learning, researching and educating (Ellis, Goodyear, O'Hara & Prosser, 2007).

However, many **challenges to the successful adoption** of IT in the classroom exist. Some of these obstacles exist at the student level, while some come from the faculty level. As the major challenges to adoption of IT in learning and teaching process (from the teacher; professor point of view) are identified in the research works conducted by Butler and Sellbom (2002). Those challenges are equipment failure, weak support from campus, software out of date and software malfunction, slow domain etc. According to a study conducted at Illinois State University, there are several major factors that influence adopting IT for teaching and learning process. Those factors are shortcomings of financial and institutional as well as the lack of time for lecturers to learn way of use of the new technologies (Butler, 2002).

At the same time, several studies (Gokhale, Rabe-Hemp, Woeste & Machina, 2015; Buzzetto-More, 2014) have demonstrated that **students' attitudes** toward technology are

also important in deciding whether there will be educational benefits using an online learning resources and experiences. According to Hofman (2002 in Ali, 2004) students are able to understand course content more clearly when their courses are Web-based. It is also noted that the better learning environment, which is provided by the Web, increases learning convenience. However, there are concerns regarding the students' experience with Web-based learning. One of the main concerns that has been expressed, is that students still have technical difficulties coming regularly with no proper supporting process. Thus, students showed different opinions when it comes to the true technology significance in learning process (Pittman & Gaines, 2015).

Research so far has established a list of seven variables that affect student attitudes towards using IT. These variables include:

- **Computer self-efficacy:** can be explained as an individual's judgment focused on individual's ability to use computers in different situations (Thatcher & Perrewe, 2002).
- **Computer anxiety:** explained by Ball & Levy (2008, p.434) is that computer anxiety is "the fear of apprehension felt by individuals when they used computers, or when they considered the possibility of computer utilization".
- **Computer experience:** can be explained as an individual's exposure to using computers and the skills and abilities he/she gains while using them (Ball & Levy, 2008).
- **Relative Advantage** can be defined as the "degree to which an innovation is being perceived as better than its precursor" (Rogers, 2010).
- **Compatibility:** is defined by Rogers (2010), as a state where an individual will more likely adopt an innovation if it is consistent with his/hers values and beliefs.
- **Perceived ease of use** was defined by Davis (1989) as the extent to which a person believes that using a technology will be free of effort.
- **Attitudes** are defined as "a disposition to respond favorably or unfavorably to an object, person, institution, or event" (Ajzen, 2005, p.3) in the Theory of Planned Behavior.

The main objective of this research work will be to identify all the significant factors influencing the adoption of IT among students studying at University of Ljubljana. Hence, this research will mainly be focused on overall use of technology, such as computers and basic computer programs, such as Microsoft Office package together with various of websites faculties are using in order to incorporate IT in classrooms. This kind of study is the firstly one being done in Slovenia, it is important to gather the information about the general use of computers and basic computer programs in order to provide the good starting point for further research, since the field of information technology is constantly growing term. Nowadays, universities in Slovenia have taken for granted that IT must be incorporated into the classroom, and many professors are putting substantial effort to incorporate recent technologies into the teaching and learning processes. However, previous research has shown that students have different attitudes towards using IT in for educational purposes, and that these differences tend to be very large across countries and cultures (Al-Azawei,

Parslow & Lundqvist, 2017; Arenas-Gaitán, Ramírez-Correa & Javier Rondán-Cataluña, 2011; Tarhini, Hone & Liu, 2013). Even within-country studies have shown that student attitudes within the same country and cultural context are largely dependent by different factors, for example by age, gender, computer self-efficacy, relative advantage perception, compatibility as well as previous computer experience (Li & Kirkup, 2007; Venkatesh & Morris, 2000). Moreover, most of these studies are done in the US, Japan, Taiwan and other leading countries and universities in Asian region, while not much research has examined this issue in Slovenia in particular. Thus, I will focus on the question of attitudes towards IT in the classroom from the side of students in Slovenia, hoping to contribute to other global studies on student attitudes towards IT in education.

Faculties are integrating information technologies into their teaching and lecturing methods, however the integration degree is highly influenced by many factors, of which student attitudes are a critical component, as listed in the section above. However, we need more information to determine to the attitudes of students towards adopting technologies into courses. Therefore, the **purpose** of this thesis is to address similar issues as well as putting an effort to diagnose the factors that might be critical in influencing students' usage of educational technology in classrooms at University of Ljubljana. This will help universities better understand the obstacles and challenges in implementing IT in the classroom from the student side and will allow universities to more effectively implement new technologies.

The **goals** of the thesis include:

- To determine the perception of students at University of Ljubljana towards integrating information technologies into educational process.
- To identify the most significant factors that influence University's students to adopt to IT when it comes to the learning and educational process.
- To identify the main obstacles students, perceive in integrating new IT in the educational process.
- To determine the relative significance of each of these factors in influencing students' use of educational technology.
- To discover how are these factors, among students in Slovenia, different or similar to what research has demonstrated about student attitudes in different countries.

More specifically the study will investigate the following **research questions**:

- RQ1. What is the perception of students at University of Ljubljana towards integrating information technologies into education?
- RQ2. What are the most significant factors influencing University's students to adopt IT when it comes to the learning process?
- RQ3: What are the obstacles preventing students from having positive attitudes towards IT in the classroom?

- RQ4: What is the relative significance of each of these factors in influencing students' use of educational technology?
- RQ5: How are these factors, among students in Slovenia, different or similar to what research has demonstrated about student attitudes in different countries?

The thesis includes a theoretical and an empirical part. The empirical part of this thesis is based on an online questionnaire composed for collecting information from respondents. For this study the population sample consisted of full-time and part-time students and also exchange program students, both undergraduate and graduate, currently enrolled at University of Ljubljana using the snowball and convenience sampling methods explained mathematically and statistically by Goodman (1961). The research instrument relies on an already existing instrument which was previously used to measure faculty's attitudes towards IT adoption in the lecturing process. Since the questionnaire developed by John and Surej (2015) was concentrated on teachers and professors, I adopt their questionnaire to be addressed to students. In addition to these variables, I ask a few additional questions about attitudes towards computer technology in the classroom that are more specific to the Slovenian context (e.g. about the platforms we use at the university like Canvas, Zoom, etc.) in order to get a broader understanding of their attitudes. Data collected by the questionnaire was analyzed using descriptive statistics for demographic data and hypothesis testing using the statistical package SPSS.

In the first chapter I discuss the information technology in education sector, including its growth over time, and industry trends. Furthermore, the chapter discusses the types of IT that can be found in classrooms together, the expected benefits of using them, as well as the obstacles to using IT from three different perspectives, including institutional barriers, faculty-level barriers and student-level barriers. The second chapter covers student attitudes towards technology in the classroom. In this chapter, I explain two different models covering the technology acceptance testing i.e. the Technology Readiness Index (hereinafter: TRI) and the Technology Acceptance Model (hereinafter: TAM). Since the research model was based on TAM, I describe each factor affecting technology acceptance according to that model. The third chapter describes the methodology and sample used throughout my research process, the purpose and goals, research questions and proposed hypotheses, data collection methods and data analysis models as well as the sample description. The fourth chapter presents the main findings of my research, starting with the descriptive statistics, the model design, and relationship between stated variables, and hypotheses testing. The fifth chapter includes the discussion of findings, detected limitations of research together with recommendations for further research.

1 INFORMATION TECHNOLOGY IN EDUCATION

The late 20th century was a period of significant changes in human history marked by the transition from the industrial age to the age of knowledge in which at exponential rates

knowledge is produced, transferred, consumed and re-created (Islam, Mok, Xiuxiu & Leng, 2018). These changes were pushed by fast expansion in the internet and communication technologies (hereinafter: ICT). Major effects of ICT have been seen in the business as well as in the education sector. The education sector was positively pushed by wider wireless internet availability as an essential education resource in broad vary of electronic learning (hereinafter: e-learning) and mobile learning (hereinafter: m-learning) in higher education in developed as well as developing countries, including Australia, Malaysia, Turkey, the United Kingdom (hereinafter: UK) and the United States of America (hereinafter: USA) (Alsabawy, Cater-Steel & Soar, 2013; Chuang, Lin & Tsai, 2015; Chun, 2014; Ilgaz & Gülbahar, 2015; Islam, Leng & Singh, 2015; Shin & Kang, 2015; Yu, 2015)

The following chapter describes these trends in greater detail: the historical development, types, and major trends of IT in the education sector, and the expected benefits and common challenges to using IT in the education sector.

1.1 Growth of IT in the education sector and industry trends

With the world's constant development, advances in technology became common. Thus, the increasing in use of the Internet have a major impact to our everyday lives including the way we are used to learn and study. Traditional classrooms, as we known, are no longer constrained to the conventional learning process and teaching methods (Alsayyari, Alblawi & Elhajji, 2018). As many researchers advocate (Baragash & Al-Samarraie, 2018; Chang, Hajiyev & Su, 2017), the technology actually dictated the change of teaching methods to faculties and universities.

To be able to present the growth of IT in education sector throughout the history, I will split it into two parts. Firstly, I will start from its origin, following with the things the modern era brought us.

Concerning the origins of IT in education, computer mainframes were used in education since its beginnings. Since the initial days of information technology, computers were somehow present at college campuses in USA. According to Bushnell and Allen (1967) there were four different topics regarding the fusion between education and computers discussed back then. The earliest study conducted among large number of students was done by The American Institute for Research. According to their research, approximately 13 % of public high schools in the United States of America was using computers in education, which also was proved to be quite popular among students (United Press International, 1971).

Going further through history, back in 1975, Apple Inc. started donating first Apple computers to schools, and traditionalists started to lose former dominance they use to have over education processes they used to have (Murdock, 2004). The snowball effect brought the computer usage to the state of continuous growth through this era. Back in 1977, a conducted study showed that more than 90% of students studying at Dartmouth College had

used computers for their educational purposes (Haney, 1977). Only six years after, in 1983, Drexel University became the first USA college to strictly require every student to have their own laptop (Hewett & Perkey, 1986).

By the early 1980s, computer instruction was mainly accepted in schools. Firstly, only exclusive classrooms had access to computers, but as years went by, computers became generally used in educational purposes. That brought a period of hardware shortage in schools which became a big issue, leaving teachers „bare-handed“ (Johnstone, 2003). All in all, until 1990, computer usage shifted from being hard-to-get and considered as rarity in schools, to the point where nearly every school had been equipped with at least few of them.

The computer modern era started in the early 1990s. At the very beginning as a modern media technology were considered CD-ROMs and modern software for presentation, such as Microsoft PowerPoint (Murdock, 2004). Additionally, electronic whiteboards and laptops became widely available for students (Lee, 2010). With the development of operating system Windows 98, between 1997 and 1999, the prevalence of computer usage for educational purposes boomed. The common known program „Classroom 2000“ built in 1999 at Georgia Tech, was the classroom equipped with video and audio equipment designed to capture recordings of lectures instead of notes taking (Abowd et al., 1997).

In recent history, an important step in applying information technology in education was actually the introduction of Web 2.0. That phenomenon enables everyone to create and publish content online, including video materials on YouTube, photos on Flickr and Instagram, blog posts, social networking, wiki projects and so on. The key components for the Web 2.0 is mainly ease of use of its tools and social interaction with expected results (Tarnavska, 2013). The Web 2.0 brought us the so-called “collective mind” and/or “collective intelligence”. The notion “collective mind” and/or “collective intelligence” is the ability to search and sharing knowledge with users and experts from around the world (Mulgan, 2018). Consequently, after the Web 2.0 term appearance, Canadian researcher Stephen Downes (2017) introduced and proposed a new term, E-Learning 2.0 which he explained as a derivative for aggregate trends in e-learning, which arose from combination with the means of Web 2.0. Furthermore, a study conducted in 31 countries showed that normal use of computers in classrooms will produce the best learning outcomes (Peña-López, 2015).

At the moment, the IT Governance is becoming an important issue for companies. Organizations use IT as a tool to be competitive on the market as well as to ensure its survival. The developing of IT has increased exponentially and is becoming main guarantee of better performance and efficiency of the entire organization (Ribeiro & Gomes, 2009). Expenditure for investment in IT has become significant in all institutions, including Higher Education Institutions (hereinafter: HEI). Furthermore, IT is mainly used as a support to the research and learning activities as well as to support teaching, administrative and institutional activities. In order to support IT funds and investment in decision making

processes, companies started to follow an universal approach when it comes to managing risks and IT performance measurements at their strategic level (Coen & Kelly, 2007). Until today, it can be clearly seen that IT had strong influence on HEI and its stakeholders.

In today's times, industry needs are exponentially growing in a way that the education system is barely keeping up. This is accompanied by exponential growth of IT which has exploded at an unprecedented rate (Rogers, 2010), including novel technologies such as artificial intelligence. As a matter of fact, at the beginning of 21st century, Hernández-Ramos (2005) emphasize in his research that in USA public schools there were 87 % of classrooms cover with the internet connection. Furthermore, as discussed throughout the articles, the main obstacle to the future of information technology is not the internet connection and its access but the utilizations of the technology which needs to support students' learning and education process and achievements. The year 2020 additionally highlighted the importance of IT in education. When the whole world has stopped due to the covid-19 pandemic, education could continue due to the use of IT. It also showed the need for governments and countries of the world to pay more attention to IT and its inclusion in the field of education, because in the modern world it can it is indispensable (Gurukkal, 2020).

1.2 Types of IT in the classroom

Since it has been shown that IT can greatly contribute to the development of education, IT has evolved so that there are more forms used in classrooms (de Koster, Kuiper & Volman, 2012).

One form of IT which is used in the classroom is **e-learning**. E-learning can be defined as a learning ecosystem which is strictly web-based and it is used for propagation of information and its usage as well as the communication and knowledge needed for the training and education of a group or individual (Cidral, Oliveira, Di Felice & Aparicio, 2018). It has been generally proven that e-learning has a positive impact on individual performance (Cidral, Oliveira, Di Felice & Aparicio, 2018). In addition, students showed very high interest in this type of learning.

The second form of IT used in the classroom is **m-learning**. M-learning is another type of learning that at a first place provides learners the ability to learn anywhere at anytime with the support of ICT (Alioon & Delialioğlu, 2019). This form has been widely criticized since personal electronic devices greatly hinder students from following and participating in the classes (Stephens & Pantoja, 2016). On the other hand, this approach is good because students are more willing to get involved in some projects because they can use their mobile devices (Alioon & Delialioğlu, 2019).

