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MASTER'S THESIS

**DETERMINANTS OF ACCEPTANCE OF E-MATERIALS: AN
EMPIRICAL INVESTIGATION IN THE CONTEXT OF SLOVENIAN
ELEMENTARY EDUCATION**

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ROK SEŠEL

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INTRODUCTION

For the past few years we have been commonly hearing that the only thing which is constant is change. One of the main reasons for that is development and use of new information technologies (hereinafter: IT). In many industries, implementation of IT solutions has improved and changed process flows.

Impacts of IT can also be found in educational processes. Nowadays, marks of chalk in classrooms can only be found within an Art class. Majority of classrooms are equipped with at least one of the IT innovations; computer, projector, interactive white board, internet connection, etc.

Since today's pupils are raised with presence of modern IT at every step and consequently with the modern lifestyle, they are losing the initial contact with the traditional way of learning. That is why it makes sense to think about alternatives to traditional learning, to raise the motivation among students and prepare them to accept more information, as well as to link new information with the already obtained knowledge and store it in long-term memory (Clark & Mayer, 2011, p. 36).

Integrating technologies in educational process offers alternative channels to deliver knowledge in pursuit of promoting learning and motivating pupils. In the last few years, we have been witnesses to a large promotion of e-materials use in classrooms. However, use of e-materials does not only require technologically equipped classrooms, but mostly a change in the way of teaching. Since the educational system has been moving quite slowly towards changes, there has not been a massive adoption of e-materials in classrooms, especially by teachers (Demetriadis et al., 2003, pp. 19-20).

Technology by itself does not increase motivation among students, and after all, the teacher is still the one who needs to guide the lesson. Therefore, it is important to increase the perceived value of technology in the eyes of the teachers.

The purpose of this master's thesis is to examine how perceptions of different factors influence acceptance behaviour of the teachers in terms of e-materials within Slovenian elementary schools.

The goal of this research is to understand the determinations of teachers' acceptance of e-materials in Slovenian elementary schools and to propose an e-materials acceptance model. To follow that, my research will be focused on the main drivers of technology acceptance; performance and effort expectancy, extended with social norms and personal innovativeness in IT. Additionally, I will also focus on major factors of perceived credibility of provider; corporate reputation and communication.

Within the research, my goal is also to find out whether age, years of proficiency and prior experience with e-materials impact the teacher's acceptance of e-materials. Under my own findings and previous insights of other authors, I would like to contribute to a better use of e-materials in classrooms, especially when it comes to the elementary school system.

I start my master's thesis with a literature review on the topic of e-materials; here, I explain some key terms from the field of e-teaching materials, the reasons for their use, and the differences with conventional types of teaching materials. In addition, I discuss the importance of teacher's acceptance of the technology as such, where I also illustrate some trends in the evolution of technology within education. The last part of the theoretical background chapter represents the demonstration of three most widely used technology acceptance theories.

I continue my master's thesis with research model development, where I comprehensively describe both already used as well as some additional e-materials acceptance constructs, one by one. Further, I place hypotheses according to the proposed research model, and present data collection and analysis.

The last part of my master's thesis represents results of the research, interpretation and their application discussion, where I give theoretical, practical, and further research implications. Finally, I close my master's thesis with a conclusion.

1 THEORETICAL BACKGROUND

1.1 E-materials

Learning materials are one of the most important components in the educational process. The content of a learning material is in accordance with the educational program, thus a learning material first and foremost plays an important role as it serves as a useful utility for the teacher to prepare for his or her lectures. Furthermore, learning materials are especially designed for delivering information to learners. In this part of the educational process, learning materials serve as a source of information, where a student can refresh the already obtained knowledge or acquire new one. Moreover, learning materials may also be used as a motivational tool for the teacher to attract more attention of his or her listeners.

Learning materials do not serve only as a storage of learning content but also, according to Kitao and Kitao (1997), "materials have a hidden curriculum that includes attitudes toward knowledge, attitudes toward teaching and learning, attitudes toward the role and relationship of the teacher and student, and values and attitudes related to gender, society, etc.", and as such, they enhance the teaching-learning experience.

There are various forms of learning materials; however, it is a teacher's decision which of them he or she will use. The most common learning material that teachers rely on is a textbook. The structures of textbooks base on the teaching program and thus determine the components of teaching content, which facilitates the teaching effort to prepare for the lecture. By using textbooks it is easier for teacher to control content lessons, methods and procedures of teaching (Kitao & Kitao, 1997).

There are other learning materials as well that are involved in educational processes. In addition to textbooks, multimedia such as sound, video, interactivity content, etc. are stepping increasingly to the forefront. Use of supplementary materials depends on limitations of subject and mainly on classroom equipment.

With the development of information technology (IT), mostly the access to World Wide Web, education got new dimensions and possibilities, and so did teaching materials. At first, technological advancements have enabled distance educators to provide opportunities to interactive dialogue. Furthermore, the influence of IT developments changed educational environment and learning processes with growth of e-teaching.

In practice, we can find several interpretations of e-teaching, or in other words, e-learning. Holsapple and Lee-Post (2006, pp. 67-68) defined it as the process of spreading teaching or publishing didactic materials to distant sites via the Internet, private networks, audio, video and portable drives like CD, etc. Moreover, they added that e-teaching is still often used correspondently with education over distance or distance teaching. Ruiz, Mintzer and Leipzig (2006, p. 207) define the concept of e-teaching as a computer-assisted aid in the delivery of stand-alone multimedia packages. In my thesis, I use Anderson's (2008, p. 17) definition of e-teaching, which describes it as the use of the World Wide Web to access teaching-learning materials; to interact with the content, instructor, and other members-students; and to obtain support during the educational process, in order to acquire knowledge, to construct personal meaning, and to grow from the teaching experience.

Thus, as a loose definition of e-teaching, it is also e-materials that do not have a uniform terminology definition. We can find very general definitions of e-materials; for instance, Carliner and Shank (2007, p. 424) see e-materials as every material that is presented on a computer. On the other hand, authors, such as Anderson (2008, p. 17), give a more detailed interpretation and describe e-materials as digital learner-content interaction to detect the information and to process it. The main supplement of Anderson's definition of e-materials is that the content of e-materials needs to be a component of the lesson and could take the form of pre-learning, learning and post-learning activities. Consequently, this is the reason I adopt Anderson's definition of e-materials.

1.1.1 Types of e-materials

There is a great difference in teaching pupils at elementary level or giving lectures at a university due to diverse complexity of the audience. E-materials need to enable different levels of learner involvement according to the educational program. Therefore, the teacher is the one that has to be able to decide which material is an appropriate for considered difficulty level.

In the last century, three views of learning have evolved and based on them we can find three e-learning architectures, summarized in Table 1. We can see that receptive architecture is based on the information acquisition view, directive is based on a response strengthening view and guided discovery is based on a knowledge construction view (Clark & Mayer, 2011, p. 22).

Table 1. Three e-learning architectures

Architecture	View	Inter-Activity	Used For
Receptive	Information Acquisition	Low	Inform training goals
Directive	Response Strengthening	Medium	Perform procedure training goals
Guided Discovery	Knowledge Construction	High	Perform strategic training goals

Source: R. C. Clark & R. E. Mayer, *e-Learning and the Science of Instruction*, 2011, p. 22.

According to the above described e-learning architectures, interactivity of the lessons in e-materials ranges from low to high. For receptive lessons, e-materials contain a low level of interactivity and do not offer opportunities for student responses and feedback. At this level we can classify traditional learning materials converted in digital media. Examples of this type of e-material are digital textbooks and workbooks, and the like (Clark & Mayer, 2011, p. 22).

Medium level of interactivity presents e-materials designed for directive architecture e-learning. The e-materials for directive lessons accompany the sequence of “explanation-example-question-feedback”. E-materials in this segment incorporate highly structured practice opportunities composed to attend teaching in a step-by-step aspect. An example of an e-material for directive lessons is the e-textbook, with integrated multimedia building blocks and linkage of terms across the lessons (Clark & Mayer, 2011, pp. 22-23).

With guided discovery forms of e-learning, e-materials include simulations and games. This type of e-materials presents the highest level of interactivity. A student can engage both behaviourally and psychologically. This kind of lesson in e-material requires from students to solve a problem and learn from its situation (Clark & Mayer, 2011, p. 23).

1.1.2 The role of e-materials in teaching

Many teachers decide to utilize e-materials in their classrooms, since all interactive and multimedia elements help them get attention of all the students and their senses. Namely, when information is detected by several channels simultaneously, quality of understanding and memory significantly increases, because of enhanced activity in all parts of brains (Mayer, 2005, pp. 118-121).

Teaching with e-materials helps the student to transform the words and pictures in the lecture through the working memory so that they are integrated into the already obtained knowledge in long-term memory (Mayer, 2005 pp. 31-33). Structure of e-materials is from this perspective in accordance with the cognitive learning theory.

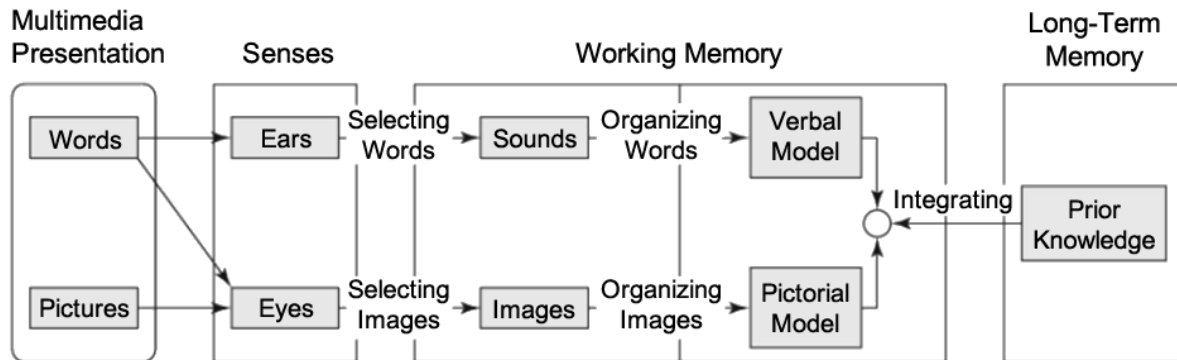
The knowledge construction view is to Mayer's theory of cognitive multimedia learning (2005, pp. 31-38) based on three central foundations:

- **Dual channels;** this foundation declares that two independent approaches are used to deal with processing data. The first channel processes sounds in working memory and the second channel is used to process images. The former model results in verbal models and the latter in pictorial models. The construction of both can be affected by background knowledge saved in long term memory (Clark & Mayer, 2011, p. 35-36).
- **Limited capacity,** as our next foundation, suggests that students are restricted in the volume of information that they can actively detect and integrate simultaneously along both sensing paths (Clark & Mayer, 2011, p. 35).
- **Active processing;** as the last foundation of multimedia learning, which take a place when pupils become involved in appropriate cognitive processing during learning. The result of active cognitive processing is the development of an understandable subjective illustration, so active learning can be considered as a process of model assembling. A psychological model symbolizes the essential elements of the given materials and their connections to the already obtained knowledge (Clark & Mayer, 2011, p. 35).