Another form of IT used in classrooms are **digital smart boards**. Smart boards are considered to be an interactive technology tool which are widely present in schools and

universities (Mun et al., 2019). Active learning is a classroom approach which puts student in the center of the learning process making them the most active part of the class.

Furthermore, **social media** is considered to be valuable form of learning. As Goodyear and Armour (2021) highlighted in their research, social media is actually embedded in young people's lives and is considered to be an effective educational and health-related medium. Additionally, they suggested that both teachers and young people should find shared understandings of social media and its impacts, positioning themselves as continuous learners who are willing to co-construct digital path and pedagogies together with young people. Hillmayr and others (2020) argue that digital learning tools had a positive effect on student learning outcomes. They show that the learning outcomes of student using digital tools are much better than those taught without the use of digital tools.

Another type of IT which can be found in classroom is **Learning management systems** (hereinafter: LMS). Chaw and Tang (2018) defined the Learning management system as a system composed of different assets, such as quizzes, pictures, graphs and videos that can be reached while using technology. There are many studies researching the level of learning efficiency that learners reach while using LMS and it seems that the topic will remain a matter of interest for a longer period, especially from different stakeholders' point of view.

The development and advancements in IT brought us new terms which, through time became present in classrooms all over the world (Radianti, Majchrzak, Fromm & Wohlgenannt, 2020). Those include, for instance, deep learning, machine learning and artificial neural networks. Implicitly, those phenomena have enabled application on Virtual Reality, Augmented Reality and Artificial Intelligence in classroom (Geroimenko, 2020; W. J. Park & Park, 2018). All od those stated above, are considered to be a part of IT revolution, which are influencing out day-to-day life and consequentially increasing an interest in the education and research field in the form of Artificial Intelligence in Education (hereinafter: AIEd) and Learning Analytics (Gandedkar, Wong & Darendeliler, 2021).

1.3 Expected benefits of using IT in the classroom

By answering the question "*What are the goals of technology education?*" we will be closer to understanding the expected benefits of using IT in classroom. According to International Technology Education Association standards (hereinafter: ITEA), the main stated goal of technology education is focused on supporting students to better understand the technology as well as its place in society. Students' understanding needs to relate to the *technology literacy* which must be composed of two things, the aim of true technology education and the potential outcome.

The International Technology Education Association (ITEA) emphasizes that "technological literacy is what every person needs in order to be an informed and contributing citizen for the world of today and tomorrow" (Dugger Jr, Meade, Nichols & Delany, 2003, p. 10). The

understanding of benefits technology is bringing for a society is crucial than it was ever before. For a society deeply dependent on technology, we are so ignorant about the technological processes and concepts (Bybee, 2000). Furthermore, other research studies have found empirical evidence in support of positive impacts on students of learning through wireless internet, such as enhanced metacognition (Huang et al., 2014), physical mobility (Mohammadi, 2015), opportunities offered for self-regulation and self-monitoring in learning process (Coşkun & Ghaemi, 2015), enhanced interaction with lecturers (Coşkun & Ghaemi, 2015) and the flexibility of being able to study anywhere anytime. This approach and feature is important to adults, especially women, in those countries where, for cultural or other reasons, they did not have access to traditional higher education (Ilgaz & Gülbahar, 2015; Mohammadi, 2015). All in all, there are so many benefits of using IT in classroom, the most important of which are students' engagement, collaboration, motivation, inclusion, differentiation, creativity, automation, future focus, etc.

We can define **student engagement** as the main driver related to the students' experience, which has direct influence to the students' performance in online environment. The student engagement is used as one of the best indicators of student learning and online teaching process (Ayouni, Hajjej, Maddeh & Alotaibi, 2021).

When it comes to **collaboration and motivation**, Vidergor (2021) claims that students prefer digital learning activities which include gamification. As main reasons, he stated the better collaboration among students, as well as better learning motivation followed by the stronger experience which is in charge of created challenges, playfulness and different shapes of learning accomplishments.

Furthermore, the study showed that the students who live in new-age era and the era of digitally inclusive schools are about the benefit from ICT **without alienation and exclusion** (Kim, Yi & Hong, 2021). The prevalence of evidence-based practices (hereinafter: EBP) research combined together with higher availability of instruction based on technology in classrooms equipped for special education for sure have created the opportunity to research the engagement, feasibility, and effectiveness of technology-based interventions (V. Knight, McKissick & Saunders, 2013). Spencer, Evmenova, Boon, and Hayes-Harris (2014) advocate that technology-based learning is one of the most effective EBPs for people with Autism Spectrum Disorder (hereinafter: ASD). However, according to Knight, Huber, Kuntz, Carter, and Juarez (2019), among 2429 special educators, approximately 24 % of respondents said they are using ICT on a daily basis while teaching students with ASD and/or intellectual disability.

Hewett (2005) advocates the idea that the ICT can help providing crucial information when needed which can support students to come up with **creative ideas**, which are considered to be a foundation to the creative processes. Furthermore, to be able to start the creative thinking, student or any other individual, needs someone or something to support the process

from the start (Lubart, 2005). Throughout the process, computers as the expert systems, can for sure help the individuals to go as far as possible, supporting them on each step.

Finally, another big advantage of digital technologies is that they are **highly scalable** (Yardi, 2008). Thus, there are so many benefits of using IT in classroom, and in the following years there will be more and more studies researching those benefits.

1.4 Obstacles to using IT

IT is a powerful tool for improving lives in various aspects. It is a great fortune to live in a modern time when most things are digitized and bring faster and better results. However, this does not mean that incorporating IT into life only brings positive results. There are also negative side effects. Although virtual learning environments are now increasingly seen and present in the world, many problems arise in their use and all that it brings. These problems can be perceived from different perspectives: the students' perspective, teachers' perspective, and the institutional perspective. During different research projects, two specific categories express the barriers which affect stakeholders who implement technology in the classroom. These two categories are explained as first and second-order barriers. First-order barriers are those that are external to the students and/or teachers and second-order barriers are internal to them (Brickner, 1995; Ertmer, 2005).

External barriers include hardware, software, infrastructure, time, training, and support. First-order barriers are probably easier to manage and to be avoided but teachers may become frustrated with the amount and extent of these barriers (Jonassen, 1994). Due to frustration and negative energy, these barriers can lead to internal barriers (McLellan, 1994).

Internal barriers involve teachers' and students' beliefs, values, vision, perceptions, and experience with technology (Ertmer, 2005; Kerr, 1996; Kopcha, 2012). Internal barriers are considered to be more difficult to overcome. Teachers are usually very confident in their attitudes and opinions, which makes it difficult to convince them that there are other modern ways that can improve the quality of education (McLellan, 1994).

What greatly helps to remove many of these barriers is the fact that IT is becoming more and more present in educational institutions all over the world. This does not leave much room for personal attitudes and opinions to influence the modernization of the education system. It is crucial that all stakeholders are involved in solving problems that prevent the greatest possible use of IT in educational institutions. Comprehensive plan of technology integration and implementation should be made in order to fulfill all aspirations on making educational systems more IT oriented (McLellan, 1994).

1.4.1 Institutional barriers

The changes brought by the digital era have also impacted governments. One of the main governments' priorities is restructuring country's strategies. This can be especially seen in developing countries. Third countries are recognizing their long-term chance to start now from the scratch in order to be able to achieve and set the foundation to an information culture while supporting ICT access to their citizens as well as by ensuring diffusion of technology services (Afacan, Er & Arifoglu, 2013). In order to bring digital aspects to educational process, governments need to provide technology services to all citizens.

1.4.2 Faculty-level barriers

At the beginning, it is important to emphasize that just providing a technology alone will not lead to a better and more efficient learning environment, neither will automatically improve students' achievements. Researchers attempted to address the level of effectiveness of using technology in classrooms, however they realized there are other obstacles which are important in evaluating and supporting the use of technology. Their main findings are, firstly, lack of understanding of teachers knowledge level in technology use, secondly, the difficulties teachers may be facing as well as their technology acceptance level (Holden, Ozok & Rada, 2008). Many conducted studies have researched teachers' personal and instructional usage. For example, a research conducted among 69 lecturers who were employed in one American educational facility showed that approximately 90 % of teachers use computers on daily basis for their personal use. However, approximately 30 % of teachers responded positively to use computers for educational purposes while teaching (Owre, 2006).

Furthermore, the interesting results were presented in a study which was comparing lecturers' computer use in 1991 and 2004. Even though the data on usage showed a enormous increase in computer usage in general, there was an actual slight increase when it comes to instruction purposes (Shi & Bichelmeyer, 2007). Even though the technology is much more present in daily use, it still did not become the usage norm for instruction purposes (Rother, 2005). As studies showed, possible reasons for that may be the lack of support, time or in some cases also lack of access etc.

For example, across different educational systems, teachers on average have shown that they rarely use technologies while teaching. For instance, findings of the International Computer and Information Literacy Study reported that less than a half of the participating teachers answered that they use technologies frequently for teaching (Eickelmann, 2019; Fraillon, Ainley, Schulz, Duckworth & Friedman, 2019b). In the other hand, teachers in South Korea and Denmark said that they are using technologies on a daily basis, while teachers in Italy and Germany elaborated that they are more reluctant to use technology frequently (Backfisch, Lachner, Stürmer & Scheiter, 2021).

To conclude, teachers, are playing the main role in the success of each and any learning technology initiative. Hence, if teachers are supporting the initiative socially as well as mentally, the technology effectiveness and usage in education will have bright future.

Sally Bowman Alden (2003), the Executive Director of the Computer Learning Foundation concluded that the first thing to do to achieve computer literacy among students and nation in general, is to support and educate the teachers to become computer literate at the first place. Furthermore, teaching and learning can be positively affected by teachers use of technology in the classroom. Levin and Wadmany stated that the good practice example is simply "by being a source of knowledge, a medium for transmitting content, and an interactive resource furthering dialogue and creative exploration" (2008, p. 234). Integrating technologies into teaching has the potential to both enable students' to be a part of digitalized society and support students' learning process (Fraillon, Ainley, Schulz, Duckworth & Friedman, 2019a; Mayer, 2019; Peña-López, 2015; US Department of Education, 2020).

1.4.3 Student-level barriers

Although students are generally interested in incorporating technology into all aspects of their lives, including education, this does not mean that it goes smoothly. Students keep up with technology more than professors and are therefore more interested in using technology in education. But not all students are equally familiar with technology and this can create resistance and frustration among these students. It can also be a big problem that the use of electronic devices, instead of making education processes easier, makes sure that students are not maximally committed to education. The use of electronic devices makes it easier for students to be occupied with non-educational things. Also, students are often frustrated and uninterested if they know how to use IT better than their mentors and teachers (Pittman & Gaines, 2015).

Furthermore, we need to be aware of the fact that there are a large number of students who have developmental disabilities and who are probably not able to simply accept the use of technology in education. Such persons have to be addressed and that person usually require a more direct contact with teachers who did not really possible using the technology (Dicheva, Dichev, Agre & Angelova, 2015). In conclusion, it is crucial to consider all aspects. Students accept the use of technology in education well, but it does not come without problems. There are problems and obstacles that can be overcome if the whole system of institutions is involved in solving them.

2 STUDENT ATTITUDES TOWARDS TECHNOLOGY IN THE CLASSROOM

Frequently, the assumption underlining the discussion of IT in education is that technology moves only forward and that technology should be included as much as possible in the

education system (Butler, 2002). However, one very important question is how willing students are to incorporate technology into education. The following chapter reviews factors affecting student attitudes towards IT in the classroom, including two types of theories to explain these attitudes: first, theories based on individual trait indicators such as the Technological Readiness Index, and second, those based on how technology's attributes affect individual perceptions and use of technology, including the Technology Acceptance Model, in which perceived usefulness and ease of use of technology affect attitudes and also mediate the relationship between other external variables and individual attitudes (Porter & Donthu, 2006).

2.1 The Technology Readiness Index (TRI)

Under the TRI model, researchers focus on different variables in order to justify a individual's tendency in new technology usage. As Parasuraman (2000) stated, the technology readiness index has two main influencing factors, which are optimism and innovativeness as well as the two inhibitors (discomfort and security) of an individual's tendency to use new technologies. The technology-readiness construct mainly refers to individual's tendency to support and use new technologies to be able to acchieve their goals in private and professional life. For example, the construct can be observed as an overall state of mind which result from gestalt of mental inhibitors and enablers that overall determine persons' predispositions and readiness to use new available technologies.

The Technology Readiness Index is a scale which is consist of multiple items intended to assess people's readiness to interact with technology. The TRI was developed and presented in 2000 due to the collaborative effort between Parasuraman and Rockbridge Associates, which is a Virginia based company, specialized in a service and technology research. Meanwhile, by the year of 2015, several revolutionary technologies arise and significantly impacted people's lives. Due to those technologies (social media, mobile commerce and cloud computing) the TRI was updated and streamlined to 45-item scale measurement (before 36-item scale). Statements were the same fully anchored 5-point agreement scale (strongly/somewhat disagree, neutral, somewhat/strongly agree) used in both TRI versions, TRI 1.0 and TRI 2.0 (Parasuraman, 2000; Parasuraman & Colby, 2015).

2.2 The Technology Acceptance Model

The Technology Acceptance Model is an information systems theory that shows how users come to accept and use a particular technology. This model has been used to evaluate the perceived ease-of-use and usefulness as well as attitudes towards using a specified technology. This model researches how individuals will make a decision on using new technology, when that particular technology is presented to them.Among all the different theories, the Technology Acceptance Model is considered the most influential and worldwide used theory for researching and describing an individual's acceptance of different

information systems. The father of the TAM is the Theory of Reasoned Action developed by Ajzen and Fishbein (1975) and originally proposed by Davis (1989). Over time, TAM remains one of the main models used by researchers studying IT acceptance, which is also documented by analyses of citations in academic articles (Lee, Kozar & Larsen, 2003; Lucas & Spitler, 1999).

Throughout history, the TAM has been used to research the level of acceptance for widely known technologies (e.g. word processors, World Wide Web, e-mail, Hospital Information Systems, etc.) under different conditions and situations (e.g., time and culture), while using different control factors (e.g., gender, organizational type and size), which are after combined with subjects (e.g. undergraduate students, MBAs, and knowledge workers), leading its supporters to believe in its durability. Evaluation is essential for Information System community because it helps researchers of IS adoption to understand TAM's research findings in the past, and to identify possible research topics and research problems to be conducted in the future. Overall, it helps to educate IS doctoral and master students while researching how IS-owned theory has developing over time.