Figure 1 presents a model of how student learns from lectures that contain multimedia content - elements, which are the building block of any e-material. As we can see in the Figure below, the dual channel foundation is displayed by two flows; one for converting words and the other for handling visual contents. The foundation of limited capacity is displayed by the Working Memory square box in the centre of the same figure. In figure

below we can also see the active processing foundation that is interpreted by five pointers. Active processing consists of choosing words, picking images, arranging words and images, and integrating, which are the essential processes of cognitive meaningful learning (Mayer, 2005, pp. 33- 37; Clark & Mayer, 2011, pp. 35-36).

Figure 1. Cognitive Theory of Multimedia Learning



Source: R. C. Clark & R. E. Mayer, *e-Learning and the Science of Instruction*, 2011, p. 36.

In Figure 1 we can also see three important cognitive processes indicated by the arrows (Clark & Mayer, 2011, pp. 36-37):

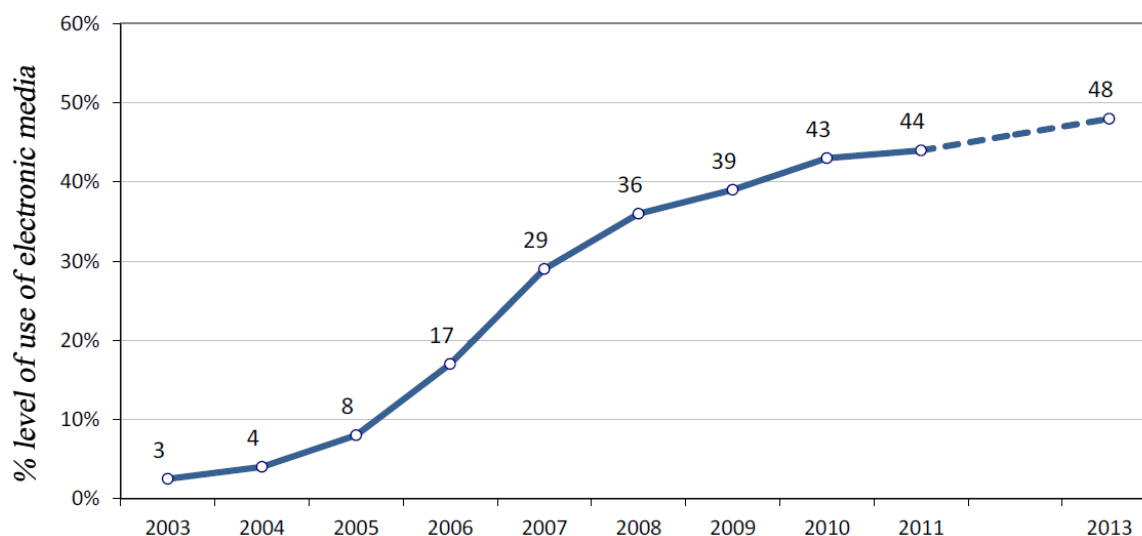
- Selecting words and images; firstly students pay attention to important words and graphics sensed by ears and eyes in the present material – lesson.
- Organizing words and images; at this step pupils in their minds organize selected words and images in reasoned verbal and pictorial likeness.
- Integrating; as a last step that combines inbound verbal and pictorial perceptions with each other and with already obtained – background knowledge.

Active learning occurs when the student appropriately engages in all of these processes (Mayer, 2005, p. 36).

1.1.3 E-materials versus traditional printed materials

The breakthrough of e-learning has been very successful in the past years. Acceptance of this type of teaching and learning was acknowledged in the education area as well as in the business world. Flexible Learning Advisory Group has been in charge of a well established e-learning benchmarking surveys for ten years, and the trends in delivering learning media through electronic media shows a persistent growth of e-learning, as shown in Figure 2.

Figure 2. Uptake of e-teaching in education sector



Source: Flexible Learning Advisory Group, 2013 E-Learning Benchmarking Survey, 2013, p. 4.

We often say and hear that paper can handle everything, but can it truly? It can when we have in mind words, pictures, diagrams, etc. But when speaking about interactive multimedia content, such as digital media, paper just cannot come into play. When compared to e-materials, traditional printed learning materials are losing the pace. In the paragraphs below, I expose some major benefits of e-materials according to traditional printed learning materials.

In comparison to traditional printed learning materials, the main benefit of e-materials is a set of interactive and multimedia learning elements. E-materials are with all interactivity and multimedia more dedicated to user perception of multiple senses and that is why they are more design-sophisticated and user attractive. According to that, e-materials are much better for presenting complex or ambiguous real-world events, for providing actual examples whose benefits are also reflected in higher education quality, innovativeness in learning process and motivation to learn.

E-learning materials with proper learning objects enable greater interaction between student and learning content. By that, e-learning materials encourage higher mental participation of student in the educational process than classic printed learning materials. Thereby students' learning is more efficient and even promotes independent self-discovery of new knowledge. Aitken and Tabakov (2005, p. 638) in their research reveal that students who use e-materials improve in their knowledge from 25 to 35 percent, which indicates that e-material has been more effective in comparison with traditional materials.

From point of view of the student, Aitken and Tabakov (2005, p. 638) identify that the best features of e-materials are their easiness of use and their clarity of material. Furthermore,

they also reveal that today's students do not find traditional learning materials the best materials to learn from. Authors suggest that unlike traditional learning material, involving e-materials in the educational process increases motivation and deep learning of students (Aitken & Tabakov, 2005, p. 638).

According to traditional materials, e-materials enable higher education quality with simulations and instructive games. Since this type of learning is focused on case solving, students adopt information and knowledge faster, as well as they integrate more knowledge into long-term memory after past simulations. In addition, students develop thinking skills through problem based learning (Clark & Mayer, 2011, pp. 346-349).

Another functional advantage of e-materials over printed learning materials is accessibility. E-materials are available everywhere and anytime. That is one of the crucial benefits of learning, because students spend less time to get the keen material. With e-materials, there is no waiting in the line to get desired material like with traditional materials; every e-material is just one click away (Aitken & Tabakov, 2005, p. 638).

A further advantage of e-materials is related to their reusability. Providers can easily change or complement lessons. Also, teachers can evaluate the materials and help make them even better. The real benefit of this is that the content is constantly up to date. In comparison with e-materials, classic materials in a few years fall out of use since content, methods, etc. become out-of-date (Bates, 2005, p. 164).

When considering pros and cons from financial perspective e-materials once again show precedence over traditional printed learning materials. The major costs of e-materials can be considered as costs of developing, costs of delivery and the costs of e-material administration. In comparison with traditional learning material the major cost is eliminated – the cost of printing. Therefore, e-materials are cheaper over printed materials, in many cases even free to use (Rumble, 2001, pp. 79-81; Bates, 2005, p. 84).

There are also some limitations of use of e-materials. A major limitation in comparison to traditional learning materials is necessity of use of IT that enables presentation of e-materials. In spite of the fact that we are in the 21st century, not every classroom has a computer, a projector or access to the internet. However, we can solve this problem by equipping students with laptops and tablet computers, but there is another problem that occurs – battery autonomy of portable devices (Ekanayake & Wishart, 2013, p. 20).

The next constraint or maybe better trait is improper use of IT in the classroom. When students use traditional materials – a book on the desk, the teacher can easily see on which page the student is and if he or she is following the lesson or not. If students use portable devices it is hard to keep everyone under control. And if we take into consideration that 77 percent of youngsters in their everyday life use social networking sites a few times a week

or more (Gosper & Malfroy & McKenzie & Rankine, 2011, p. 506), it appears to be a serious concern that they are going to use social networks in time of lectures.

1.2 Teachers' acceptance of technology

IT by itself enables the use of e-materials in classrooms, however, it does not grant their actual use. Namely, teacher's acceptance of e-materials is greatly dependent on their attitude and perception of the IT as such. For that reason, I investigate how IT and education have gone hand in hand over time. Also, I take a look on the approaching trends of technology in education; furthermore I expose what are the justifications of teacher's use of technology. Finally, I expose the steps to be considered when adopting technology. All of this is further described in the following sub-chapters.

1.2.1 Evolution of IT use for educational manners

The first contacts between technology and education were made for military purposes. After that, institutes were impressed about the new technology and spent more and more attention to involve technology in educational processes. Firstly, a massive emerging technology was television with corresponding videos, which, however, did not fulfil the expectations. The first problem was shown as lack of knowledge about the placement of used IT into the instructional program, and the second problem, educators did not know how to incorporate technology into the teaching process. Television in education was recognized as an unfortunate adoption also because students found it as uninteresting due to its non-interactivity (Stigzelius, 2011, p. 12).

Following the emerged technology was the computer. The technology was at that time still in its infancy, so it provided only basic functions of nowadays possibilities. Also, at that time the above mentioned technology was very expensive, so mass use of it was not available. In time, prices have decreased, performance of hardware improved, so did user friendly software. Thus, educational institutions adopted computer-based teaching, which was the beginning of e-teaching (Stigzelius, 2011, p. 12).

Authors Ma, Andersson and Streith (2005, p. 387) in their study examine acceptance of computer technology and despite the widely used technology they expose that some teachers are still sceptical and have a reserved attitude towards computer technology. Therefore, they carry out research to verify educator's acceptance of computer technology and to determine main determinations of computer technology use. Results of their study reveal utilization and implementation of computer technology based on teacher's intention to use. They find influences of two major influences on teacher's intention to use computers: usefulness and ease of use, (Ma & Andersson & Streith, 2005, pp. 392-393).

Technology trends are also present in education; therefore, we can find the next generation of e-learning, which is mobile learning, also known as m-learning. Here, teaching and learning is conducted through portable devices. From the point of view of e-materials this is very important technology as its main purpose is to deliver e-materials to every individual user. With e-teaching it is mostly the teacher who is operating with the technology, but when using mobile devices in the classroom, every student has its own device, which enables them to include into the lesson all students at the same time and promote collaborative learning. Currently used and supported technologies for m-learning are handheld computers, laptop PCs or tablet PCs. Mobile phones or smart phones are not yet supported portable device in educational manner (Uzunboylu & Ozdamli, 2011, pp. 544-545; Jairak & Praneetpolgrang & Makhabunchakij, 2009, p. 363).

In the study acceptance of tablet PCs in classroom instruction, authors Ifenthaler and Schweinbenz (2013, p. 532) explore determinants of teacher's acceptance of tablet computers. Findings show that most teachers do not know how tablet PCs can be used as an innovative improvement to facilitate teaching processes. Therefore, they rather base on more secure techniques of delivering knowledge and their prior experience.

1.2.2 Technology trends in the educational context

For emerging technology to penetrate into educational systems is inevitable. Gartner, a leading global corporation in IT research and consulting, forecasts evolving technologies and trends in the upcoming future. New trends and evolving technologies in the field of education are presented in Figure 3, where it can be seen that technology innovations are highly present in education. Tablet PCs as such are according to Gartner (2013, p. 7) going to reach the plateau in 2 to 5 years.

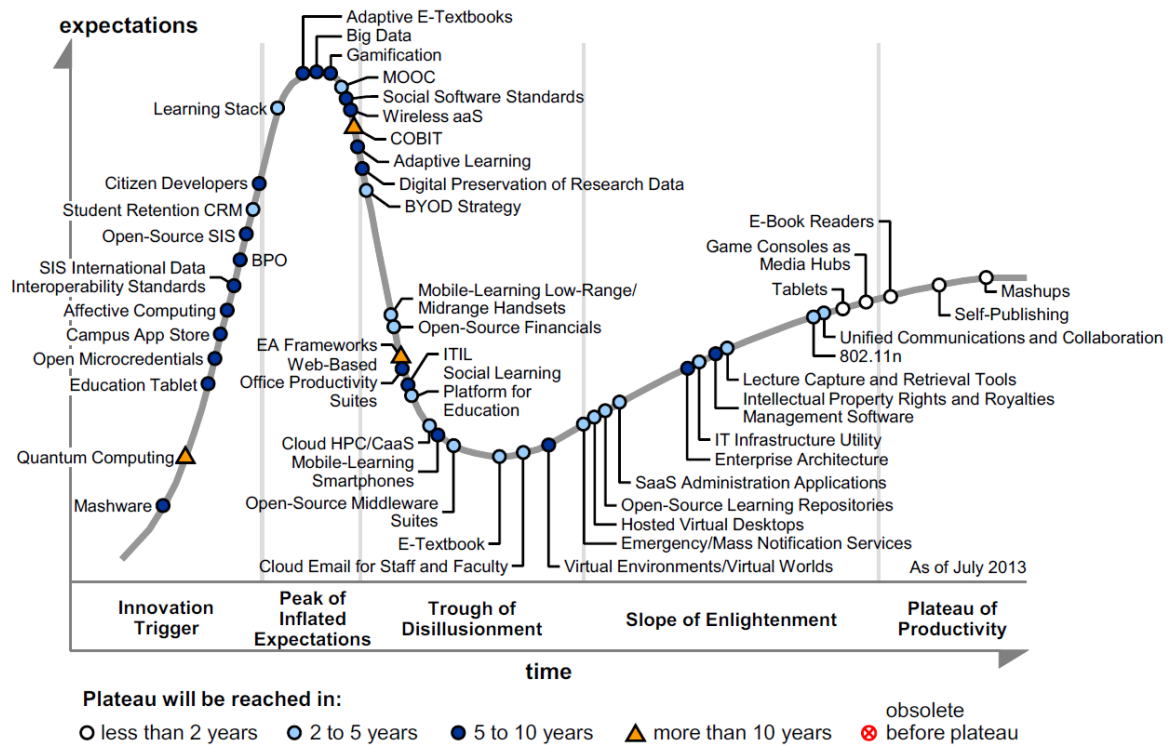
According to Stigzelius (2011, p. 14), when technologies rapidly evolve, educational systems need to be agile to new demands. Authors, including Vander Ark and Hess (2014) argue that schools focused in acquiring state-of-the-art technology are making huge mistakes, as technology by itself won't improve education. Technology needs to be properly addressed to educational problems and needs to serve as a tool for teachers, students and parents to complete their tasks sophisticatedly. Thus, adapting to change, new innovative and effective methods have to be developed, which are necessary for teacher support at student learning.

In the field of education we can see, in Figure 3, many technologies that are represented under e-materials. We can also see several innovation trends which are reflections on e-materials and which justify subject relevance of my master's thesis.

High expectations in the year 2013, present especially adaptive e-textbooks and gamification; it is estimated that they will reach the plateau in 5 to 10 years (Gartner, 2013,

p. 7). Gamification is the use of games in nongame contexts to design behaviours, develop skills or to engage people in innovation. By 2020, Gartner (2012, p. 5) predicts that gamification will be generally used to develop more engaging course materials.

Figure 3. Hype Cycle of technology maturity used in Education, 2013



Source: Gartner Inc., *Hype Cycle for Education, 2013*, p. 7.

1.2.3 IT support in teaching

Implementation of IT in education institutions has for a long time been perceived as a matter of provision of hardware and software only. In the last few years, attention has been oriented to implications of use of IT for curriculum content, learner activities, teacher role, assessment practices, etc. (Voogt & Knezek, 2008, pp. 38-39).

New technology present in the classroom can contribute to teaching and learning. John and Sutherland (2004, p. 102) provide the following four contributions with respect to student learning:

- State-of-the-art technologies can trigger growth of intellectual skills.
- Recent technologies can add to the approaches of learning skill, attitudes and acquiring new knowledge. In spite of that this is mainly dependent on formerly obtained knowledge and type of learning activity.

- Modern technologies motivate and stimulate voluntary interest more than conventional approaches.
- Students that use advanced technologies accumulate more than students on the usual approach.

Incorporating IT into classroom situations can and does alter the traditional balance between teacher and student (John & Sutherland, 2004, p. 102). Notwithstanding the high level of IT in education, teacher presence is vital. The main task of the teacher has for long decades been delivering information to students and strengthening their knowledge. With the presence of IT, the teacher is not losing this role, but his or her role is changing. Nowadays teacher has to consider and accept changes and move to new roles. The teacher role has evolved from deliverer to active participant, monitor, consultant and student guide (Yang, 1998, pp. 128-129).

Authors (John & Sutherland, 2004, p. 102) emphasize that positive images of IT contribution to classroom are, however, balanced by two further observations of genuine significance:

- The advantage of practicing modern technologies to students largely depends on the teacher's ability to use technology and the teacher's attitude to the presence of the technology during the lectures.
- The training that educational staff receive, greatly impacts on their skills and attitude towards the technology.

1.2.4 Obstacles to overcome

Use of IT in educational processes has been an examination focus for decades. Results have revealed that in spite of teacher training programs, an increase in IT resources and the requirements of the curriculum, there has been very reluctant uptake of IT communication in educational institutions by the most of teachers. Authors expose the following reasons for a lack of a more extensive uptake of IT (Cox & Preston & Cox, 2000):

- **Understanding the need for change;** one of the major issues in education reform is that employees do not have a clear and rational sense of the reasons for educational change, what it is and how to proceed. It is not that teachers are by default reluctant against changes, but they just get insufficient information to make sense of the change.
- **Questioning professional practice;** previous studies have also shown that educators usually do not doubt about their instructional practice. After they pass their initial training they do not feel the need for additional training and consequently they are not initiative to improve their teaching practice or to learn new skills. Teachers who are satisfied with current methods do not see the need to change their professional

practice, and it is very probable that they may not accept the use of IT at their lectures or other instructional processes.

- **Pedagogical practice versus technical skills;** much research has shown that until lately teacher training has covered mainly the technical aspects of use of IT with less focus on the pedagogical practice required and how to incorporate IT in the curriculum. In short, teachers knew only how to run certain software, but did not know how to use it for teaching students.
- **Support from the whole school;** like in many cases of adopting an innovation, one of the major factors of effective and successful adoption is the support from the top. The same goes for the school system, where without a committed head of school, changes are more or less doomed. Another key part to successful adoption is involving individual teachers who are going to be part of change and are willing to learn and pass the knowledge to colleagues. Only one or few enthusiastic teachers will probably not impress others to change their rooted practice.
- **Losing control of the learning;** most teachers like to have order in the classroom and to maintain controlled learning environment. Teachers in most cases see adoption of IT as a threat to current mold and therefore changes are not preferable. There is fear present amongst many teachers about IT and reluctance of its value to their pupils.
- **Inadequate resources;** even if all above issues are overcome, it is still often difficult to use IT in the learning process. Teachers simply cannot be able to use IT if there are insufficient resources of technology in the school. Problems of adoption occur as well if teachers do not have enough time to plan lessons incorporating the use of IT.

Sang, Valcke, Van Braak and Tondeur (2009, p. 808) categorize two levels of adoption barriers for hindering teachers' IT integration efforts. They differ between external and internal barriers. Factors exposed in the previous paragraphs mostly present the external barriers. Among external barriers, authors include those which are frequently recognized as the main obstacles for adoption; issues of insufficient access to the technologies, inadequate training and lack of support. They also add that with disregarding those factors, it is almost hopeless to talk about technology integration.

Resolving external barriers is a necessary but not sufficient condition to count integration of technology as successful. Even with prosperous overcome of external barriers, Sang, Valcke, Van Braak and Tondeur (2009, p. 808) add that, "teachers would not automatically use technology to achieve the kind of meaningful outcomes advocated". Therefore we need to consider internal barriers stalling IT integration by teachers.

Internal barriers are in first place related to a teacher's attitude towards teaching and learning which is deeply rooted in their daily practices. If a teacher is going to involve IT into the learning process in the classroom, he or she is strongly determined by his or her beliefs. It is the belief that plays the crucial and persuasive role in the educational process of teachers. That is why it is important that teachers be told that new teaching approaches

are better than old ones. Likewise there are some other factors that also influence information communication integration, such as computer motivation, computer attitudes and perceptions on IT policy (Sang & Valcke & Van Braak & Tondeur, 2009, p. 808).

Crossing the line between described barriers and factors affecting the decision about adoption of IT it is not surprising as the learning process has not significantly changed for decades. Hooper and Rieber (1995, p. 155) twenty years ago gave an example that if we compared teachers and doctors from fifty years ago, only few of doctors would be capable and skilled enough to barely handle with the nowadays technology. On the other side, teachers from fifty years ago would probably continue with their practice without any significant issues in most of today's classrooms.