The TAM has been proved to be a trustworthy model in many researches (Stoel & Hye Lee, 2003; Yan, Gong & Thong, 2006). From the very start, Davis proposed TAM in order to predict and explain the use action of IS (Davis, 1989). Davis' research recommended two key factors of IS use: Perceived Usefulness and Perceived Ease of Use. TAM accentuate that people will use an information technology if they believe it will help them do a better job, and if they believe that given system is easy to use. Throughout the years, TAM has gotten broad experimental support through approvals, validations, applications, and replications for its capacity and power to predict and foresee use of information systems (Davis, 1989; Davis, Bagozzi & Warshaw, 1992; Taylor & Todd, 1995a, 1995b; Venkatesh, Morris, Davis & Davis, 2003; Venkatesh & Morris, 2000). In the other hand, researchers have pointed out that the generality of TAM fails to supply more common and meaningful information about users' opinions when it comes to one specific system. There was the need for TAM to incorporate additional factors or to integrate with other IT acceptance models in order to improve its specificity and explanatory power (Agarwal & Prasad, 1998; Hu, Chau, Sheng & Tam, 1999; Mathieson, 1991).

A second line of research, in contrast to TAM, focuses on specific contexts and external factors that can influence the adoption of technology. The most known example is the Theory of Planned Behavior (hereinafter: TPB) developed by Ajzen (1985, 1991). Furthermore, Taylor & Todd (1995b) broader and connect TAM and TPB by constructing a decomposed TPB. The new model also includes some new factors that were not present in TAM but have been proven to be important factors of individuals' behavior. Meanwhile, Davis and Venkatesh (1996) have been validating and extending TAM model but under different situations and conditions in order to make it more explanatory. Through out the history, there were numerous modification of TAM model, and those new models were developed mainly

to suit new up-coming technologies, such as internet, World Wide Web and intranet (Agarwal & Prasad, 1998; Hu, Chau, Sheng & Tam, 1999).

2.3 Factors affecting technology acceptance according to the TAM

As stated in the table above, there are many factors affecting technology acceptance. This research will concentrate on seven factors, which are computer self-efficacy, anxiety, experience, relative advantage, compatibility, perceived ease of use and students' attitude.

2.3.1 Computer Self-Efficacy

Computer self-efficacy is considering an individual's judgment about their ability to use computers in different situations (Thatcher & Perrewe, 2002). The studies about Computer self-efficacy mainly proved the positive relationship between IT adoption and computer self-efficacy (Fagan, Neill & Wooldridge, 2004). Even though Agarwal & Karahanna (2000) proved the positive relation between computer self-efficacy and use of technology, they suggest the further research to support the relationships between wide variety of ICT used in education. Thus, we can conclude that it is crucial to understand the students' computer self-efficacy while measuring their intention to adopt ICT for educational and learning process.

2.3.2 Computer Anxiety

Computer anxiety may be defined as the fear that results when an individual is faced with the possibility of using an ICT (Simonson, Maurer, Montag-Torardi & Whitaker, 1987). In other words, as Ball & Levy (2008, p.434) stated that the computer anxiety is basically the fear felt by individuals when and while they use computers, or even when they consider the possibility of using one. It can be clearly seen that the computer anxiety for sure plays extremely significant role in ICT and information system adoption (Venkatesh, Morris, Davis & Davis, 2003). Whatsoever, while speaking of computer users, studies showed that they usually overcome their feeling of anxiety after the time, and that the time is crucial for them to develop the skills they need while using ICT. According to Thatcher and Perrewé (2002) computer self-efficacy and computer anxiety are having negative correlation with each other, which is also proved in later studies (Fagan, Neill & Wooldridge, 2004; He & Freeman, 2010).

2.3.3 Computer Experience

Computer experience can be defined as an individual's exposure to using ICT and the skills and abilities he/she gains while using ICT (Ball & Levy, 2008). According to numerous conducted researches (Summers & Vlosky, 2001; Wozney, Venkatesh & Abrami, 2006),

prior experience in using ICT and/or computer is a significant influence of whether and to what extent a faculty will use ICT for teaching purposes.

Taylor & Todd (1995) conducted an empirical study where they were examining the influence between the two variables and the influence between them. Those two variables are computer experience and information system usage. The study showed the significant influence the previous computer experience has on perceived ease of use, perceived usefulness and attitude. The study was conducted among 786 experienced and inexperienced potential users of student information system.

2.3.4 Relative Advantage

The relative advantage factor was firstly mentioned in 1962 inside the well-known book, Diffusion Theory (Rogers, 2002). This construct has been commonly used in the IT adoption studies by many different authors such as perceived usefulness (Davis, 1989), relative advantage (Venkatesh, Morris, Davis & Davis, 2003), extrinsic motivation (Davis, Bagozzi & Warshaw, 1992).

Venkatesh and others (2003) found that relative advantage is one of the strongest factors that can predict the intention to use ICT. The same, strong relationship was also proved in many previously conducted studies (Mehrtens, Cragg & Mills, 2001; Poon & Swatman, 1999; Premkumar & Roberts, 1999) in various contexts. The study showed the positive correlation between relative advantage and perceived ease of use of an ICT. In other words, the students who believe that using ICT applications will improve their educational and learning activities are more likely to perceive those technologies easy to use.

2.3.5 Compatibility

As stated for a relative advantage, the compatibility is also construct Rogers (2010) proposed in his Diffusion Theory. According to Rogers, an individual will more likely to adopt an innovation if it is consistent with values and beliefs that person has. Considering the adoption of information technology and systems, previous studies found that compatibility is an important factor of attitude towards using a system (Gumussoy, Calisir & Bayram, 2007; Taylor & Todd, 1995). In addition, while conducting a research among 278 banking customers, Karahanna and others (2006) identified that compatibility with existing work practices and compatibility with prior work experience are positively correlated with perceived ease of use of a customer relationship management system.

2.3.6 Perceived Ease of Use

Perceived ease of use can be defined as the magnitude to which an individual believes that using a technology will be free of effort (Davis, 1989). Computer and ICT users in general

change their ease-of-use perceptions which thy have about a system over particular timeframe. Many previous researches showed that people may see a computer systems as difficult to use when they have the first interaction with one mainly because they are not thought with the necessary skills and confidence (Hackbarth, Grover & Yi, 2003). As time goes by, they build up their techniques, gain confidence and become more familiar with the particular system, and as the result most individuals develop more favorable perceptions of its ease of use. Since TAM also acknowledges perceived usefulness, it is important to point out the difference between those two. Perceived usefulness can be defined as the degree to which the individual believes using a particular technology will increase his or her work performance and perceived ease-of-use is the degree to which the individual expects a particular technology to be free from effort (Venkatesh & Morris, 2000).

2.3.7 Attitude

Attitude is defined as "a disposition to respond favorably or unfavorably to an object, person, institution, or event" (Ajzen, 2005, p.3) in the Theory of Planned Behavior. Behavioral theories written by many different authors (Ajzen, 1991; Davis, 1989; Fishbein, 1975) emphasize the positive attitude of the individuals' leads to his or her behavioral actions. Even though the world knows many instructional and educational technologies that can in fact improve higher education, Baylor & Ritchie (2002) conclude that those are not going to be used by teachers unless they possess the necessary skills, knowledge and the right attitudes to inculcate the curriculum. Additionally, according to the Diffusion of Innovations Theory firstly mentioned back in 1995 (Rogers, 2010), it is discovered that individuals' attitude towards a technology is one of the key elements to its adoption.

2.4 Socio-demographic differences in student attitudes towards IT in education

Studies have also been done to research whether other factors, such as socio-demographic characteristics, including gender, economic background, and culture, influence students' opinion of technology in the classroom.

Most studies have found differences in **gender**. Plumm (2008) found that there is a female bias that characters in the technology used in education favors males and then it is difficult for women to identify with it. Another study conducted by Heemskerk and others (2009) and related to the first showed that in general, technology in education is more in favor of males. Another study found that when females were interested in an educational tool, they achieved better results while males made no difference (Incantalupo, Treagust & Koul, 2014). This research also has shown that males are better and easier to cope with technology in the classroom and easier to identify with it (Rehmat & Bailey, 2014).

Furthermore, some reports suggest that Internet usage differences are not defined by **race** (Porter & Donthu, 2006; Rainie & Packel, 2001) while Porter and Donthu (2006) proved

that **education**, **income** and **age** can influence the difference within the beliefs individuals have about the technology and internet in general, and that those beliefs also influence an individual's attitude toward its usage.

Porter and Donthu (2006) stated that the decision to adopt to a new technologies is mainly related to the amount of **knowledge** individual possess on how to use that particular technology appropriately. Rogers' (2010) study about the diffusion of innovation elaborate that those individuals who adopt to the new technology quicker and earlier than others tend to be highly educated than those who not.

The attitudes of individuals with higher **incomes** are likely to be based on few constructs. To be precise, since a higher income directly influences the decrese in risk awareness of new technology acceptance (Venkatesh & Brown, 2001), individuals possessing higher incomes tend to be more focused on their emotional enjoyment that the technology usage can bring. In the opposite, because access barriers are much greater for lower income individuals (Porter & Donthu, 2006), those individuals are less likely to spend their time or even money to new technology.

In his research study Park (2006) arguing that **age** is an important factor influencing behavioral intentions towards new technology adoption. Speaking of that, numerous studies were conducted on different samples when it comes to age. Studies are continuously researching technology adoption in primary schools, high schools, universities as well as at the workplaces (Garcia & Qin, 2007; Holden, Ozok & Rada, 2008; John, 2015; Morris & Venkatesh, 2000). Overall, studies seem to agree that the younger person is, the higher technology acceptance indicators will be shown; with age, adults are less interested in acquiring information and making new social contacts (Porter & Donthu, 2006).

3 METHODOLOGY AND SAMPLE DESCRIPTION

3.1 The thesis purpose and goals

This research's main objective is basically to identify all significant factors which are influencing the adoption of information technologies among students studying at University of Ljubljana. Nowadays, universities in Slovenia have taken for granted that IT must be incorporated into the classroom, and many professors are putting substantial effort to incorporate recent technologies into their teaching and learning processes. However, previous research has shown that students have different attitudes towards using IT for educational purposes, and that these differences tend to be very large across countries and cultures (Al-Azawei, Parslow & Lundqvist, 2017; Arenas-Gaitán, Ramírez-Correa & Javier Rondán-Cataluña, 2011; Tarhini, Hone & Liu, 2013).

Even within-country studies have shown that student attitudes within the same country and cultural context are largely influenced by different factors which are age, gender, computer

self-efficacy, previous computer experience, perception towards relative advantage, compatibility etc. (Li & Kirkup, 2007; Venkatesh & Morris, 2000). At the same time, though, most of these studies are done in the US, Japan, Taiwan and other leading countries and universities in Asian region, while not much research has examined this issue in Slovenia in particular. Thus, I focus on the question of attitudes towards IT in the classroom from the side of students in Slovenia, hoping to contribute to other global studies on student attitudes towards IT in education.

There are several factors influencing the information technofixes integration level, and among them the student attitudes are a critical component, as listed in the section above. However, more information is necessary to determine the attitudes of students towards adopting technologies into courses and their learning process.

Therefore, the **purpose** of this thesis is to address similar issues as well as putting an effort to diagnose the factors that might be critical in influencing students' usage of educational technology in classrooms at University of Ljubljana. This will help universities better understand the obstacles and challenges in implementing IT in the classroom from the student side and will allow universities to more effectively implement new technologies.

The **goals** of the thesis include:

- To determine the perception of students at University of Ljubljana towards integrating information technologies into education.
- To discover the most significant factors influencing University's students to adopt to IT when it comes to the learning process.
- To identify the main obstacles students, perceive in integrating new IT in the educational process.
- To determine the relative significance of each of these factors in influencing students' use of educational technology.
- To discover how are these factors, among students in Slovenia, different or similar to what research has demonstrated about student attitudes in different countries.

3.2 Research questions and hypotheses

More specifically the study investigates the research questions listed bellow:

- RQ1. What is the perception of students at University of Ljubljana towards integrating information technologies into education?
- RQ2. What are the most significant factors influencing University's students to adopt IT when it comes to the learning process?
- RQ3: What are the obstacles preventing students from having positive attitudes towards IT in the classroom?

- RQ4: What is the relative significance of each of these factors in influencing students' use of educational technology?
- RQ5: How are these factors, among students in Slovenia, different or similar to what research has demonstrated about student attitudes in different countries?

Based on previous literature on the factors that influence IT adoption, listed in the theoretical section above, the following hypotheses are tested:

- H1: Students' computer self-efficacy positively influences their perceived ease of use of educational technologies.
- H2: Students' computer self-efficacy negatively influences their computer anxiety.
- H3: Higher the students' computer anxiety lesser will be perceived ease of use of IT applications.
- H4: Prior computer experience significantly influences students' perceived ease of use of an information technology.
- H5: Relative advantage will positively influence the students' perceived ease of use of educational technology.
- H6: Compatibility positively influences the students' perceived ease of using Information Technology for educational and learning process.
- H7: Perceived ease of use positively influences students' attitude towards using educational technologies.

3.3 Model design and relationship between variables

The major part of the research questions regarding the factors influencing students' attitudes toward information technology in classroom was analyzed with the help of pre-existing studies on attitudes toward using IT in different industries, that were already developed by different researchers and were found in various articles. Attitudes towards using IT were measured with 7 items from Shiverdecker (2002), Ball and Levy (2008), Thatcher and Perrwe (2002), Albirini (2006), Moore and Benbasat (1991), Gibson and others (2008).

The questionnaire was designed based on six different sources stated above. There are seven variables, which consist of a group of specific number of questions. Variables such as Attitudes towards technology (hereinafter: ATT), Perceived ease-of-use (hereinafter: PCE) and Compatibility (hereinafter: CMBLTY), are defined throughout four questions each, while the variables, such as Prior computer experience (hereinafter: EXP), Computer anxiety (hereinafter: ANX) and Computer self-efficacy (hereinafter: CSE) construct from six questions each. The Relative advantage (hereinafter: RA) variable consists of seven questions. Some modifications were applied to adjust the statements to my own research questions and research sample.

The model consists of dependent and independent variables. The **dependent** variable is Attitudes towards technology (ATT). The **independent** variables are – Computer self-efficacy (CSE), Computer anxiety (ANX), Previous computer experience (EXP), Relative

advantage (RA), and Compatibility (CMBTLY). Model also represents the development of the hypothesis. This research will be focus on those presented variables, and the research approach will be presented here.

Firstly, the arrow marked with H1 on Figure 1 on the other page of the document represents the relationship between computer self-efficacy and perceived ease of use. This research work will research and present the influence between those two variables, trying to prove first hypothesis – H1.

Secondly, the next connection on Figure 1 is the H2 connection showing the relationship between computer self-efficacy and computer anxiety. Here this research work will present the influence between those two variables. The second hypothesis is trying to prove negative influence between CSE and ANX.

Thirdly, the connection H3 in Figure 1 is showing us the relationship between computer anxiety and perceived ease of use thus this study work will research the correlation between those two variables, trying to prove the inverse proportion, or strong inverse correlation.

Fourthly, next connection that can be seen in Figure 1, named H4, represents the relationship between prior computer experience and perceived ease of use. Proposing the fourth hypothesis this study work will research if prior computer experience has significant influence on perceived ease of use.

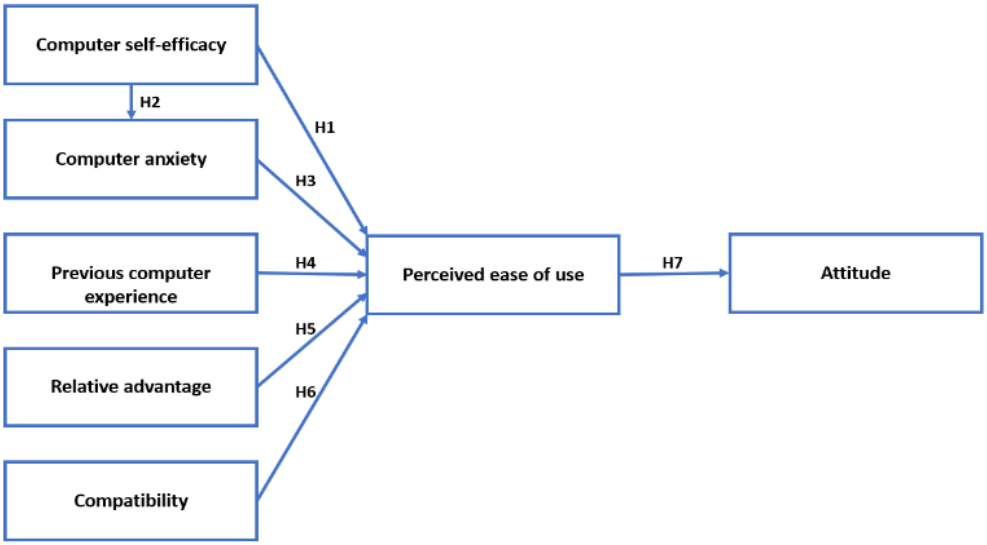
Fifthly, the connected arrow between relative advantage and perceived ease of use represents the fifth hypothesis – H5. This study work will examine the influence between those two variables assuming the positive influence between them.

Sixthly, the last connected arrow that can be seen on a left-hand side of Figure 1, and the last one examining the influence between compatibility and perceived ease of use, assuming the positive outcome is the hypothesis six – H6.

Seventhly, the last connected arrow represents the hypothesis seven. This study work assumes that given perceived ease of use has a direct influence on the dependent variable, which in this case is attitude. Assuming the positive outcome in the beginning, the final hypothesis has been proposed.

The relationship between variables is presented graphically in the Figure 1 on the other page of this paperwork. It can be clearly seen that five out of seven hypotheses are testing the relationship those five variables and having with the variable called the perceived ease of use individuals have toward using the IT. Additionally, the second hypothesis is examining the relationship between computer self-efficacy and the computer anxiety and finally, the seventh hypothesis is examining the relationship between the perceived ease of use and the attitude the individual has toward using IT in classroom.

Figure 1: Relationship between dependent and independent variables



Source: John (2015).

3.4 Research instrument

The empirical part of this thesis was based on an online questionnaire for collecting information from respondents. The questionnaire was prepared using Microsoft Forms, allowing respondents to provide their opinions over the internet. Participation in the study was voluntary and based on students' willingness to participate. Approximate responding time was 12 minutes. The questionnaire consists of 48 questions (46 of them being multiple choice and 2 open non-mandatory questions). Questions were divided into 7 different groups (each group contains 4-7 multiple choice questions), and demographical part consists of 10 questions. The questionnaire was completely anonymous, and gathered answers are only to be used for master thesis and educational purposes.

For the research instrument**,** I decided to use an already existing **instrument** which was previously used to measure faculties' attitudes towards information technology adoption in the teaching and lecturing process. Since the questionnaire developed by John and Surey (2015) was concentrated on teachers and professors, so the questionnaire used as a research instrument for this thesis was adopted in order to address students particularly. All the items for the questionnaire were carefully selected from relevant literature considering this particular field of study, and the questionnaire was sorted into 7 different segments as explained above. The number of items for each of these 7 variables and their primary sources are given in Table 1 below. All the items use 5-point Likert scale for measuring the responses.

Table 1: Questionnaire constructs

Constructs	**No. of Items**	**Primary Source**
Computer Self efficacy $(CSE)_{Q10}$	6	(Shiverdecker, 2002, Thatcher & Perrewe, 2002)
Computer Anxiety $(ANX)_{Q11}$	6	(Ball & Levy, n.d., Thatcher & Perrewe, 2002)
Prior Computer experience $(EXP)_{Q12}$	6	(Albirini, 2006, Ball & Levy, n.d.)
Relative Advantage $(RA)_{Q13}$	7	(Moore & Benbasat, 1991)
Compatibility $(CMBTLY)_{Q14}$	4	(Moore & Benbasat, 1991)
Perceived ease of use $(PCE)_{Q15}$	5	(Gibson, Harris & Colaric, 2008, Moore & Benbasat, 1991)
Attitude towards Computer usage $(ATT)_{Q16}$	4	(Albirini, 2006)

Source: Own work

Participants were asked to give their opinion concerning the level of efficacy they have while using computers and internet as an education and learning tool. They were asked about the level of anxiety they are facing with while using computers and IT while studying. Furthermore, they were asked to provide their answers regarding their prior computer experience while using computers and computer incorporated tools, such as Microsoft Word, Excel, Access, Power point etc. Additionally, throughout the questions asked in a section about the relative advantage, they were asked for an opinion about the improvement of IT is bringing to their learning activities, educational performance, productivity etc.

While investigating the compatibility variable, students were asked to give their opinion regarding the degree of how much using IT is compatible with their current situation, educational and learning activities, and their learning style in general. Throughout the next set of questions, they were asked for an opinion about faculties' online educational resources, such as Canvas, Digital Library of Ljubljana University (hereinafter: DiKUL), Cooperative online bibliographic system and services (hereinafter: COBISS), online course management tools, websites and so on, and their perception on how easy they are to use. Finally, in the last set of questions, students were asked to provide their opinion about the attitude they have towards computer-based learning.

In addition to these variables, I asked few additional questions about attitudes towards computer technology in the classroom that are more specific to the Slovenian context (e.g. about the platforms we use at the university like Canvas, Zoom, etc.) in order to get a broader understanding of their attitudes.

3.5 Data analysis models

Data will be analyzed using descriptive statistics for demographic data and hypothesis testing using independent samples T-tests and one-way ANOVA testing using SPSS statistics. To test the seven hypotheses, several data analyses were conducted. Firstly, descriptive statistics together with the analysis of variance (ANOVA) following with the Pearson's correlation coefficients. Those analyses tend to determine and to understand the current technology use within the student population at University of Ljubljana. This was followed by descriptive statistics on difficulties in using technologies and descriptive statistics as well as correlations on technology perceptions.

3.6 Sampling method and sample description

The sampling technique included the snowball and convenience sampling techniques explained mathematically and statistically by Goodman (1961). The study utilized the opportunities of social networking sites, such as LinkedIn, Facebook and Instagram. The questionnaire was shared also into closed students' community groups created on different platforms and student participation was completely voluntary.

The population sample for this study includes both graduate and undergraduate full-time, part-time students and exchange program students currently enrolled at any faculty at the University of Ljubljana. To be able to demographically distinguish between different groups of students, throughout the questionnaire, respondents had a chance to group themselves based on carefully posted questions.

Criteria used to group respondents to different clusters/groups were set as following:

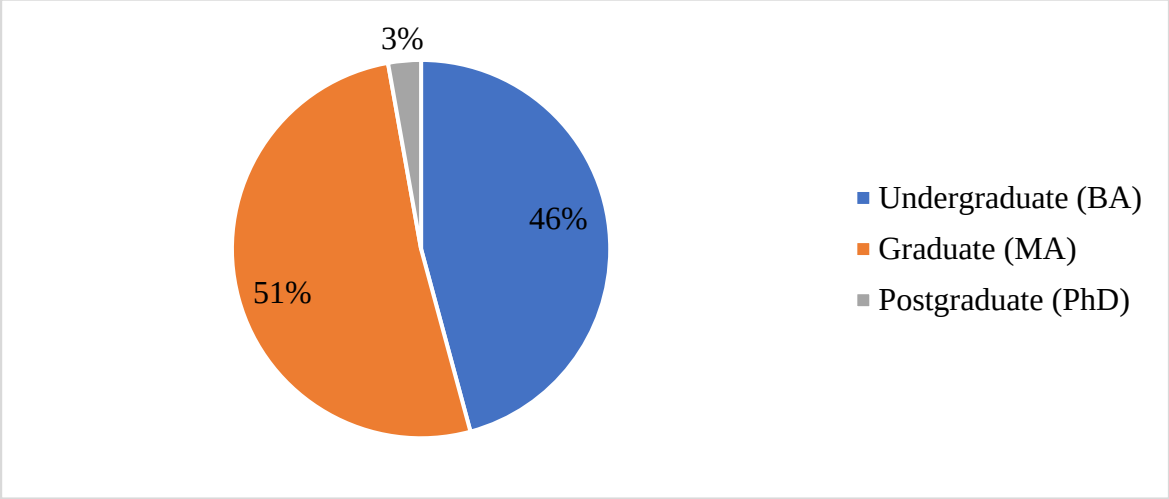
- Study program (e.g. BA, MA, PhD)
- Type of study (e.g. full-time students, part time students, exchange program students)
- Branch of study (e.g. Arts, Humanities, Social sciences, Medical sciences, Natural sciences, Technical sciences)
- Different faculties provided for each branch of study.

In addition, the following demographic questions were asked: age, gender, study program, branch of study, type of study, faculty, type of activities where they prefer using IT over traditional methods in educational process and overall activities where students prefer using IT over traditional methods. All questions were multiple-choice questions, and the question about age was fill-in-the-blank format.

Approximately 94 % of respondents classified themselves as the target population sample for this study. In the sample of 114 respondents, 107 were either full-time, part-time or exchange program students at University of Ljubljana.

Figure 2 bellow graphically shows the type of student program respondents are currently enrolled in. The results are as follows: 51 % of respondents were currently enrolled at the University of Ljubljana for their graduate (hereinafter: MA) studies, followed by 46 % of undergraduate students (hereinafter: BA) and 3 % of postgraduate students (hereinafter: PhD). The ratio between full-time and part-time students was 90:10. Exchange program students also participated in the research with the 12 % of the total responses.

Figure 2: Respondents' current study program



Source: own work. N = 107

As presented in Table 2 bellow, when it comes to gender, the ration between women and men is 70:30.

Table 2: Socio-demographic profile of respondents by gender

Gender	Frequency	Percent	Valid Percent
Male	35	30,7	32,7
Female	71	62,3	66,4
Nonbinary	0	0,0	0,0
Prefer not to say	1	0,8	0,9
Total	107	93,8	100

Source: Own work.

The age of participants ranged from 18 to 32, with an average age of 22,71. For analysis purpose the age has been put into three different groups G1 (18 – 21); G2 (22 – 27); G3 (28 – 32). Grouping was done regarding the study program most students are currently enrolled in. For example, undergraduate program students mostly belong to G1, furthermore graduate students mostly belong to G2, and postgraduate students mostly belong to G3. The largest group accounted for approximately 43 % of total respondents was for the age between 22 and 27 (G2). The largest individual age group accounted for roughly 15 % of total respondents and it was for the age of 20. Results are presented in Table 3 on the other page.

Table 3: Socio-demographic profile of respondents by age and age group

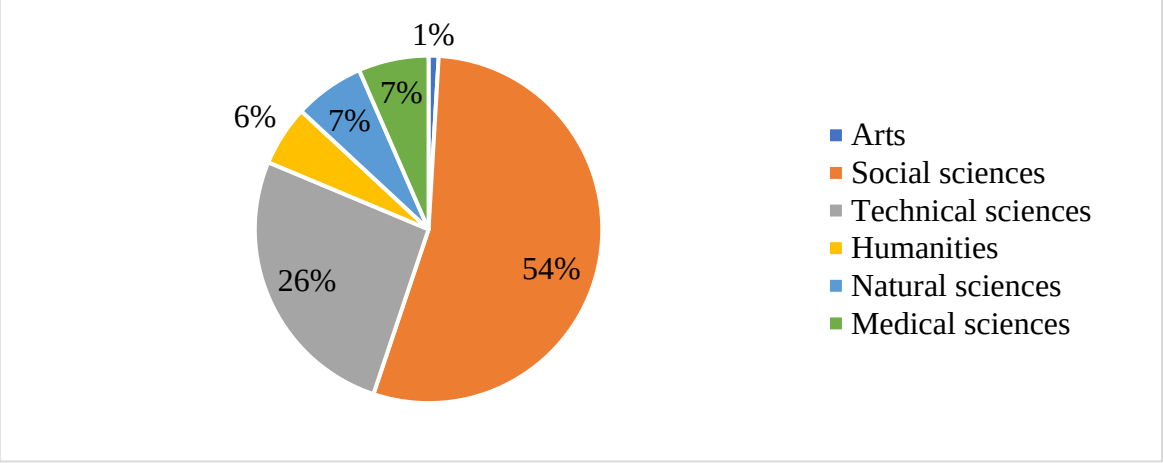
	Age	No. Of respondents	Percentage by Age	Percentage by Group
G1	18	1	0,93	
	19	15	14,02	
	20	16	14,95	
	21	10	9,35	39,25
G2	22	10	9,35	
	23	11	10,28	
	24	14	13,08	
	25	11	10,28	
	26	10	9,35	
	27	5	4,67	57,01
G3	28	2	1,87	
	29	0	0,00	
	30	1	0,93	
	31	0	0,00	
	32	1	0,93	3,74
Total		107	100,00	100,00

Source: own work.