1.2.5 IT adoption process in education

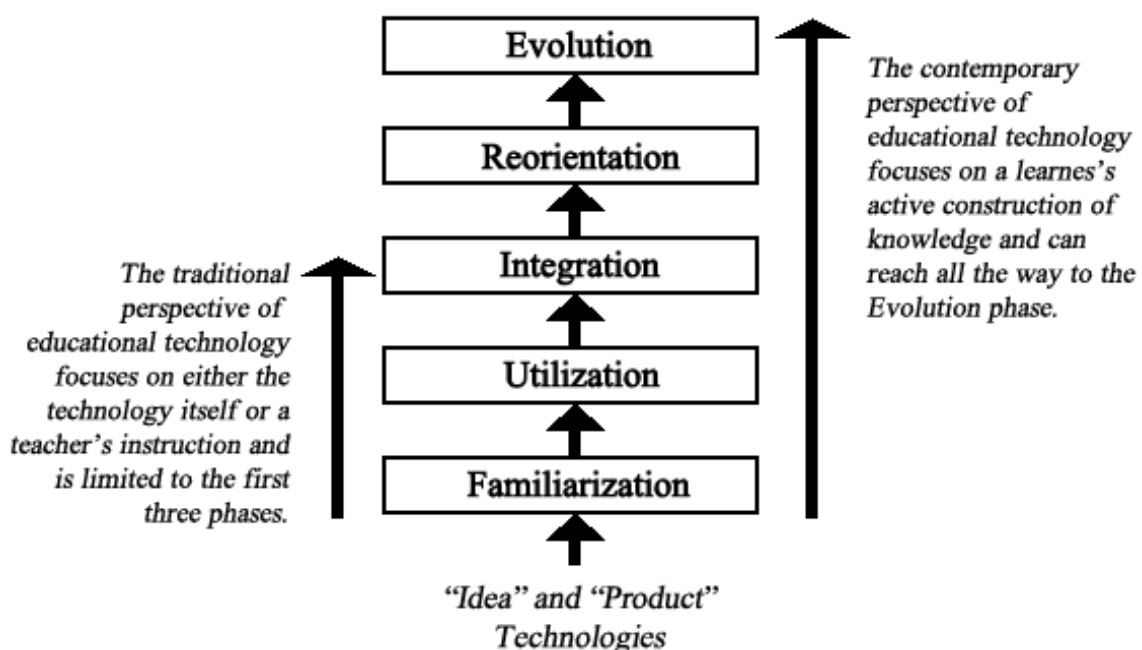
To easier understand adoption patterns of technology in education, Hooper and Rieber (1995, pp. 154-158) present a model in simplified form. The model is illustrated in Figure 4; it consists of five steps or phases of IT adoption:

- **Familiarization;** initial contact and experience with technology. The most usual example of familiarization is a teacher who participates in a workshop where usage of technology is presented. The main result of this phase is memory of the experience in teachers' minds, which triggers discussions among teachers and sharing ideas about the features seen. In this phase no further action takes place.
- **Utilization;** this phase starts when the teacher tries out the technology in the classroom. In this phase occurs a chance of giving up on the technology, because teachers are testing limited editions and they cannot use all features presented and learned in the workshops. That is why teachers who proceed only to this stage are likely to refuse the use of technology at the first sign of trouble, since they have not made any commitment to use it.
- **Integration;** represents the breakthrough phase. This stage takes place when the educator is dependent on technology in the educational process. So in case that IT fails or is suddenly unavailable, the teacher cannot continue with his or her lessons as planned. For many, integration presents the last stage of the adoption model, but this phase truly illustrates the beginning of comprehending education technology.
- **Reorientation;** this phase is more advance and it requires teachers' readiness for changes in the learning process. It requires the teacher to re-examine and reconceptualize the aim and role of the classroom. The main characteristic of this phase is change of classroom focus. Instead of the teacher's instructions, focus is in this phase centered on a student's learning. Teachers who reached this stage do not perceive good teaching as the delivery of content, but as a coordination of knowledge. At this stage the student becomes the subject instead of the object. According to that, the teacher's role is to build a teaching environment that supports and facilitates a

single student to gain their own knowledge. In this stage of the adoption model, teachers are open to new technologies that enable and support this knowledge development process and are not scared by being replaced by technology. Teachers will in this phase likely adopt technology even if they are not experts in usage.

- **Evolution;** presents the final stage of IT adoption process in education, which is intended as a reminder to teachers to be aware that educational system need to continue to develop to remain effective. To meet the challenge and potential provided by new understandings of how students learn, educational environment should constantly subject to change.

Figure 4. A model of technology adoption in education



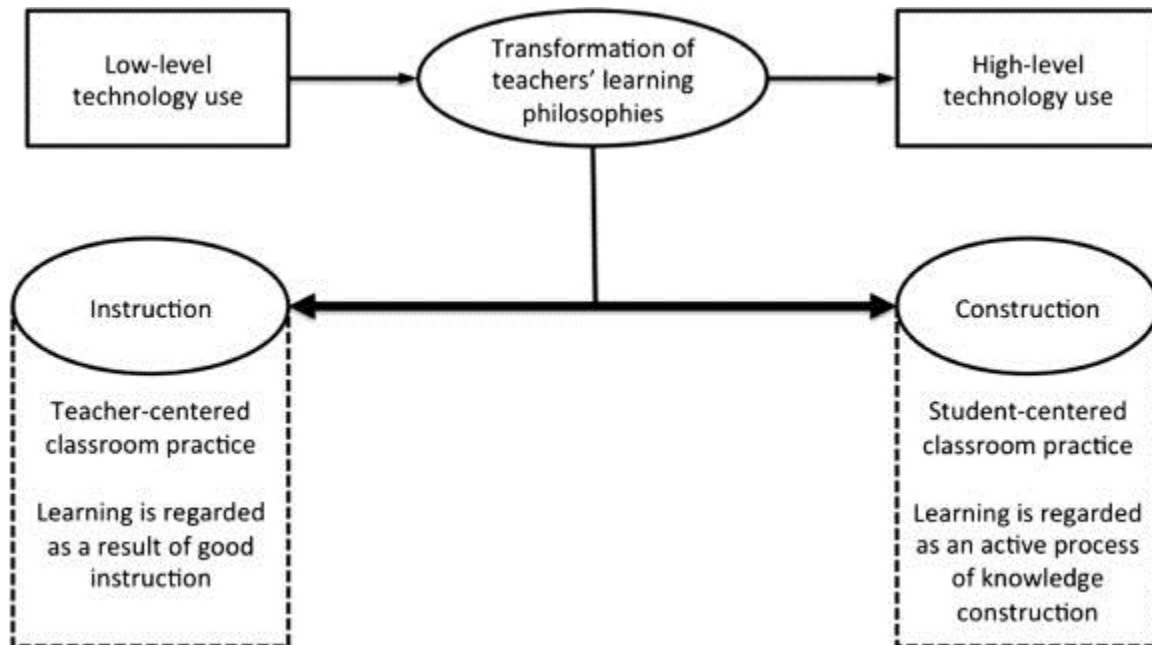
Source: S. Hooper & L. P. Rieber, *Teaching with Technology*, 1995, p. 156.

Authors Hooper and Rieber (1995, p. 155) affirm that the entire potential of any education IT can be accomplished only when the teacher progresses through all five phases. Contrarily, the technology will likely be misused or discarded. The key phase of successful IT is reorientation, where teachers change the philosophy of learning and teaching and develop expertise to apply a high level technology use and in term of transformation lead to a change towards a student-oriented teaching practice (Ifenthaler & Schweinbenz 2013, pp. 532-533).

Ways of learning and teaching can be viewed in Figure 5, where we can see both extreme teaching interpretations of behaviourism (for example, instruction) on one side and cognitivism (for example, construction) on other side. Every teacher's instructional practice can be located somewhere on this line. The line between the two views marks a critical point of transformation for a teacher. In Figure 5, we can also see that the

transformation indicates the crossing from low level of technology use to high level of technology use at teaching process in classroom (Hooper & Rieber, 1995, pp.159-160).

Figure 5. Connection between learning philosophies and level of technology use



Source: D. Ifenthaler & V. Schweinbenz, *The acceptance of Tablet-PCs in classroom instruction: The teachers' perspectives*, 2013, p. 533.

1.3 Review of technology acceptance theories

Hereinafter I review relevant models for acceptance of e-materials in the teaching processes from a teacher's point of view. Many theories and their models are not appropriate for examination of teacher's acceptance of e-materials. Some of them are designed for other purposes, which is why I review some of the earlier studies in the related field.

In previous researches related to technology acceptance in educational field authors adopt several research models of acceptance theories. Authors most widely used two acceptance models for the base of their study, which are Technology Acceptance Model (hereinafter: TAM) and Unified Theory of Acceptance and Use of Technology (hereinafter: UTAUT). This indicates that these two acceptance theories are well established and approved, not only in business but also in educational field. In the following sub-chapters, I describe both of them.

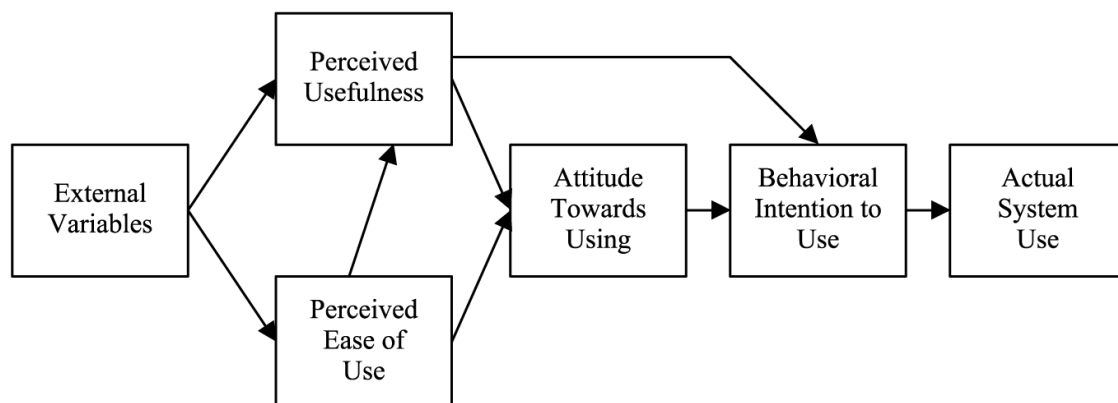
1.3.1 Technology Acceptance Model (TAM)

Successfulness of the integrated information system into processes is closely related to user acceptance and actual use of technology, which has been identified by numerous researches. Davis (1989, p. 319) adapts the theory of reasoned action (TRA) in the view of computer acceptance behaviour and presents his Technology Acceptance Model (TAM). The model identifies two main user beliefs: perceived usefulness and perceived ease of use, which influence on individual's behavioural intention to use the information system (Bourgonjon & Valcke & Soetaert & Schellens, 2010, p. 1146).

Researchers have applied TAM to various technologies and tests in different contexts. In research of Bourgonjon, Valcke, Soetaert and Schellens (2010, p. 1146) we can come across a statement that TAM has developed into one of the most widely used and empirically approved models within information systems research in the last 25 years. Additionally Hong, Thong and Tam (2006, p. 1822) state that TAM is among researchers a preferred choice over alternative models as the Theory of Reasoned Action (TRA) and the Theory of Planned Behavior (TPB). Authors (Bourgonjon & Valcke & Soetaert & Schellens 2010, p. 1146) expose that comparative studies affirm the dominance of the TAM over other intentional behaviour theories as TAM justify about 40% of the deviation in usage intentions and behaviour.

The bellow paragraph in Figure 6 visually presents the TAM model with vital constructs and causal relations between them. As mentioned above, main constructs of the model are user-perceived usefulness and perceived ease of use. Those user beliefs are constituted by external variables which directly influence from design features. According to the model, a major determinant of user actual use is the overall attitude toward using a given system (Davis Jr., 1986, p. 24).

Figure 6. Technology Acceptance Model (TAM)



Source: F. D. Davis Jr., *A technology acceptance model for empirically testing new end-user information systems: Theory and results*, 1986, p. 24.