This study work focuses mainly on students' attitudes on using IT in classroom, throughout demographic questions participants were asked to choose their branch of study. University of Ljubljana distinguishes six different branches of study, which are arts, humanities, social sciences, medical sciences, natural sciences and technical sciences.

As presented on the next page in Figure 3, 54 % of respondents are studying social sciences at University of Ljubljana, following with technical sciences 26 %, medical and natural sciences, both with 6,5 %, and finally, arts and humanities together with 6,5 %.

Figure 3: Respondents divided by branch of study



Source: own work, N=107

Furthermore, examining the respondents' structure, Table 4 and Table 5 are showing to which faculties respondents are currently enrolled in for two "winning" branch of studies, social sciences and technical sciences. Further analysis was based on the sample of 58 responders studying social sciences as a branch of study, and also a sample for 28 respondents studying technical sciences as a branch of study. As can be clearly seen in Table 4, among social sciences branch of study, 67 % of respondents are currently enrolled in School of Economics and Business following with almost 15 % of Faculty of Social Sciences.

Table 4: Faculties attended by respondents in the social sciences branch of study

Faculties under the Branch: Social sciences	**Number of Respondents**	**Valid Percent of Respondents**
School of Economics and Business	39	67,24 %
Faculty of Social Sciences	10	17,24 %
Faculty of Law	7	12,07 %
Faculty of Public Administration	2	3,45 %
Faculty of Social Work	0	0,00 %
Total	58	100,00 %

Source: own work.

Furthermore, among technical sciences branch of study, almost 43 % of respondents are currently enrolled in Faculty of Civil and Geodetic Engineering following with 25 % of Faculty of Computer and Information Science. Results are presented in Table 5 on the next page.

Table 5: Faculties attended by respondents in the technical sciences branch of study

Faculties under the Branch: Technical sciences	**Number of Respondents**	**Valid Percent of Respondents**
Faculty of Civil and Geodetic Engineering	12	42,86 %
Faculty of Mechanical Engineering	5	17,86 %
Faculty of Architecture	2	7,14 %
Faculty of Computer and Information Science	7	25,00 %
Faculty of Electrical Engineering	2	7,14 %
Faculty of Maritime Studies and Transport	0	0,00 %
Total	28	100,00 %

Source: own work. N = 28

4 MAIN FINDINGS

In this chapter, I present the research results. Firstly, using descriptive statistics, I explained IT aspects that students like and do not like the most, as well as the activities for which

students like to use IT over traditional methods. Secondly, in the 4.2 part of this chapter, the average scores of each variable can be found. Each variable vas computed using a different set of questions, and the average score of each question is provided. Thirdly, in the 4.3 part of this chapter, the model design and relationship between variables is presented. In the end, under the 4.4 part of the chapter, the hypotheses testing is described.

4.1 Descriptive statistics

4.1.1 Most positive aspects of IT in education for students

Among other questions asked throughout the questionnaire which were researching students' attitudes towards information technology in education due to explain different stated variables, students were also asked to give their opinion about a wide variety of benefits they see while using IT in education. Speaking of that, the open type non-required question was asked in the end of the questionnaire stated as "*What do you perceive as the biggest benefits of using IT at faculty?*".

The emphasis is on the fact that among 107 respondents, 69 of them decided to write down their perceptions about the benefits they see using IT at faculty. The rate of responses on this particular question is pretty high, approximately 64 %.

The main **benefits** can be divided into four different segments:

- Easier, wider, and faster access to study material
- Flexibility
- Knowledge sharing component
- Improved efficiency and accuracy

Easier, wider, and faster access to study materials: When it comes to the segment of easier, wider, and faster access to study materials it should be emphasize that most of the responses were collected throughout the covid-19 crises. The questionnaire was prepared before the crisis, but under the given circumstances, it was launched in the middle of the crises, so the students' responses was mainly concentrated to the fact that faculties did their best to provide the easier and wider access to the study material from comfort of students' home. The students were emphasizing the faster access to the study materials were mainly concentrated to the fact they like to be able to get study materials as soon as possible as well as to get the materials in digital form, which they consider is improving their way of studying.

Flexibility: The flexibility aspect was emphasized by students mostly when it comes to the communication and collaboration part of the education. The ability to collaborate more flexibly with their colleagues is also the thing covid-19 pushed us to get used to it. The

flexible communication was present also before the covid-19, but as students stated, was not commonly recommended.

Knowledge sharing component: As one of most emphasized benefits of using IT at faculty is actually the knowledge sharing component. Students recognized that by using an IT at faculty allows them not just to share their own knowledge with the colleagues, but also to gain new knowledge pretty quickly using the information technology. Furthermore, due to the covid-19 crisis, the remote way of learning become, actually the main way of learning, and the way to share and also gain a knowledge was limited solely to the use of IT for that purpose.

Improved efficiency and accuracy: Using IT at faculty is improving in educational and learning process when it comes to the efficacy and accuracy segment of learning. Students said that by using the IT in a right way, you can improve your accuracy and also you can be more efficient while doing the seminar papers, thesis, studying and also while collaborating with your colleagues. Students emphasized the use of different ad-ons and apps which they considered to improve their efficiency and accuracy throughout their educational process.

4.1.2 Most negative aspects of IT in education for students

Throughout the questionnaire the students were asked to give their opinion about their perception of the biggest challenges of using IT at faculty. Again, the response rate was high considering the fact that the question was not mandatory. Among 107 respondents, 64 of them decided to give their opinion about the challenges they are facing with when it comes of using IT at faculty. The response rate was approximately 60 %. The question asked for this research topic was stated as "*What do you perceive as the biggest challenges of using IT at faculty?*". The question was meant to collect the answers about overall technology use at faculty, but due to the Covid-19 crisis, for some reason, students felt the need to answer this question in totally different way, which is completely understandable. Why? We should take into the consideration the following facts. Firstly, the thesis sample and secondly, the time frame in which they were filling in the questionnaire. As stated in the very beginning, the thesis sample for this research paper was Slovenian students studying at University of Ljubljana, and due to the government's recommendations and decisions in that period of time, Slovenian students were forced to attend classes strictly online and to get used to the remote way of learning. Most of the responses were collected in October and November of 2020, when students were at home or inside their dorms, facing both IT infrastructure difficulties as well as lack of socialization.

Students' responses mainly encompass four **challenges**:

- Unsuitable infrastructure and equipment
- Lack of focus
- Lack of practical lectures and socializing

– Lack of knowledge; students & lecturers

Unsuitable infrastructure and equipment: In the sample of 64 respondents who provided an answer to the question "*What do you perceive as the biggest challenges of using IT at faculty?*", around 20 % of them emphasize they do not have a good equipment in order to be able to follow the lectures properly. Additionally, some of them stated that the infrastructure was the biggest challenge they facing, most notably the internet connection.

Lack of focus: Due to the fact that students mostly use IT in a free time using social media, four respondents emphasize the lack of focus they have while using the same technology for learning as they do in a free time. Most of the respondents who emphasized the lack of focus, also find it challenging to differ between work and home environment, which hardly influence their way of learning and studying.

Lack of practical lectures and socializing: Due to the influence covid-19 clearly had in the time students were filling in the questionnaire, one-third of the responders pointed out the lack of practical lectures and socializing issues they were facing. One student also pointed out the depression caused by lack of socializing he/she was facing. Furthermore, students studying medical sciences and natural sciences highlighted the importance of lab sessions to be held in-class rather than on-line, and the challenges they are facing with, having those sessions on-line is huge from their point of view.

Lack of knowledge; students' & lecturers': The lack of knowledge as an answer to the question "*What do you perceive as the biggest challenges of using IT at faculty?*" is a commonly present sentence. Some of the respondents see the lack of their knowledge as a biggest challenge, while others see the lack of the faculty's knowledge as a biggest challenge. Regardless of the answers to the question stated above, what certainly needs to be done in the coming period is providing additional education in the field of the use of information technology in the education of both students and professors.

4.1.3 Activities for which students prefer IT over traditional methods

There were two questions asked about the students' preferences to use IT over traditional methods. Questions were investigating two different preferences, one was focused on finding out students' preferences when it comes to using IT for activities related to learning/educational purposes, and the second one was focused on students' preferences about the activities they prefer using IT over traditional methods overall.

The questions were stated as follows:

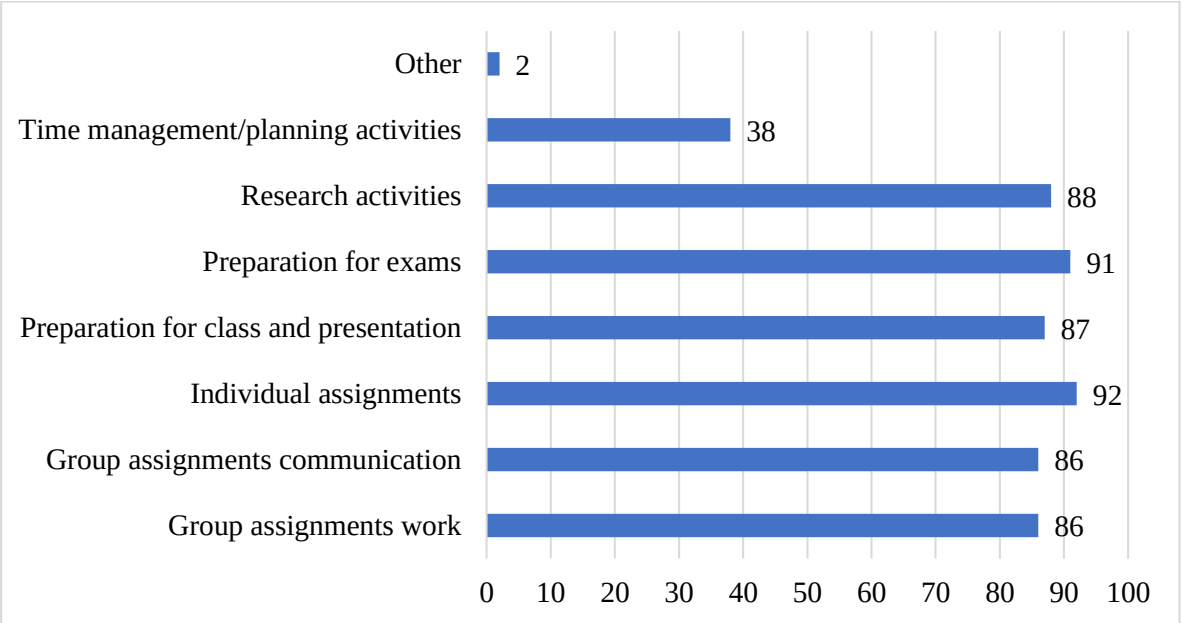
– For which activities related to learning/educational purposes do you already use IT (including internet)?

– In general, for which activities do you prefer to use IT (including internet) over traditional methods?

Figure 4 bellow represents the response summary where students were asked to choose for which activities related to learning and educational purposes, they prefer using IT over traditional methods of learning. It can be clearly seen that students prefer to use information technology when it comes to the research activities, exams, presentations and individual assignments preparations, as well as the group assignments and communication.

When it comes to the time management and planning activities, the results are showing that students do not prefer to use information technologies for those purposes in other words, students prefer using traditional methods for those type of activities over the use of information technologies.

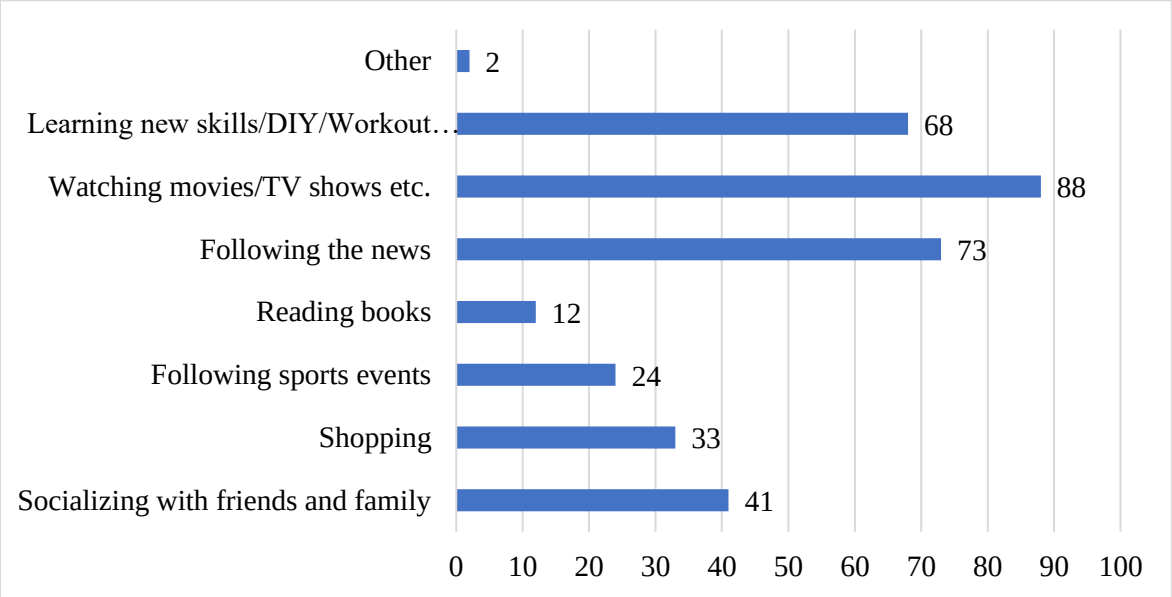
Figure 4: Preferred IT usage for activities related to learning/educational purposes



Source: own work. N = 107

As can be seen in the Figure 5 on the next page, students generally use IT for everyday activities which include IT. If we look carefully, we will see a discrepancy between so called individual and group assignments. Based on the given answers, we can conclude that students are more likely to use IT for learning/educational purposes when it comes to individual tasks and activities, rather than group tasks and activities. Two students also felt the need to enter additional activities related to their learning/educational process and activities for which they prefer to use IT over traditional methods such as “For everything actually” and “I google everything”.