Davis (1989, p. 320) defines perceived usefulness in his research as “the degree to which a person believes that using a particular system would enhance his or her job performance”. Persons will have higher expectations and intentions to use technology if they are familiar with the benefits of technology implementations to their performance on the job. Technology as such does not attribute to persons’ attitude toward use as the importance of the performance increase (Amoako-Gyampah, 2007, p. 1235).

Davis (1989, p. 320) defined users’ perceived ease of use as “the degree to which a person believes that using a particular system would be free of effort”. Among the beliefs, perceived ease of use is hypothesized to be a predictor of perceived usefulness. Past researches provide evidence of the significant effect of perceived ease of use on usage intention, either directly or indirectly through its impact on perceived usefulness (Wang & Wang & Lin & Tang, 2003, p. 507).

Amoako-Gyampah (2007, p. 1235) states that if technology is easy to use, users expectations about technology regarding to performance enhancement are higher. Usually users find the system which is easier to use more useful, when selecting between two systems which perform equal operations (Davis, 1993, p. 477). To prevent the “under-used” useful system issue, the information system should be as easy to learn as easy to use (Wang & Wang & Lin & Tang, 2003, p. 507).

In the research by Davis Jr. (1986, pp. 109-110), we can find the TAM analysis, where he tests the TAM motivational variables and their causal relations. Results of the analysis show significant impact of perceived ease of use and perceived usefulness on user behaviour. Results also show that perceived usefulness has a significant direct impact on actual use in addition to its indirect effect via user attitude toward using. Results also show that perceived usefulness has a greater impact on the attitude toward using and consequently on the actual use than perceived ease of use.

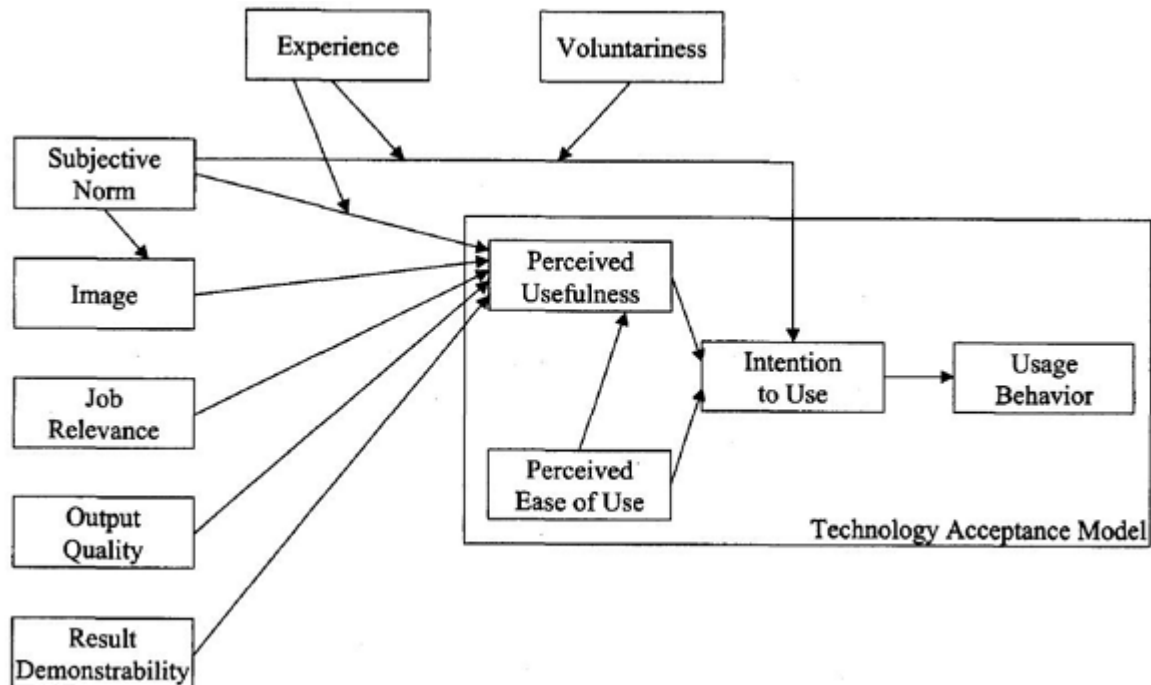
The key finding of Davis’ (1986, pp. 109-110) research is that the attitude toward using has, due to direct influence of perceived usefulness, indirect influence between users’ beliefs and the actual use. That is why the question to consider the attitude in the model is justified. In addition, researchers also expose that TAM findings are not always consistent because of comprehensiveness of use (Bourgonjon & Valcke & Soetaert & Schellens 2010, p. 1146).

1.3.2 Extended technology acceptance model (TAM2)

According to the above stated deficiencies of original TAM, researchers try to solve them by extending the model with factors implied by other theories and context. Venkatesh & Davis (2000, p. 188) propose an extended version of the technology acceptance model (TAM2). The TAM2 model, shown in Figure 7, provides a more complete understanding

of usefulness and ease of use; as well as improves clarification of larger proportions of variance (Bourgonjon & Valcke & Soetaert & Schellens 2010, p. 1146).

Figure 7. Proposed TAM2 - Extension of the Technology Acceptance Model



Source: V. Venkatesh & F. D. Davis, *A Theoretical Extension of the Technology Acceptance Model: Four Longitudinal Field Studies*, 2000, p. 188.

TAM2 consists of five additional direct factors – Subjective Norm, Image, Job Relevance, Output Quality, and Result Demonstrability – and two indirect factors – Experience and Voluntariness.

Subjective norm and Image evaluate if the technology is socially accepted or rejected. Social influences also have an impact on individuals, i.e. thinking and beliefs of people who are important to individuals. Perception of expected behaviour from people who influence individuals is concerned as a subjective norm. Other authors define also other concepts of that perception, such as normative beliefs, social influence and social norms (Van Raaij & Schepers, 2008, p. 842; Venkatesh & Davis, 2000, pp. 187-189).

Subjective norm was initially included in TRA, which presented the base of the later developed TAM, but Davis found subjective norm as a problematic aspect, so he did not consider it in the original TAM. Regardless of that, many authors in their studies integrate back the construct of the subjective norm and it is incorporated in the later developed TAM2 (Van Raaij & Schepers, 2008, p. 842; Venkatesh & Davis, 2000, p. 187).

The reason why we should consider the subjective norm in research when analyzing user behaviour about intention to use is more than justified, since individuals may behave and react as others expect from them to perform. Venkatesh and Davis (2000, p. 187) expose that an individual can perform contrary to their own beliefs against the attitude or its consequences when people who are important in the individual's environment think he or she should adopt the system or technology. Since opinion of important persons in the environment has an influence on an individual's behavior, individuals are sufficiently motivated to comply with others' beliefs (Van Raaij & Schepers, 2008, p. 842; Venkatesh & Davis, 2000, p. 187).

Voluntariness indicates how a user perceives the use of technology. It can be perceived either mandatory or voluntary. When use of technology is perceived as voluntary, then Subjective norms usually do not have a significant impact on the user's behaviour. There are similar experiences where users without experience are more reliant on beliefs of others. On the contrary, persons with prior experiences with the use gain their own opinions and beliefs so they trust their own beliefs and beliefs of others are no more significant (Venkatech & Davis, 200, pp. 188-189; Stigzelius, 2011, p. 27).

Job relevance reflects the perception of how technology supports their assignments and what the contribution is to the objectives set. The benefits of the performed assignments are indicated as output quality. When users have demonstrable results and they understand them, they lose doubts about the usefulness of technology (Venkatech & Davis, 200, pp. 191-192; Stigzelius, 2011, p. 27).

1.3.3 Unified Theory of Acceptance and Use of Technology (UTAUT)

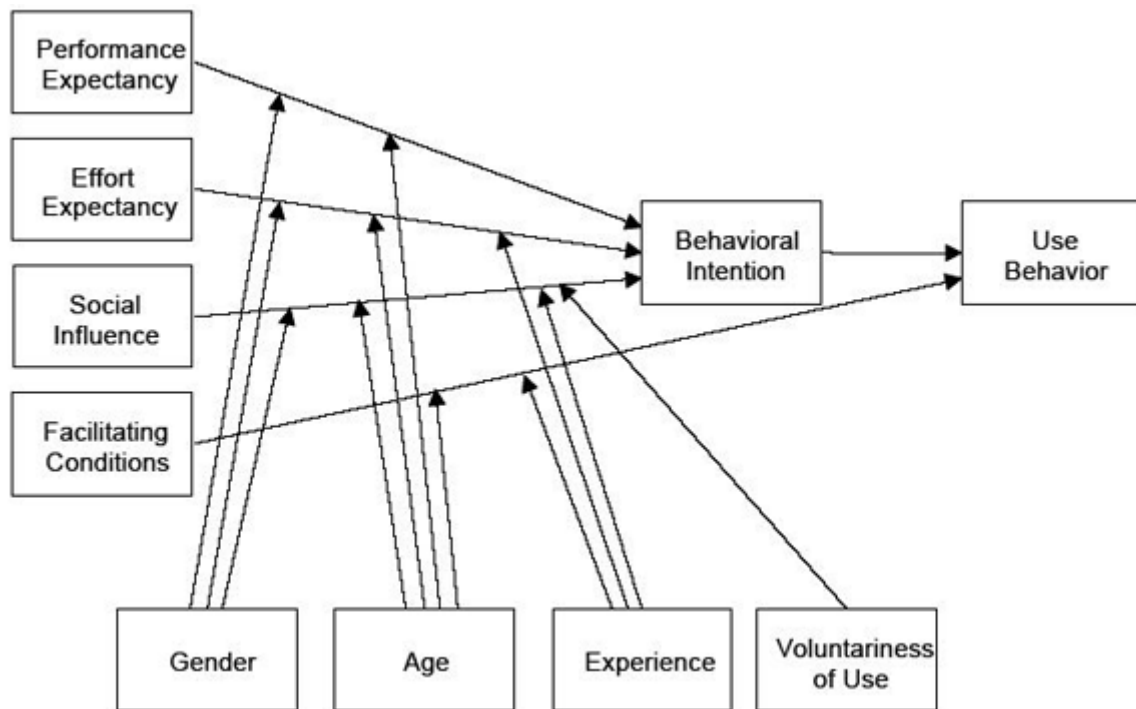
Furthermore, other models have been suggested. One of them needs to be especially mentioned. This model integrates eight different models of technology acceptance in one – the Unified Theory of Acceptance and Use of Technology (UTAUT), proposed by Venkatesh, Morris, Davis and Davis (2003, p. 447).

As already mentioned, the proposed model combines eight adoption theories; the Theory of Reasoned Action (TRA), Technology Acceptance model (TAM), Motivational model (MM), Theory of Planned Behaviour (TPB), Combined TAM and TPB (C-TAM-TBP), Model of PC Utilization (MPCU), Innovation Diffusion Theory (IDT), and Social Cognitive Theory (SCT).

This model represents a significant step forward in the technology acceptance. As we can see in Figure 8, the model is based on four constructs which analyze and forecast user acceptance and use of new technology: performance expectancy, effort expectancy, facilitating conditions and social influence. The model also has four key moderators; gender, age, experience and voluntariness of use. As discovered from the studies, these

constructs explain up to 70% of the variance in usage intention (Van Raaij & Schepers, 2008, p. 841).

Figure 8. The Unified Theory of Acceptance and Use of Technology (UTAUT) model



Source: V. Venkatesh & M. G. Morris & G. B. Davis & F. D. Davis, *User acceptance of information technology: Toward a unified view*, 2003, p. 447.

Venkatesh et al. (2003, p. 447) define performance expectancy as “the degree to which an individual believes that using the system will help him or her to attain gains in job performance”. The construct performance expectancy is equivalent to perceived usefulness from TAM and TAM2 models. Authors also argue that construct, performance expectancy, is the strongest predictor and it has the most influential impact on behavioural intention. Studies confirm the significance in both mandatory and voluntary technology acceptance environments.

Effort expectancy is according to Venkatesh et al. (2003, p. 450) defined as “the degree of ease associated with the use of the system”. When comparing with the TAM model, authors in prior research note that construct effort expectancy is equivalent to perceived ease of use. The significance of effort expectancy in relation to behavioural intention has been proofed in both, mandatory and voluntary usage. However, prior studies expose that this construct is becoming non-significant over periods of extended use.

Social influence is individual perception of what other important persons believe that he or she should or should not use the system. When comparing this construct with other

acceptance models, we can find similarities. There are three constructs related to social influence; subjective norm, social factors and image. Despite different labels, each of the above mentioned constructs determine the individual's behaviour influenced by the other person's opinion and expectations to behave about the use of technology (Venkatesh et al., 2003, p. 451).

Venkatesh et al. (2003, p. 453) define facilitation conditions as an individual belief if existing technical infrastructure can support the use of the system. In other words, this construct considers if companies remove barriers that affect the use and if the technology is compatible with the current environment. Authors expose that when both performance expectancy and effort expectancy are present, facilitating conditions becomes non-significant in predicting intention.

As Van Raaj and Schepers (2008, pp. 841-842) state in their research work, UTAUT's high R^2 is only attained when moderating the key relationships with up to four variables – gender, age, experience and voluntariness, in order to yield more significant coefficients.

2 PROPOSED MODEL DEVELOPMENT

Acceptance models have been deployed in a number of studies attempting to clarify the acceptance of a range of different technologies. To explain technology adoption behaviour, authors in various studies in educational context mostly use for the base model the TAM or UTAUT as most effective and powerful models used in this millennium (Ling & Downe & Ahmad & Lai, 2011, p. 2). Many of them modify the original model and extend it with additional constructs from other theories. For the purpose of my study model I first review some of the prior studies in educational context and gather them in Table 2, where we can see which acceptance model authors use for the base of study, what the technology examined in the study is, what modifications of the original model they make and which constructs they consider in research model.

Table 2. Research review from the field of technology acceptance in education manner

Base model	Study reference	Type of technology	Research model	Research variables
TAM	Ma, Andersson & Streith (2005)	computer technology	Modified TAM	Perceived usefulness Perceived ease of use Subjective norm Intention to use

Table continues

Continued

Base model	Study reference	Type of technology	Research model	Research variables
TAM	Callum & Jeffrey (2013)	Mobile learning	Combined TAM and ICT Self-Efficacy	Perceived ease of use Perceived usefulness Behavioural intention Advanced mobile skills Basic ICT skills Advanced ICT skills
	Bourgonjon, Valcke, Soetaert & Schellens (2010)	video games in the classroom	Modified and extended with gender, experience and learning opportunities	Perceived ease of use Perceived usefulness Gender Experience Learning opportunities Preferences for video games
	Cox, Preston & Cox (2000)	use of IT in classroom	TAM	Perceived ease of use Perceived usefulness Attitude towards use Behavioural intention to use Actual system use
	Sang, Valcke, Van Braak & Tondeur (2009)	integration of ICT into classroom	Extended TAM	Teacher beliefs ICT-related policies ICT motivation ICT attitudes Assisted ICT use ICT use in class
	Liu, Liao & Pratt (2009)	Media richness learning materials	Extended TAM	Perceived usefulness Perceived ease of use Concentration Attitude towards use Intention to use
	Van Raaij & Schepers (2008)	Virtual learning environment	Extended TAM	Personal innovativeness in IT Computer anxiety Social norms Perceived usefulness Perceived ease of use System usage
	De Smet, Bourgonjon, De Wever, Schellens & Valcke (2012)	Learning management system	Extended TAM	Perceived usefulness Perceived ease of use Experience Personal innovativeness in IT Subjective norm Internal ICT support Communicational use Informational use

Table continues

Continued

Base model	Study reference	Type of technology	Research model	Research variables
TAM	Teo, Lee & Chai (2009)	Computers in classroom	Extended TAM	Perceived usefulness Perceived ease of use Facilitating conditions Computer attitude
UTAUT	Anderson, Schwager & Kerns (2006)	Tablet PCs	4 constructs UTAUT model	Performance expectancy Effort expectancy Social influence Facilitating conditions Use behaviour
	Jairak, Praneetpolgrang & Mekhabuchakij (2009)	Mobile learning	Replaced social factors for social influence, included attitude towards behaviour and excluded the mediator variables	Performance expectancy Effort expectancy Social Factors Facilitating conditions Behavioural intention Attitude towards behaviour
	Ifenthaler & Schweinbenz (2013)	Tablet PCs in classroom	UTAUT	Performance expectancy Effort expectancy Social influence Behaviour intention Use behaviour
	Stigzelius (2011)	Online learning environment	UTAUT	Performance expectancy Effort expectancy Social influence Facilitating conditions

According to the revised theories of adoption and reviewed prior studies, I find that regardless of the acceptance model, the two main constructs in all cases are perceived usefulness or performance expectancy and ease of use or effort expectancy. However, I also examine the comparison between the mentioned acceptance models in educational contexts. Ling et al. (2011, p. 2) expose that TAM is more suitable for business and commercial settings, but for the educational context authors propose UTAUT. The latter also explains 70 percent of variance while TAM about 40 percent.

Thus as my base model I consider UTAUT; however I modify it according to my research needs and study purpose. In my model I integrate performance expectancy and effort expectancy as key determinants. Also, according to prior studies in educational context and acknowledge influence on technology acceptance I integrate subjective norms into my model.

However, according to the environment of my study I exclude facilitating conditions from the research model, as I run the study among current users of e-materials, where the

teaching environment already fulfils all the necessary technology infrastructure conditions for implementation and further use of e-materials into lectures. Oshlyansky, Cairns and Thimbleby (2007, p. 83) expose that when required technology is available and accessible to all participants, it makes responses to this construct redundant. Therefore, facilitating conditions should be excluded.

Results from prior studies have proposed that personality traits have influential part in terms of technology adoption (Van Raaij & Schepers, 2008, p. 841). That is why I consider extending my model with personality traits into research, namely I include into model a personal innovativeness in the domain of IT, as I feel this is a particularly relevant in an e-materials context. As well, it is a well proven and used construct in many of studies in educational context. In a chapter below, I briefly described the term of personal innovativeness in domain of IT.

In previous studies related to technology acceptance, researchers have not devoted much attention to the role of the innovation's provider. However, authors Lee, Kim and Ahn (2011, p. 223) expose that potential adopters may not regard new technology innovation only as a new tool for gaining benefits, but may also consider the relationship with the technology provider. Authors also note that the adopter's past experience with the technology provider often shapes his or her beliefs and perception about the provider's credibility. Thus, I consider provider's credibility in my study model, as I believe that it has a great impact on the teacher's acceptance of e-materials.

2.1 Personal innovativeness in IT

On acceptance of certain technology, researchers found an impact of personality traits. Since individuals have their own opinions and beliefs, they form different dispositions toward using technology (Walczuch & Lemmink & Streukens, 2007, p. 207). Agarwal and Prasad (1998) argue why some of the persons effortlessly adopt new technology while others reject it. Therefore, they consider personal innovativeness an important and significant construct of IT innovation acceptance.

In behavioural science there are only few concepts with such immediate impact to consumer behaviour as innovativeness. Innovativeness plays one of the most crucial roles in theories of brand loyalty, decision making, preferences, and communications. Without innovativeness consumer behaviour would consist of a series of routine buying responses to a static set of products. Innovativeness is on the one hand a main actor for rapid changes in markets, and on the other hand, it makes consumer behaviour hard to predict (Hirschman, 1980, pp. 283-284).

Lu, Yao and Yu (2005, pp. 251-252) agree that individuals with high level of innovativeness are more active in seeking information about new ideas. And as the authors

say, these persons are able to cope with high levels of uncertainty, they are more perceptive to new manners and they develop stronger intentions concerning acceptance.

Our willingness to innovate affects personality and perceptions of the environment. Constraints, negative outcomes and high risks are perceptions to individuals which may reduce the interest in exploratory or creative behaviour (Bennett Thatcher & Srite & Stepina & Liu, 2003, p. 74).

In the concern of IT, Agarwal and Prasad (1998, pp. 16-18) consider personal innovativeness in the domain of IT as the willingness of an individual to try out new IT. To Agarwal and Prasad definition of personal innovativeness in IT, Van Raaij and Schepers (2008, p. 841) add that a person's tendency to experiment with and adopt new IT is individual and autonomous of opinions from others.

Persons who are not afraid of changes are willing to take risks and will go for new challenges, and they are more likely to express willingness to innovate with IT. On the other hand, persons with restraints to usage of IT will more likely need external incentive to try IT innovation (Bennett Thatcher et al., 2003, p. 74).

Where persons are not self aware of the importance of innovations, authors (Bennett Thatcher et al., 2003, pp. 74-75) agree that managers need to encourage them. Managerial actions and support regarding innovativeness with IT have significant effects on IT acceptance of other employees. According to Lee, Qu and Kim (2007, pp. 887-888), highly innovative users with managerial support are likely to use a certain technology, in contrary, low innovative users with no managerial support are reluctant to use the proposed technology.

2.2 Perceived credibility of provider

Many authors, including Newell and Goldsmith (1997, p. 235) and also Lee, Kim and Ahn (2011, p. 223) in their studies expose that corporate credibility of company which design and produce products – innovation's provider – has received a slight attention in business research and even less attention in educational context. To better understand the credibility of corporate, hereinafter I expose its meaning relevance to the study.

Newell and Goldsmith (1997, p. 235) define corporate credibility as “the extent to which consumers feel that the firm has the knowledge or ability to fulfil its claims and whether the firm can be trusted”. When corporate is credible, it is also known as believable, reasonable and reliable. The concept of corporate credibility bases on consumer perceptions of expertise and trustworthiness, that is, the believability of its intentions and communications. However, credibility is also found as a source that influences consumer

responses and attitude towards company's brands or products and consequently it has a relative impact on purchase intention (Goldsmith & Lafferty & Newell, 2000, p. 304).