Figure 5: Preferred IT usage for general activities



Source: own work. N = 107

The last two questions asked in the questionnaire were open type questions. Even though those two questions were marked as non-mandatory questions, students showed an interest to express their opinion about the biggest benefits as well as their biggest challenges of using IT at faculty. Approximately 63,5 % of respondents decided to answer those questions. First question intended to gather information about the biggest benefits of using IT at faculty while the second one was focused on students' biggest challenges while using IT at faculty. The answers on the second question were summarized in 4.1.2 under the most negative aspects of IT in education for students.

Considering the first open question "What do you perceive as the biggest benefits of using IT at faculty?", students' answers were very engaging. Most of them pointed out data and literature access, as well as more free time and flexibility. One student pointed out that the biggest benefit of using IT at faculty is the "*process we go through that prepares us much better for the future that will be more and more technology friendly"* (Respondent no. 89, Man, Faculty of Computer and Information Science). Students advocate the fact that IT provides greater flexibility to those who know how to use it effectively.

„I guess the solving methods have gotten faster. We have a wide array of programs or even some that we make ourselves to solve certain mathematical tasks. Besides, almost everything has been digitalized, which of course has its pros and cons, but mostly pros. When it comes to engineering, I don't think the role of IT is questionable or even a deep philosophical subject. Therefore, the main benefits would be improved efficiency and accuracy, as well as the wider access to information, as suggested." (Respondent no. 97, Faculty of Civil and Geodetic Engineering).

4.2 Average scores of variables testing

In this part of the chapter 4 I will provide an average scores of variables testing. There are seven variables tested. Each variable consists of four to seven questions which intend to investigate those variables.

4.2.1 Computer self-efficacy (CSE)

In order to investigate the Computer self-efficacy variable, a group of six questions were dedicated to that purpose. The questions contained exclusively a series of Likert scales where one represented "strongly disagree" and five represented "strongly agree".

As presented in Table 6 bellow, on average, students consider themselves to be able to use computers effectively for their educational and learning purposes. With an **average score of 4.12**, we can conclude that students on average can effectively use computer as an educational tool as well as effectively manage their individual and group work assignments using computers.

Table 6: Computer self-efficacy set of statements

No.	Statements	Average scores
1	I can effectively use computers as educational tool.	4,52
2	I can effectively manage my student project groups when all of us are using computers.	4,14
3	I can extend my educational options by using computers and internet.	4,34
4	I can learn to use computers for my educational and learning process.	4,37
5	I cannot effectively engage in learning activities that incorporate computers.	*Control question* 2,11
6	I could complete my educational and learning process using computers if someone could show me how to do it first.	3,25

Source: own work. N = 107

4.2.2 Computer anxiety (ANX)

To be able to investigate Computer anxiety variable, a group of six statements, provided in Table 7 below, were asked for that purpose. Those six questions contained a series of Likert scales where one represented "strongly disagree" and five represented "strongly agree". Furthermore, to be able to understand the variable correctly, in this case a person having strong computer anxiety would answer this group of question with higher Likert scale value

(ex. 4 or 5) and the other person without computer anxiety would have lower Likert scale values on the scale (ex. 1 or 2).

On average, students do not feel anxious about computer and IT usage. For example, the set of questions asked while investigating Computer anxiety variable were mostly concentrated about the fear of losing data, hesitation when it comes to IT usage, (un)comfortable computer usage etc. With an **average score of 1,98**, we can conclude that students on average do not feel anxious about the computer and IT usage.

Table 7: Computer anxiety set of statements

No.	Statements	Average scores
1	I feel anxious about using computers.	1,83
2	It scares me to think that I could cause the computer to destroy a large amount of information by hitting the wrong key.	2,53
3	I hesitate to use computers for fear of making mistakes that I cannot correct.	1,93
4	Computers and internet technologies are somewhat frightening to me.	1,89
5	Using computers and related technologies to educate myself makes me feel uncomfortable.	1,73
6	The challenge of learning about information technologies is exciting.	3,73

Source: own work. N = 107

4.2.3 Prior computer experience (EXP)

Prior computer experience variable consisted of six statements, provided in Table 8 on the next page. Those questions were focused to collect more information about students' ability to use different computer programs, such as Microsoft Package (Outlook, Word, Excel, PowerPoint, and Access) as well as internet and various of websites.With an **average score of 4,35** we can clarify that on average, students are feeling confident while using MS Office Package as well as while using different websites. The question about the confidence while using MS Access was poorly graded, precisely from one to five on Likert scale, it landed just in the middle with an average of 3,00.

Table 8: Prior computer experience set of statements

No.	Statements	Average scores
1	Sending and receiving emails	4,79

(table continues)

(continued)

2	Using internet and various websites	4,86
3	Operate a word processing program (eg. Microsoft Word)	4,78
4	Operate a spreadsheet program (eg. Microsoft Excel)	4,03
5	Operate a database program (eg. Microsoft Access)	2,99
6	Operate a presentation program (eg. Microsoft Power point)	4,67

Source: own work. N = 107

4.2.4 Relative advantage (RA)

In order to investigate the Relative advantage variable, provided in Table 9 below, a group of seven statements were used. Students were asked to use a 5-point Likert scale to grade different statements. Statements are connecting the influence information technologies have on their way of doing assignments, learning activities, educational performance, educational activities, productivity etc. With an **average score of 3,87** we can clarify that, on average, students consider the use of IT improves the quality of their learning activities, enhances their effectiveness on educational activities, increase study related productivity, educational performance.

Furthermore, while doing a school assignment, students state that using IT enables them to accomplish the assignments more quickly and easier.

Table 9: Computer self-efficacy set of statements

No.	**Statements**	**Average scores**
1	Using IT enables me to accomplish my assignments more quickly.	4,10
2	Using IT improves the quality of my learning activities.	3,90
3	Using IT makes it easier to complete my assignments.	4,15
4	Using IT improves my educational performance.	3,90
5	Using IT gives me greater control over my educational activities.	3,78
6	Using IT increases my study related productivity.	3,53
7	Using IT enhances my effectiveness on educational activities.	3,70

Source: own work. N = 107

4.2.5 Compatibility (CMBTLY)

The Compatibility variable consisted of four statements, provided in Table 10 below. Those questions were focused to collect more information on students' compatibility with the IT. Questions mainly investigated the compatibility level between IT and students' educational activities, the current situation they are currently in and their learning style. With an **average score of 3,76** we can clarify that on average, students feel that using improved IT is compatible with their educational and learning activities as well as with their learning style.

Table 10: Compatibility set of statements

No.	Statements	Average scores
1	Using improved IT is compatible with all aspects of my educational activities.	3,74
2	Using improved IT is completely compatible with my current situation.	3,93
3	I think that using IT fits well with the way I like to study/learn.	3,71
4	I think that using IT fits into my learning style.	3,68

Source: own work. N = 107

4.2.6 Perceived ease-of-use (PCE)

To be able to investigate the Perceived ease-of-use variable, a group of five statements were asked, provided in Table 11 which can be find on next page. Students were responding to the set of questions including those about Canvas, Zoom, DiKUL, COBISS etc. Using a 5-point Likert scale, students were asked to give their opinion about the intensity they feel the IT is easy for use while incorporated in education.

With an **average score of 3,81** we can clarify that, on average, students consider IT educational tools to be easy to use.

Separately investigating the one particular question, we can also conclude that, overall, students believe that information technologies, including internet, are easy to use. The question was stated as follows »*Overall, I believe that IT (including internet) is easy to use.*«. On a 5-point Likert scale, 94 out of 107 respondents said they are either strongly agree or agree with the given statement. With the percentage of 87 % of respondents, positively graded the statement, it is clear that students are well prepared for a digital transformation of the education system.

Table 11: Perceived ease-of-use set of statements

No.	Statements	Average scores
1	I find my faculty's online educational resources (ex. Canvas, Zoom, DiKUL, COBISS, online course management tools, websites etc.) to be easy to use.	3,96
2	I find it easy to get everything that I need for educational purposes while using my faculty's educational resources (ex. Canvas, Zoom, DiKUL, COBISS, online course management tools, websites etc.)	3,70
3	It is not easy for me to become more skillful in using IT for my learning/educational process.	*Control question* 2,49
4	I find it difficult for me to gain more IT skills which I need for my learning/educational process.	*Control question* 2,30
5	Overall, I believe that IT (including internet) is easy to use.	4,19

Source: own work. N = 107

4.2.7 Attitudes towards technology (ATT)

In order to investigate the Attitudes toward technology variable, a set of four statements were provided. Students were asked to grade their attitude towards computer-based learning. As shown in a Table 12 bellow each statement is graded positively with an **average score of 3,70** on a 5-point Likert scale. Although if we take a look to the statement 3, we can notice a lower grade comparing to other statements. We can conclude that although students are technically educated and ready to digitize education system, they still do not think that information technology should be used in all subject matters.

Table 12: Attitudes towards technology set of statements

No.	Statements	Average scores
1	Learning with computers offers real advantages over traditional methods of learning.	3,74
2	I like using computers for my learning/educational process.	3,92
3	I think students and teachers should use computers in all subject matters.	3,37
4	I think computers can be effectively implemented as regular learning/educational tools.	3,79

Source: own work. N = 107

4.3 Hypothesis testing

The full list of the hypotheses is presented in Chapter 3 and the variables used to test these hypotheses are available in the Table 1 within the same chapter. Results of hypothesis testing are provided below.

H1: *Students' computer self-efficacy positively influences their perceived ease of use of educational technologies.*

The variables used to test hypothesis H1 were computer self-efficacy (CSE) and perceived ease of use (PCE). There were six questions asked about computer self-efficacy, one of them being control question excluded from the analysis (see Q1 to Q6 in Appendix B) and four questions asked about perceived ease of use (see Q30 to Q33 in Appendix B). Statements about computer self-efficacy and perceived ease of use were measured by a Likert scale from 1 – strongly disagree to 5 – strongly agree.

Computer self-efficacy (CSE) is measured by the following statements:

- I can effectively use computers as educational tool.
- I can effectively manage my student project groups when all of us are using computers.
- I can extend my educational options by using computers and internet.
- I can learn to use computers for my educational and learning process.
- I cannot effectively engage in learning activities that incorporate computers.
- I could complete my educational and learning process using computers if someone could show me how to do it first.

Mean CSE of these scores is equal to 4,12.

Perceived ease of use (PCE) is measured by the following statements:

- I find my faculty's online educational resources (ex. Canvas, Zoom, DiKUL, COBISS, online course management tools, websites etc.) to be easy to use.
- I find it easy to get everything that I need for educational purposes while using my faculty's educational resources (ex. Canvas, Zoom, DiKUL, COBISS, online course management tools, websites etc.)
- It is not easy for me to become more skilful in using IT for my teaching.
- I find it difficult for me to gain more IT skills which I need for my learning/educational process.
- Overall, I believe that IT (including internet) is easy to use.

Mean PCE of these scores is equal to 3,81.

According to Pearson's correlation statistic, there is a positive relationship between computer self-efficacy and their perceived ease of use. Pearson correlation coefficient is r = 0,092, significant at the 0,05 level, indicating weak positive correlation between variables.

Results of 2-tailed test with sig. = 0,033 indicates that we cannot accept the null hypothesis that there is a statistically significant relationship between computer self-efficacy and perceived ease of use.

H2: *Students' computer self-efficacy negatively influences their computer anxiety.*

The variables used to test Hypothesis H2 were computer self-efficacy (CSE) and computer anxiety (ANX). There are six questions asked about computer self-efficacy (see Q1 to Q6 in Appendix B) and six questions asked about computer anxiety (see Q7 to Q12 in Appendix B). Questions about computer self-efficacy and computer anxiety were measured by a Likert scale from 1 – strongly disagree to 5 – strongly agree.

Computer anxiety (ANX) is measured by the following statements:

- I feel anxious about using computers.
- It scares me to think that I could cause the computer to destroy a large amount of information by hitting the wrong key.
- I hesitate to use computers for fear of making mistakes that I can't correct.
- Computers and internet technologies are somewhat frightening to me.
- Using computers and related technologies to educate myself makes me feel uncomfortable.
- The challenge of learning about information technologies is exciting.

Mean ANX of these scores is equal to 1,98.

According to Pearson's correlation statistic, there is a negative relationship between computer self-efficacy and computer anxiety. Pearson correlation coefficient is r = -0,138, significant at the 0,01 level, indicating a statistically significant weak correlation between the CSE and ANX variables.

H3: *Higher the students' computer anxiety lesser will be perceived ease of use of IT applications.*

The variables used to test Hypothesis H3 were computer anxiety (ANX) and perceived ease of use (PCE). There are six questions asked about computer anxiety (see Q7 to Q12 in Appendix B) and four questions asked about perceived ease of use (see Q30 to Q33 in Appendix B). Questions about computer anxiety and perceived ease of use were measured by a Likert scale from 1 – strongly disagree to 5 – strongly agree.

Computer anxiety (ANX) and Perceived ease of use (PCE) are measured by the statements listed above.

According to Pearson's correlation statistic, there is a negative relationship between computer anxiety and perceived ease of use variables. Pearson correlation coefficient is r = -0,331, significant at the 0,01 level, indicating a statistically significant moderate correlation between ANX and PCE variables.

H4: *Prior computer experience significantly influences students' perceived ease of use of an information technology.*

The variables used to test Hypothesis H4 were prior computer experience (EXP) and perceived ease of use (PCE). There are six questions asked about prior computer experience (see Q13 to Q18 in Appendix B) and four questions asked about perceived ease of use (see Q30 to Q33 in Appendix B). Questions about prior computer experience were measured by Likert scale from 1 – not at all to 5 – very much, at the same time questions about perceived ease of use were measured by a Likert scale from 1 – strongly disagree to 5 – strongly agree.

Prior computer experience (EXP) is measured by the following statements:

- Sending and receiving emails
- Using internet and various websites
- Operate a word processing program (eg. Microsoft Word)
- Operate a spreadsheet program (eg. Microsoft Excel)
- Operate a database program (eg. Microsoft Access)
- Operate a presentation program (eg. Microsoft Power point)

Mean EXP of these scores is equal to 4,35.

According to Pearson's correlation statistic, there is a positive relationship between prior computer experience and perceived ease of use. Pearson correlation coefficient is r = 0,056, indicating weak correlation between EXP and PCE variables. However, since the results of 2-tailed test have a sig. = 0,196, we can reject the third hypothesis.

H5: *Relative advantage will positively influence the students' perceived ease of use of educational technology.*

The variables used to test Hypothesis H5 were relative advantage (RA) and perceived ease of use (PCE). There are seven questions asked about relative advantage (see Q19 to Q25 in Appendix B) and four questions asked about perceived ease of use (see Q30 to Q33 in Appendix B). Questions about relative advantage and perceived ease of use were measured by a Likert scale from 1 – strongly disagree to 5 – strongly agree.

Relative advantage (RA) is measured by the following statements:

- Using IT enables me to accomplish my assignments more quickly.
- Using IT improves the quality of my learning activities.
- Using IT makes it easier to complete my assignments.
- Using IT improves my educational performance.
- Using IT gives me greater control over my educational activities.
- Using IT increases my study related productivity.
- Using IT enhances my effectiveness on educational activities.

The mean RA of these scores is equal to 3,87.

According to Pearson's correlation statistic, there is a positive relationship between relative advantage and perceived ease of use variables. Pearson correlation coefficient is r = 0,230, significant at the 0,01 level, indicating a statistically significant weak correlation between RA and PCE variables.

H6: *Compatibility positively influences the students' perceived ease of using Information Technology for educational and learning process.*

The variables used to test Hypothesis H6 were compatibility (CMBTLY) and perceived ease of use (PCE). There are five questions asked about compatibility (see Q26 to Q29 in Appendix B) and four questions asked about perceived ease of use (see Q30 to Q34 in Appendix B). Questions about compatibility and perceived ease of use were measured by a Likert scale from 1 – strongly disagree to 5 – strongly agree.

Compatibility (CMBTLY) is measured by the following statements:

- Using improved IT is compatible with all aspects of my educational activities.
- Using improved IT is completely compatible with my current situation.
- I think that using IT fits well with the way I like to study/learn.
- I think that using IT fits into my learning style.

Mean CMBTLY of these scores is equal to 3,76.

According to Pearson's correlation statistic, there is a positive relationship between compatibility and perceived ease of use. Pearson correlation coefficient is r = 0,279, significant at the 0,01 level, indicating a statistically significant weak correlation between CMBTLY and PCE variables.

H7: *Perceived ease of use positively influences students' attitude towards using educational technologies.*

The variables used to test Hypothesis H7 were perceived ease of use (PCE) and attitude towards computer usage (ATT). There are four questions asked about perceived ease of use (see Q30 to Q34 in Appendix B) and four questions asked about attitude towards computer

usage (see Q35 to Q38 in Appendix B). Questions about perceived ease of use and attitude towards computer usage were measured by a Likert scale from 1 – strongly disagree to 5 – strongly agree.

Perceived ease of use (PCE) is measured by the statements listed above.

Attitude towards computer-based learning (ATT) is measured by the following statements:

- Learning with computers offers real advantages over traditional methods of learning.
- I like using computers for my learning/educational process.
- I think students and teachers should use computers in all subject matters.
- I think computers can be effectively implemented as regular learning/educational tools.

Mean ATT of these scores is equal to 3,70.

According to Pearson's correlation statistic, there is a positive relationship between perceived ease of use and attitude towards technology variables. Pearson correlation coefficient is r = 0,170, significant at the 0,01 level, indicating a statistically significant weak correlation between PCE and ATT variables.

The full statistical results of all of the listed Pearson's correlations are provided in Appendix C.

5 DISCUSSION, RECOMMENDATION AND LIMITATIONS

This part of the research paper will include the discussion of main findings, limitations, and the recommendations for future research. Firstly, the discussion of findings section assesses the hypotheses results and the status of each hypothesis and revisits the research questions stated in the beginning of the study. Secondly, the limitations of research part of the chapter discusses the limitations that arose while gathering the data, and also those limitations recognized after the date was collected. I also briefly explain the covid-19 crisis and the way in which that crisis has affected the research. Thirdly, I provide recommendations for further research. The recommendation will mainly be focused on a different choice of sample and different research approach, such as case study approach.

5.1 Discussion of findings

The main objective of the thesis was to observe and better understand the attitudes of Slovenian students towards using IT in classroom as this subject was insufficiently researched before. An important finding of this study involves the strength of the relationship between attitudes and factors influencing those attitudes. The designed hypotheses were stated individually with special connection between seven different variables. The designed hypotheses were researched using different set of questions investigating and describing

each variable and their mutual relationships influence one on another. The summary of proposed hypotheses and the results after testing can be observed in the table below.

Table 13: Tested Hypotheses and their statuses

	Hypothesis	Status
H1	Students' computer self-efficacy **positively influences** their perceived ease of use of educational technologies.	**REJECTED**
H2	Students' computer self-efficacy **negatively influences** their computer anxiety.	**ACCEPTED**
H3	**Higher** the students' computer anxiety **lesser** will be perceived ease of use of IT applications.	**ACCEPTED**
H4	Prior computer experience **significantly influences** students' perceived ease of use of an information technology.	**REJECTED**
H5	Relative advantage will **positively influence** the students' perceived ease of use of educational technology.	**ACCEPTED**
H6	Compatibility **positively influences** the students' perceived ease of using Information Technology for educational and learning process.	**ACCEPTED**
H7	Perceived ease of use **positively influences** students' attitude towards using educational technologies.	**ACCEPTED**

Source: own work

5.2 Limitations of research

Even though this study covers some important aspects of students' attitudes towards using IT in educational purposes and adds value to previously conducted research, there are still some limitations that should be mentioned. The major limitations especially concern the size of the sample, the diversity of the sample, as well as limited research review on previous studies researching Slovenian students' attitudes toward information technology in general. Potential bias may be detected if we consider the sample demographic characteristics. 70 % of the respondents were represented by females and there were roughly 30 % of male respondents. Furthermore, 54 % of respondents are part of social sciences branch of study following with the 46 % of other branch of studies all together. The vast majority of the respondents also currently enrolled at faculty grouped inside social sciences branch of study, mainly because I and a lot of my contacts belong to the same branch of study group.

It is important to emphasize the zero-response rate from some faculties which are consequently excluded from the study. Those faculties are:

– Academy of Music,

– Academy of Theatre, Radio, Film and Television,
– Faculty of Sport,
– Faculty of Social Work,
– Veterinary Faculty,
– Faculty of Natural Sciences and Engineering and
– Faculty of Maritime Studies and Transport.

Furthermore, the study results are not applicable to those faculties having only one responder, since the sample for those faculties is not represented. Those faculties are:

– Academy of Fine Arts and Design,
– Faculty of Arts,
– Faculty of Theology and
– Faculty of Mathematics and Physics.

Additionally, even though there are no noticeable discrepancy between MA and BA students in a sample, there were only three respondents currently enrolled in PhD studies at University of Ljubljana, which makes this sample unrepresented. Outcomes may be different if the sample was more diversified in a sense of branch of study segment and gender balanced.

While processing the collected data, the most interesting limitation of this research arise. The fact that covid-19 impacted the whole world in a March of 2020, also had huge influence on students' attitudes. As an example, while answering an open-type questions about obstacles while using IT in classroom, students perceived that they were asked about the on-line educational system during the covid-19 crisis, which they were not. Notwithstanding their answers helped address the problems while using IT in classrooms, the potential bias is present since the impact which the covid-19 had to the whole educational system and consequently to each student individually is huge.

5.3 Recommendations for further research

Recommendations for further research basically arise from the limitations of the research. Therefore, the recommendations bellow will cover main points which researchers should follow if decide to research and study attitudes towards information technology in education, especially on a case of Slovenia.

– Sample recommendations
  - Branch of study
  - Study program
  - Focused (one faculty) sample
  - Gender based study
– Case study recommendations

- Comparison with other EU countries
- Comparison with one USA state

Sample recommendations: The recommended sample for further research will be to do a research within each branch of study individually. For example, a results of research study within a social sciences branch of study will probably differ from results gathered within medical or natural sciences branch of study. When it comes to the study program, for a further research I recommend dividing a sample and do the research within one study program at a time. Additionally, the Covid-19 crisis brought enormous changes to the education sector and for sure changed our everyday life. As a recommendation, I suggest that further research involve each faculty individually, and to use Technology Acceptance Model (TAM) in order to investigate the level of student readiness for those changes that happened all of a sudden due to the Covid-19 crisis. When it comes to the gender, it is recommended to take care that the sample is evenly distributed, to be able to eliminate the gender bias.

Case study recommendations: Arising from the fact that the conducted study is unique due to country-specific factors, herby the recommendations for further research will encompass the case study research which will bring additional insight on the degree of diversity between Slovenia and other EU and non-EU countries. In order to investigate the differences between Slovenia and other EU countries when it comes to the attitudes towards using IT in education, for the further research I suggest the case study which will encompass the differences that may exist. Additionally, one of the suggestions also includes the case study covering the differences that may exist between students' attitudes toward technology between Slovenia and one state of the United States of America.

CONCLUSION

Given the recent presence of technology in Slovenian educational institutions, the country has the responsibility not only to provide equipment for those institutions, but also to support a culture of acceptance amongst the end-users of those tools. The challenge of integrating technology into educational and learning processes are more human impacted than it is a technological matter (Obermeyer, Ramasubramanian & Warnecke, 2016). To be able to increase the use of technology in the classrooms, there have to be more preparation, training as well as improved usability. The question if more technology implicates more or even less student negative emotions and their frustration and how will technology usage can be supported in a way to increase during the next years should be the main starting point of future studies.

Existing research on attitudes of Slovenian students towards using IT in education is still rather limited. The main purpose of this thesis was, therefore, to provide the information regarding students' readiness to accept the current and new coming technology and the level

of technology adaptability to their learning and studying activities. To do so, I used a quantitative research methodology approach, with data being collected through an online survey tool Microsoft Forms with an already existing survey instrument, which was structured in a way to provide answers to the set research questions. The obtained primary data was sorted and analyzed with the help of IBM SPSS Statistical Software and advanced Microsoft Excel and various Excel add-ons, using different statistical methods.

The main findings are, firstly, the benefits students see using IT at faculty, including easier, wider and faster access to study material, flexibility IT is providing them, knowledge sharing component IT supports as well as an improvement they recognize when it comes to efficiency and accuracy IT is helping them to achieve. The emphasis should also be put on the fact that 64 % of respondents decided to answer an open type non-mandatory question about the benefits they see while using IT at faculty. Secondly, the main findings of the thesis also are the biggest challenges students see using IT at faculty which they clearly stated in another open type non-mandatory question. Challenges they see are unsuitable infrastructure and equipment, lack of focus they are facing with because of using IT at faculty as well as the lack of knowledge from students' side and also from the lecturers' side. While researching deeper the answers students provided, I found out the main reason for most negative statements within that particular question. Most of the responses were collected in October and November of 2020, when students were at home or inside their dorms, facing both IT infrastructure difficulties as well as lack of socialization. That fact also explains the high response rate to open type non-mandatory questions, where students obviously felt the need to be heard. Thirdly, one of the main findings is that students are more likely to use IT for learning/educational purposes when it comes to individual tasks and activities, rather than group tasks and activities.

Furthermore, hypotheses testing brought some substantial findings when it comes to the relationships between variables. Six out of seven relationships proved to be weak, in other words, six out of seven correlation tests showed week correlation between two researched variables. Although, the correlation between students' computer anxiety and students' perceived ease of use proved to be the highest. Correlation between those two variables was proven as moderate. In contrary, the lowest correlation was shown between prior computer experience and perceived ease of use as well as between computer self-efficacy and perceived ease of use of information technologies.

This study also elaborates on the importance of information technology and students' acceptance of technology in education. To attain a higher level of technology presence in classrooms, educational institutions must continue their efforts by integration of more technology-based knowledge for students as well as for teachers. It is increasingly important to understand the benefits technology could bring to the educational system. The displayed results and suggestions will hopefully contribute to a more promising technology-based learning at faculties and provide a basis for further research into Technology Acceptance Model (TAM) in Slovenia.

With regard to practical contributions, the findings of this research could help university administrators and teachers who are involved in digital transformation of education system with learning delivery towards pupils from Gen Z. The respondents involved in this study have made it clear that they prefer learning via modern technological means and not the traditional methods that have been used by generations before them, but the results also demonstrate that certain types of assignments and activities are better suited for traditional vs. IT means, pointing to the need for a better understanding of how to incorporate IT more successfully into the classroom.

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APPENDICES

Appendix A: Summary in Slovene language

Današnji izobraževalni proces je precej drugačen kot nekoč in na večini univerz imajo študentje več svobode kot v preteklosti. Študentje se lahko odločajo med različnimi predmeti in smermi, ki jih zanimajo, pridobivajo raznolika znanja ter študij kombinirajo z vrsto obštudijskih aktivnosti, študijskimi izmenjavami in praksami. Eden izmed ciljev izobraževanja je postal tudi omogočiti študentom, da postanejo digitalno pismeni državljani, ki se lahko spopadajo s kompleksnostjo in dinamiko današnje družbe. Razvoj in napredek informacijske tehnologije (v nadaljevanju IT) sta popolnoma preoblikovala poslovne strategije in prakse celotnih industrij. Področje visokega šolstva pa v tem primeru ni izjema. Univerze in fakultete po vsem svetu vlagajo velike vsote denarja v pridobivanje informacijskih virov in ustvarjanje informacijske infrastrukture, ki ustreza potrebam njihovih študentov in profesorjev.

Z raziskavo poskušam identificirati vse pomembne dejavnike, ki vplivajo na uvajanje informacijske tehnologije med študenti, ki študirajo na Univerzi v Ljubljani. Magistrsko delo obsega teoretični in empirični del. Teoretični del zajema trenutno stanje IT v izobraževanju, vse pomembnejšo vlogo le-tega ter trende, s katerimi se sooča. V njem predstavim tudi vrste IT, ki jih lahko uporabljamo v predavalnicah ter koristi in ovire, ki jih to lahko prinaša. Empirični del temelji na modelu sprejemanja tehnologije (v nadaljevanju TAM), zato ga v teoretičnem delu podrobneje predstavim skupaj z modelom tehnološke pripravljenosti (v nadaljevanju TRI), ki je ravno tako pomemben v okviru raziskave.