Corporate credibility is also associated with persons trust in corporate, where credibility as such presents the first, main and essential dimension of trust. It is based upon a main actor's intention and ability to keep promises and agreements at task competences, reliability in the delivery of goods and services and predictability in work conditions behaviour (Ganesan & Hess, 1997, p.440).

Trust is in general and most commonly defined as a relationship between the buyer and seller. In this relationship there are usually four participants; vendor organization, the seller – sales representative who represents the vendor organization, buying organization and buyer. Among all four participants there is a variety of connections and consequently variety possibilities of trusts (Ganesan & Hess, 1997, pp. 440 – 441).

According to the relationship among these, entities Ganesan and Hess (1997, pp. 440 – 441) define four types of trust:

- **interpersonal** trust; occurs between an individual buyer and a sales representative,
- **organizational** trust; the buyer or sales representative trusts the selling or buying organization,
- **intraorganizational** trust; exists on the one side between the buyer and buyers organization and on the other side between the sales representative and vendor, and
- **interorganizational** trust; which exists between buying and selling organization.

Within my study, organizational trust is adequate, as I am researching how individual teacher's perception of provider's credibility as organization affects the acceptance of e-materials.

When considering trust and behaviour to use, we simply cannot avoid Morgan and Hunt (1994, p. 22) Commitment-Trust theory, where authors find that trust is positively related to commitment in buyer-seller relationships (Ganesan & Hess, 1997, p. 439). Moreover, Lee, Kim and Ahn (2011, p. 223) support the relational characteristic – trust in the provider's organization – positively influence the user's acceptance of innovations. Morgan and Hunt (1994, p. 23) define trust as the key mediating variable to relationship commitment. Commitment is considered as important in the literature of organizational and buyer behaviour. Ganesan and Hess (1997, p. 441) in their study state that trust enhances commitment to a relationship by: reducing the perception of risk related to opportunistic behaviours of the partner, increasing the confidence that short-term inequities will be resolved over a long term, and reducing the transaction costs in the relationship. Regardless of a strong positive relationship between trust and commitment authors expose

that the effect of trust on commitment relies on the level on which trust is developed (Ganesan & Hess, 1997, p. 441).

Authors Lee, Kim and Ahn (2011, p. 223) expose the importance of corporate communication and its positive impact on individual's perceived credibility, however, authors Newell and Goldsmith (1997, pp. 235-236) and Nguyen and Leblanc (2001, pp. 228-229) additionally emphasize the importance of corporate reputation that affects the perceived credibility of corporate.

Thus, I include two more constructs into my research model, i.e. corporate reputation and communication, which will additionally explain the impact of perceived provider's credibility on acceptance of e-materials among teachers.

The eligibility of considered constructs in educational context justifies findings of prior studies, where Law (1997, p. 21) exposes the importance of provider's reputation which increases the value of teaching materials and also teachers perceive them as more credible.

2.2.1 Corporate reputation

Corporate reputation has been variously defined (Dolphin, 2004, p. 79). Researchers, in the fields of economics, organizational theory and marketing, who had studied the concept of corporate reputation, have divergent interpretations of corporate reputation. Economists examine reputation in relation with product quality and price. Organizational researchers consider it a social identity and exemplify it as an intangible resource which may significantly contribute to an organization's performance. And analysts in marketing define reputation as brand equity and associate it with the credibility of the company (Nguyen & Leblanc, 2001, p. 228).

Common to all is the fact that corporate reputation is a result of past actions of the corporation. Nguyen and Leblanc (2001, p. 228) define corporate reputation as a reflection of company interactions to its target groups regarding the quality of its products and services in comparison with the competition. He also adds that corporate can have numerous reputations, for each attribute, such as price, product or service quality, innovativeness, etc., or a global reputation.

According to Gaines-Ross (2008, p. 6), corporate reputation is the perception how positively or negatively corporate is perceived by its crucial stakeholders. Stakeholders are in the first place customers, employees, suppliers and other actors which the company relies on for its success. Each stakeholder perceives reputation differently, so they consequently attribute a different attention to it.

Stakeholders have their own expectations and depend on that, they design opinions about a product, service, employer, business partner, etc., and appropriately to that, they react and response. Aggregation of stakeholder's perceptions, of how well organization meets their demands and expectations, their created opinions, previous experiences and responses, generates corporate reputation (Dolphin, 2004, pp. 79-80).

Keh and Xie (2009, p. 733) state that corporate reputation has a positive effect on financial performance. They expose the following advantages that a company with favourable corporate reputation can benefit from; charging price premium, delaying rival mobility, attracting larger amounts of investments, highly motivated employees, partnership relation with suppliers, and supporting new product and recovery strategies in time of crisis.

Nguyen and Leblanc (2001, pp. 228-229) also believe that in order to build a strong corporate reputation, a company needs many credential actions over time. However, the downsides of good reputation are shown especially when corporate makes a mistakes or comes into trouble. According to Nguyen and Leblanc (2001, p. 229) the impacts of bad actions on stakeholders are much stronger than good actions, so corporate reputation can be easily destructed. Keh and Xie (2009, p. 733) also expose findings from earlier researches where corporate with good reputation suffer more than those with poor reputation when they make a mistake. The reason for that is the contrast effect from non-fulfilment of high expectation.

2.2.2 Communication

Communication is a very large concept, composite of interactions between persons. In general, the purpose of communication is to share, to inform, to give notice, to announce, etc, relevant information to the receiver. The value of communication between customers and company has been and still is significant. Ball, Simoes and Machas (2004, p. 1277) consider communication as a forerunner of trust, along with shared values and lack of opportunistic behaviour.

There are two common ways of communicating – written and verbal. Considering communication between company and customer, written communication refers to personalized letters, direct mail, and since the development of IT also interactions on web sites and e-mail. On the other side, communication in-person refers to interactions with service personnel before, during and after service transactions (Ball & Simoes & Machas, 2004, p. 1277).

Nowadays we are surrounded by IT on every step. Since smart phones and tabs, we are a potential buyer every time and everywhere, the only requirement is an internet connection. This is why companies try to get potential buyer attention and interact with them, mostly with banners on web pages and with e-mails.

Authors (Ball & Simoes & Machas, 2004, p. 1277) define good communications as helpful, positive, timely, useful, easy and pleasant. Briefly, “service provider needs to provide information in such a way that the customer personally benefits with a minimum of effort necessary to decode the communication and determine its utility”. This kind of communication is frequently delivered in a person-to-person formation and is personalized.

To have personalized communication, a company needs to know their clients and they need to track their consumer behaviour, to provide them with right information base to their desire. In recent years, organizations have begun to realise the significance of recognizing their customers habits and to know them better. To know customers and their behaviour, organization needs to have a Customer Relationship Management (hereinafter: CRM) (Karakostas & Kardaras & Papathanassiou, 2005, pp. 853-854).

The adoption of IT-enabled CRM redefines the traditional models of interaction between organization and their customers. CRM is also considered a competitive advantage, as it allows corporations to “explore and use knowledge of their customers and to foster profitable and long-lasting one-to-one relationships” (Karakostas & Kardaras & Papathanassiou, 2005, p. 854).

3 HYPOTHESES AND RESEARCH MODEL

The chapter of hypothesis and research model is made up of two parts; in the first part, I describe hypotheses composition, one by one. The second part of this chapter is a presentation of the model used in my research.

3.1 Hypotheses development

Hereinafter, in the next four subchapters, eight hypotheses are developed, based on the literature and the prior studies on the topic revision.

3.1.1 The influence of perceived performance expectancy and effort expectancy on commitment to use

Particularly in the IT field, when it comes to theories and models for prediction and explanation of the acceptance of technological innovations, it is the TAM that is most favourable (Hardgrave & Johnson, 2003, p. 325), but as already mentioned, UTAUT is more suitable for studies in educational context (Ling et al., 2011, p. 2).

Since study context differs among studies, many authors combine more than one adoption theory to better understand and determine the acceptance of new technology. Also, authors commonly tailor original model frameworks due to their particularity of research

technology (Oliveira & Thomas & Espadanal, 2014, p. 499). Thus, according to the specificity of researched technology, I tailored an original UTAUT model.

First of all, I exclude behavioural intention from my research as I examine acceptance of e-materials among teachers who already use and teach with e-materials. Thus measuring their intention behaviour would not have sense (Van Raaij & Schepers, 2008, p. 842). Also, in my study I consider replacing construct use behaviour with commitment to use as a contextual label, because when a teacher adopts teaching material, he or she makes a commitment to use it for at least one school year.

As already exposed in the prior chapters, the main constructs of UTAUT acceptance model are perceived performance expectancy and effort expectancy. Authors in prior studies found positive effect of both constructs on acceptance of new technology (Venkatesh et al., 2003, p. 469).

However, in the educational context authors found mixed results. In a study by Jairak, Praneetpolgrang and Mekhabunchakij (2009, p. 366) results reveal that both, performance expectancy and effort expectancy, have a positive and significant impact on user's behaviour intention to use.

On the other hand, authors Anderson, Schwager and Kerns (2006, pp. 432-433) in their study confirm the positive and significant influence of performance expectancy on use of technology. Furthermore, results in their study revealed that impact of perceived effort expectancy on use of technology is non-significant.

According to hypothesis of Venkatesh et al. (2003, pp. 447-450) and findings of prior studies, I hypothesize:

H1: The perceived performance expectancy of e-materials will have a positive impact on the teacher's commitment to use e-materials.

H2: The perceived effort expectancy of e-materials will have a positive impact on the teacher's commitment to use e-materials.

3.1.2 The influence of subjective norms on commitment to use

Subjective norm is a social force influencing an individual facing the opportunity to accept or refuse to use a new technology (Venkatesh & Davis, 2000, p. 187). Subjective norm has been a popular construct with researchers who analyse the acceptance of certain technology, as it was in most studies proven that subjective norm is directly and significantly related to an individual's intention to use the technology (Van Raaij and Schepers (2008, p. 842).

As already stated, subjective norm is an individual's perception of which behaviour is expected by other important persons, in other words, what would those persons do in his or her place. Venkatesh and Davis (2000, p. 188) in their study discuss that subjective norms have a significant and direct effect on the intention to use only in mandatory situations and named this mechanism compliance with social influence.

In voluntary usage context, a potential adopter perceives the adoption decision to be non-mandatory. In this case subjective norm does not have a significant influence on individual behaviour. Despite when a user perceives technology to be organizationally required, intention to use varies because some users are unwilling to comply with changes (Venkatesh & Davis, 2000, p. 188).

In educational context, this construct has been tested in many studies. Thus, we can consider it as an important factor when researching the acceptance of technology among teachers. Studies of different technology reveal divergent results. In study by Jairak, Praneetpolgrang and Mekhabunchakij (2009, p. 366), influence of social norms on use of technology was found as positive and significant. Nevertheless, several studies in educational context did not confirm the influence of subjective norms on technology use as significant (Anderson, Schwager and Kerns, 2006, p. 433; Van Raaij & Schepers, 2008, p. 847).