Empirični del magistrskega dela temelji na spletnem vprašalniku za zbiranje informacij. Vzorec populacije za to raziskavo so sestavljali redni in izredni študentje, študentje na izmenjavi ter dodiplomski in podiplomski študentje trenutno vpisani na eno izmed fakultet Univerze v Ljubljani. Raziskovalni instrument temelji na že obstoječem vprašalniku, ki je namenjen merjenju odnosa profesorjev do uvajanja IT v pedagoški proces. Vprašalnik, ki ga je razvil John (2015) je osredotočen na učitelje in profesorje za potrebe pričujoče raziskave pa je prilagojen za študente. Poleg obstoječih vprašanj so posebej dodana še vprašanja, ki govorijo o odnosu do informacijske tehnologije na predavanjih, saj se na fakultetah po Sloveniji pogosto uporabljajo platforme kot so Canvas, Zoom ipd. S tem je raziskava še dodatno poglobljena iz vidika razumevanja njihovega odnosa do informacijske tehnologije. Podatke, ki so bili zbrani z vprašalnikom so analizirani z opisno statistiko za demografske podatke, hipoteze pa testirane s pomočjo statističnega paketa SPSS.

Glavni cilj magistrskega dela je poglobljeno razumevanje odnosa slovenskih študentov do uporabe informacijske tehnologije v učnem procesu. Ob pregledu literature je bilo mogoče zaznati, da je omenjeno področje premalo raziskano ampak zelo pomembno za današnjo digitalizirano družbo. Ena izmed ključnih ugotovitev te raziskave vključuje močne povezave med stališči in dejavniki, ki vplivajo na ta stališča. Oblikovane hipoteze so bile postavljene posamično, vendar s posebno povezavo med sedmimi različnimi spremenljivkami ter

raziskane s pomočjo različnih sklopov vprašanj, ki so se nanašala in opisovala vsako spremenljivo posebej ter njihove medsebojne odnose.

Omejitve pričujoče raziskave se nanašajo predvsem na velikost in raznolikost vzorca ter omejen pregled predhodnih raziskav, ki obravnavajo odnos slovenskih študentov do informacijske tehnologije na splošno. Izpostaviti je potrebno tudi, da je v procesu zbiranja podatkov za raziskavo v marcu 2020 svet prizadela pandemija covid-19, kar je imelo velik vpliv tudi na stališča študentov. Pogosto je bilo mogoče zaznati, da so študentje med odgovarjanjem na vprašanja odprtega tipa, ki se nanašajo na ovire pri uporabi informacijske tehnologije v učnem procesu, odgovarjali v kontekstu covid-19, čeprav so bila vprašanja zastavljena na splošno. Čeprav so njihovi odgovori pripomogli k nadaljnji analizi, obstaja možnost pristranskih odgovorov, ki so posledica dejavnikov, ki jih je pandemija covid-19 pustila na celotnem izobraževalnem sistemu ter posledično na vsakem študentu posebej.

Priporočila za nadaljnje raziskave izhajajo predvsem iz omejitev, zato v nadaljevanju zajemam glavne točke, ki jih morajo raziskovalci upoštevati, v primeru, da se odločijo proučevati in raziskovati odnos študentov do informacijske tehnologije v izobraževalnem sistemu v Sloveniji.

- Priporočila za **vzorce**
  - Področje študija
  - Študijski program
  - Fokusirani vzorec (primer: ena fakulteta)
  - Študija na podlagi spola
- Priporočila za **študije primera**
  - Primerjava z državami Evropske unije
  - Primerjava z eno od zveznih držav Združenih držav Amerike

Glede na prisotnost tehnologije v slovenskih izobraževalnih ustanovah je pravzaprav država odgovorna ne le za zagotavljanje ustrezne infrastrukture, temveč tudi za spodbujanje kulture sprejemanja teh orodij med končnimi uporabniki. Ali več tehnologije pomeni več ali manj frustracij študentov in kako je mogoče povečati uporabo tehnologije in njeno uporabnost, ob pa še zagotoviti odpravljanje ugotovljenih ovir, so vprašanja, na katere lahko poskušajo odgovoriti prihodnje študije.

Appendix B: Survey

Attitudes of Slovenian Students Towards Information Technology in Education

I am a full time Master student at School of Economics and Business, University of Ljubljana, studying Business informatics. As a part of my final thesis research, I am conducting a survey about **Attitudes of Slovenian Students Towards Information Technology in Education**. Furthermore, I would be thankful if you could help me with my research by filling in this questionnaire. The questionnaire consists of 48 questions (46 of them being multiple choice and 2 open non-mandatory questions). Questions are divided into 7 different groups (each group contains 4-7 multiple choice questions), and demographical part consists of 10 questions.

The questionnaire is **completely anonymous**, and your answers will **only** be used for master thesis and educational purposes. Approximate time for filling in the questionnaire is 15 minutes.

Please note that the population sample for this study includes:

- full-time students,
- part-time students,
- exchange program students,

currently enrolled at University of Ljubljana.

If you belong to the target group, please continue with the questionnaire. For any additional assistance, questions and/or feedback, please do not hesitate to contact me by an email np1769@student.uni-lj.si.

Q1 – I belong to the target group. *(eliminatory question)*

a) Yes
b) No

Q2 – How old are you?

Numerical field (enter age number)

Q3 – Gender

a) Woman
b) Man
c) Non-binary
d) I prefer not to say

Q4 – In which study program are you currently enrolled in?

a) Undergraduate (BA)
b) Graduate (MA)
c) Postgraduate (PhD)

Q5 – You are currently enrolled as:

a) Full time student
b) Part time student
c) Exchange program student

Q6 – Please choose your branch of study:

a) Arts
b) Humanities
c) Social sciences
d) Medical sciences
e) Natural sciences
f) Technical sciences

Q7a – In which faculty are you currently enrolled? *(filtered based on Q6 = Arts)*

a) Academy of Music
b) Academy of Theatre, Radio, Film and Television
c) Academy of Fine Arts and Design

Q7b – In which faculty are you currently enrolled? *(filtered based on Q6 = Humanities)*

a) Faculty of Sport
b) Faculty of Arts
c) Faculty of Education
d) Faculty of Theology

Q7c – In which faculty are you currently enrolled? *(filtered based on Q6 = Social sciences)*

a) School of Economics and Business
b) Faculty of Social Sciences
c) Faculty of Social Work
d) Faculty of Public Administration
e) Faculty of Law

Q7d – In which faculty are you currently enrolled? *(filtered based on Q6 = Medical sciences)*

a) Faculty of Medicine
b) Faculty of Pharmacy
c) Veterinary Faculty
d) Faculty of Health Sciences

Q7e – In which faculty are you currently enrolled? *(filtered based on Q6 = Natural sciences)*

a) Biotechnical Faculty
b) Faculty of Chemistry and Chemical Technology
c) Faculty of Mathematics and Physics
d) Faculty of Natural Sciences and Engineering

Q7f – In which faculty are you currently enrolled? *(filtered based on Q6 = Technical sciences)*

a) Faculty of Mechanical Engineering
b) Faculty of Maritime Studies and Transport
c) Faculty of Computer and Information Science
d) Faculty of Civil and Geodetic Engineering
e) Faculty of Electrical Engineering
f) Faculty of Architecture

Q8 – For which activities related to learning/educational purposes do you already use IT (including internet)? *You can choose more than one answer to this question.*

a) Group assignments work
b) Group assignments communication
c) Individual assignments
d) Preparation for class and presentation
e) Preparation for exams
f) Research activities
g) Time management/planning activities
h) Other: _____

Q9 – In general, for which activities do you prefer to use IT (including internet) over traditional methods? *You can choose more than one answer to this question.*

a) Socializing with friends and family
b) Shopping
c) Following sports events
d) Reading books
e) Following the news
f) Watching movies/TV shows etc.
g) Learning new skills/DIY/Workout following tools (ex. Online trainings, different apps for tracking workouts etc.)
h) Other: _____

Q10 – Following group of questions are focused on computer self-efficacy

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
I can effectively use computers as educational tool.	○	○	○	○	○
I can effectively manage my student project groups when all of us are using computers.	○	○	○	○	○
I can extend my educational options by using computers and internet.	○	○	○	○	○
I can learn to use computers for my educational and learning process.	○	○	○	○	○
I cannot effectively engage in learning activities that incorporate computers.	○	○	○	○	○
I could complete my educational and learning process using computers if someone could show me how to do it first.	○	○	○	○	○

Q11 – Following group of questions are related to computer anxiety

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
I feel anxious about using computers.	○	○	○	○	○
It scares me to think that I could cause the computer to destroy a large amount of information by hitting the wrong key.	○	○	○	○	○
I hesitate to use computers for fear of making mistakes that I cannot correct.	○	○	○	○	○
Computers and internet technologies are somewhat frightening to me.	○	○	○	○	○
Using computers and related technologies to educate myself makes me feel uncomfortable.	○	○	○	○	○
The challenge of learning about information technologies is exciting.	○	○	○	○	○

Q12 – Following group of questions are focused on your prior computer experience.
Please answer these questions based on how skilled you are in the following activities.

	Not at all	Not really	Undecided	Somewhat	Very much
Sending and receiving emails	○	○	○	○	○
Using internet and various websites	○	○	○	○	○
Operate a word processing program (eg. Microsoft Word)	○	○	○	○	○
Operate a spreadsheet program (eg. Microsoft Excel)	○	○	○	○	○
Operate a database program (eg. Microsoft Access)	○	○	○	○	○
Operate a presentation program (eg. Microsoft Power point)	○	○	○	○	○

Q13 – Following group of questions are focused on relative advantage which IT provides for you

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Using IT enables me to accomplish my assignments more quickly.	○	○	○	○	○
Using IT improves the quality of my learning activities.	○	○	○	○	○
Using IT makes it easier to complete my assignments.	○	○	○	○	○
Using IT improves my educational performance.	○	○	○	○	○
Using IT gives me greater control over my educational activities.	○	○	○	○	○
Using IT increases my study related productivity.	○	○	○	○	○
Using IT enhances my effectiveness on educational activities.	○	○	○	○	○

Q14 – Following group of questions are focused on IT compatibility with your lifestyle

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Using improved IT is compatible with all aspects of my educational activities.	○	○	○	○	○
Using improved IT is completely compatible with my current situation.	○	○	○	○	○
I think that using IT fits well with the way I like to study/learn.	○	○	○	○	○
I think that using IT fits into my learning style.	○	○	○	○	○

Q15 – Following group of questions are focused on your ease-of-use perception of IT

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
I find my faculty's online educational resources (ex. Canvas, Zoom, DiKUL, COBISS, online course management tools, websites etc.) to be easy to use.	○	○	○	○	○
I find it easy to get everything that I need for educational purposes while using my faculty's educational resources (ex. Canvas, Zoom, DiKUL, COBISS, online course management tools, websites etc.)	○	○	○	○	○
It is not easy for me to become more skillful in using IT for my learning/educational process.	○	○	○	○	○
I find it difficult for me to gain more IT skills which I need for my learning/educational process.	○	○	○	○	○
Overall, I believe that IT (including internet) is easy to use.	○	○	○	○	○

Q16 – Following group of questions are focused on your attitude towards computer-based learning

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Learning with computers offers real advantages over traditional methods of learning.	○	○	○	○	○
I like using computers for my learning/educational process.	○	○	○	○	○
I think students and teachers should use computers in all subject matters.	○	○	○	○	○
I think computers can be effectively implemented as regular learning/educational tools.	○	○	○	○	○

Two additional questions are open, non-required questions, but your answers would be highly appreciated.

Q17 – What do you perceive as the biggest benefits of using IT at faculty? *(ex. Wider and faster access to different materials…)*

Open question.

Q18 – What do you perceive as the biggest challenges of using IT at faculty? *(ex. Hard to study using just electronic-form literature…)*

Open question.

Appendix C: Pearson's correlation coefficients

Results of the hypothesis testing of the relationship between CSE and PCE

		Computer Self efficacy	Perceived ease of use
Computer Self efficacy	Pearson Correlation	1	0,092*
	Sig. (2-tailed)		0,033
	N	540	540
Perceived ease of use	Pearson Correlation	0,092*	1
	Sig. (2-tailed)	0.033	
	N	540	540
*. Correlation is significant at the 0.05 level (2-tailed).			

Results of the hypothesis testing of the relationship between CSE and ANX

		Computer Self efficacy	Computer Anxiety
Computer Self efficacy	Pearson Correlation	1	-0,138*
	Sig. (2-tailed)		0,001
	N	540	540
Computer Anxiety	Pearson Correlation	-0,138*	1
	Sig. (2-tailed)	0,001	
	N	540	540
* Correlation is significant at the 0.01 level (2-tailed).			

Results of the hypothesis testing of the relationship between ANX and PCE

		Computer Anxiety	Perceived ease of use
Computer Anxiety	Pearson Correlation	1	-0,331*
	Sig. (2-tailed)		<0,001
	N	540	540
Perceived ease of use	Pearson Correlation	-0,331*	1
	Sig. (2-tailed)	<0,001	
	N	540	540
* Correlation is significant at the 0.01 level (2-tailed).			

Results of the hypothesis testing of the relationship between EXP and PCE

		Prior Computer experience	Perceived ease of use
Prior Computer experience	Pearson Correlation	1	0,056
	Sig. (2-tailed)		0,196
	N	648	540
Perceived ease of use	Pearson Correlation	0,056	1
	Sig. (2-tailed)	0,196	
	N	540	540

Results of the hypothesis testing of the relationship between RA and PCE

		Relative Advantage	Perceived ease of use
Relative Advantage	Pearson Correlation	1	0,230*
	Sig. (2-tailed)		<0,001
	N	756	540
Perceived ease of use	Pearson Correlation	0,230*	1
	Sig. (2-tailed)	<0,001	
	N	540	540
* Correlation is significant at the 0.01 level (2-tailed).			

Results of the hypothesis testing of the relationship between CMBTLY and PCE

		Compatibility	Perceived ease of use
Compatibility	Pearson Correlation	1	0,279*
	Sig. (2-tailed)		<0,001
	N	432	432
Perceived ease of use	Pearson Correlation	0,279*	1
	Sig. (2-tailed)	<0,001	
	N	432	540
* Correlation is significant at the 0,01 level (2-tailed).			

Results of the hypothesis testing of the relationship between PCE and ATT

		Perceived ease of use	**Attitude towards Computer usage**
Perceived ease of use	Pearson Correlation	1	0,170*
	Sig. (2-tailed)		<0,001
	N	540	432
Attitude towards Computer usage	Pearson Correlation	0,170*	1
	Sig. (2-tailed)	<0,001	
	N	432	432
*Correlation is significant at the 0,01 level (2-tailed).			