Since in my study I research among users where e-materials are a key component of a lesson, I consider my research environment as mandatory. Due to that I follow the logic of Venkatesh and Davis (2000, pp. 187-188) and I hypothesize:

H3: Subjective norm will have a positive impact on the commitment to use e-materials.

3.1.3 The influence of personal innovativeness in IT on commitment to use

As pointed out earlier in my thesis, openness to change and willingness to try out something new is defined as personal innovativeness. Innovative persons, who seek new information and adapt new technology and processes, increase the likelihood that they might find usefulness and ease of use faster than non-innovative persons (Van Raaij & Schepers, 2008, p. 843; De Smet et al., 2012, pp. 690-691)

Van Raaij and Schepers (2008, p. 843) expose that innovative persons are well familiar with technology novelties, they like to receive news about related topics and are more informed about the possibilities of technology and also combine experiences from similar technology which enables them to faster adapt new technology. According to that and to results obtained from other studies, it is indicated that PIIT is positively related to the intention to use technology (Lu & Yao & Yu, 2005, p.259).

In educational context this factor plays an important role, as it can explain the non-adoption of technology among teachers even if technology infrastructure is available in the classroom (De Smet et. al., 2012, p. 691).

What concerns about studies of personal innovativeness in IT impact the use of technology in educational context, the results show mixed findings. In a study by De Smet et al. (2012, p. 694), results reveal that personal innovativeness in IT has positive and significant impact on intention to use. Results of a study by Van Raaij and Schepers (2008, p. 847) revealed a very weak relation between the mentioned constructs; it was not significant.

Again under the assumption that in my study I research among current users, I expect that these teachers are innovative, since they have already changed their teaching practice and started using e-materials as new, innovative and technology assisted way of teaching. Thus, I hypothesize:

H4: Personal innovativeness in IT will have a positive impact on commitment to use e-materials.

3.1.4 The influence of provider credibility on commitment to use

This study also argues that a decision to commit to use e-materials also depends on the teacher's perceived credibility of provider. Based on literature review, credibility of provider is conceptualized as a person's perception of provider's ability to fulfil its claims and if the provider can be trusted (Newell & Goldsmith, 1997, p. 235). Some authors unify perceived credibility with trust in provider (Lee & Kim & Ahn, 2011, pp. 222-223), again others differ them in the sense that credibility presents a major part of perceived trust in provider (Ganesan & Hess, 1997, p.440). However, both interpretations confirm the impact on commitment in discussed relationship.

The relationship between perceived trust and commitment has been researched in detail in a study by Morgan and Hunt (1994, p. 31), where authors prove positive and significant influence of mentioned relation. Nevertheless that commitment-trust theory bases on marketing context, the relation impact has been proved in other fields as well. Lee, Kim and Ahn (2011, p. 223), support the results from prior studies, and note the provider's credibility positive influence on user's commitment.

Eastlick, Lotz and Warrington (2006, p. 879) adopt the Morgan and Hunt model in their study and they find that person's trust in provider of services positively influences their commitment toward the use of services.

There is also theoretical and empirical support for integrating provider credibility with performance expectancy, as trust is one of the determinants of perceived usefulness. This

connection is especially relevant when dealing with online environment, where trust in provider presents a “guarantee” that consumer will gain expected usefulness (Pavlou, 2003, pp. 78-79).

Since prior studies of new technology acceptance do not consider much attention to the role of relationship between provider of innovation or technology on the one side and adopter on the other side, Lee, Kim and Ahn (2011, p. 223), as well as myself do not find any recent educational field studies related to relation between credibility of provider and teachers’ behaviour which justifies the importance to involve this relation into my research model.

The above exposed studies served me as a base for combining commitment-trust theory model with extended and modified UTAUT model. According to prior findings, I hypothesize:

H5: Perceived credibility of provider of e-materials has a positive impact on teacher’s commitment to use e-materials.

H6: Perceived credibility of provider of e-materials has a positive impact on performance expectancy.

In literature, many authors expose importance of corporate reputation and its communication in relation with credibility. Results of several studies revealed strong and positive impact of corporate reputation and communication on credibility of provider (Newell & Goldsmith, 1997, pp. 235-236; Lee & Kim & Ahn, 2011, p. 233; Morgan & Hunt, 1994, p. 29). Thus, I include them in my research model to additionally explain the credibility of provider.

In study by Morgan and Hunt (1994, p. 26), results confirm that corporate reputation and its communication with customers positively influences a person’s perceived trust in corporate.

Furthermore, Eastlick, Lotz and Warrington (2006, p. 883) integrate the construct of corporate reputation and examine the impact of a person’s perceived credibility of organization. Results confirm the relation to be positive and significant.

The influence of communication on perceived credibility of organization has also been tested in a study by MacMillan, Money, Money and Downing (2005, p. 814) where results also ratify the significance.

In educational context due to little attention to the role of provider’s credibility, there is also a lack of studies which examine the influence of corporate reputation and communication to credibility of provider. However, Law (1997, p. 21), in an unrelated

study to technology acceptance, confirms the importance of learning materials' provider reputation. Thus, and according to findings in prior studies, I hypothesize:

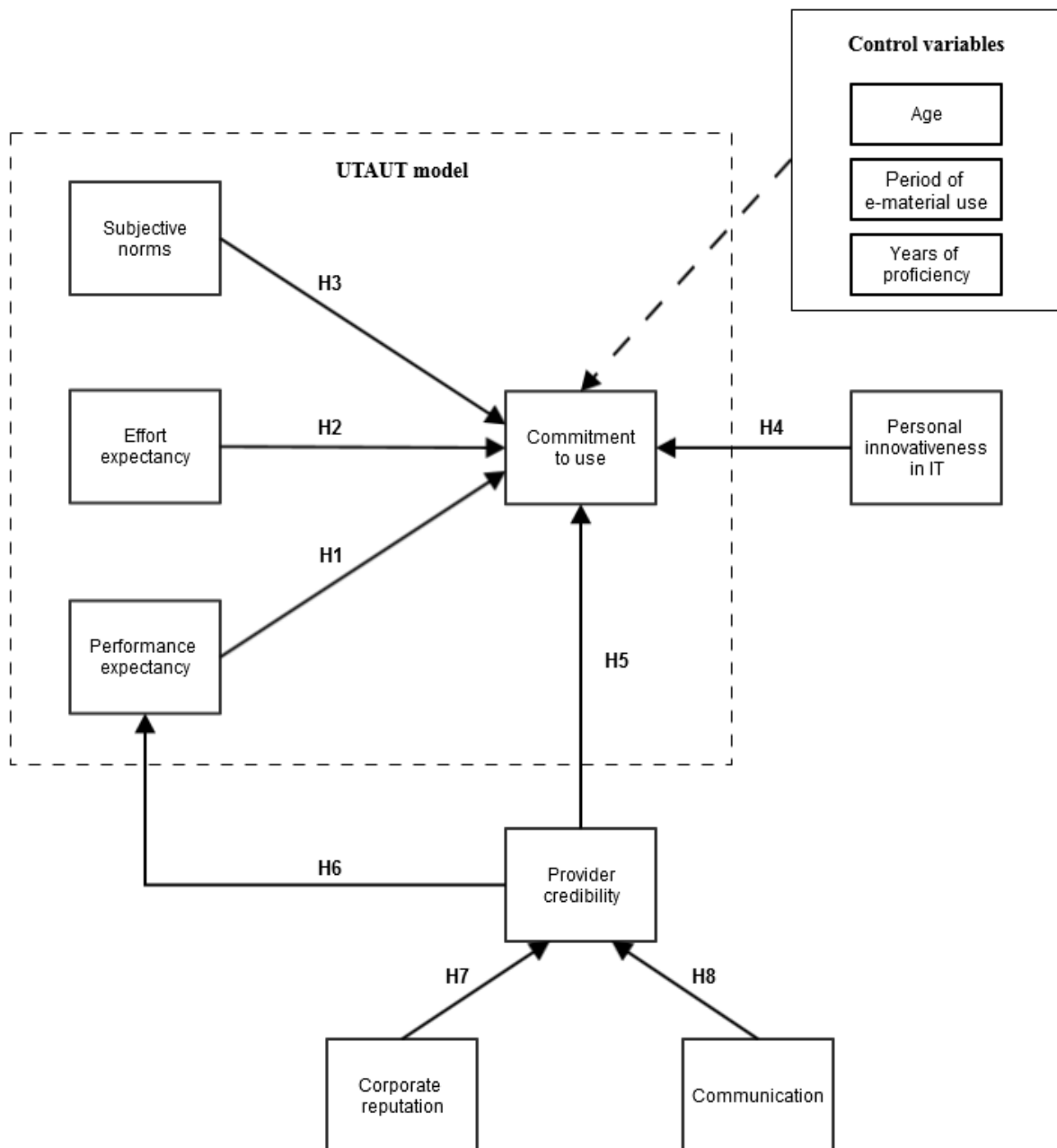
H7: Strong reputation of e-material provider has a positive impact on teachers' perception of provider credibility.

H8: Communication between providers of e-materials and teachers has a positive impact on teachers' perception of provider credibility.

3.2 Research model

Based on the previous research on the technology acceptance area, taking hypotheses placed into account, I propose the model as follows; it demonstrates the linkages between several factors such as teacher's perceived usefulness, ease of use, provider's credibility and subjective norms, and teacher's commitment to use e-materials in the classroom. Moreover, the model also identifies the impact of personal innovativeness on perceived usefulness and ease of use of e-materials, as well as the impact of provider's reputation and its way of communication on the credibility perceived by the teacher. The conceptual model used to direct the study is presented in Figure 9.

Figure 9. Proposed conceptual model of e-materials acceptance



In my modified UTAUT model I do not use proposed moderators. There are several reasons for that. First, the gender ratio of male and female teachers; in Slovenian elementary schools female teachers present 97 percent of all teachers (Statistical Office of the Republic of Slovenia – education, 2014). Next are experiences; since the research population is persons who already use the system, thus, they already have experiences with e-materials. Voluntariness to use is also not relevant in context of this study as teachers involved in this study use e-materials as primary teaching material. However, I do include control variables to rule out alternative explanations of study findings, also to reduce error terms and increase statistical power. To my research there are three relevant variables

which I include as control variables – these are the teacher’s age, years of proficiency in teaching and period of how long they have been using e-materials (Becker, 2005, p. 274).

Table 3. Prior findings of research relations

Research relation	Author	Significance
Performance expectancy → commitment to use	Jairak, Praneetpolgrang and Mekhabunchakij (2009)	+
	Anderson, Schwager and Kerns (2006)	+
Effort expectancy → commitment to use	Jairak, Praneetpolgrang and Mekhabunchakij (2009)	+
	Anderson, Schwager and Kerns (2006)	n.s.
Subjective norms → commitment to use	Jairak, Praneetpolgrang and Mekhabunchakij (2009)	+
	Anderson, Schwager and Kerns (2006)	n.s.
	Ma, Andersson & Streith (2005)	n.s.
Personal innovativeness in IT → commitment to use	De Smet et al. (2012)	+
	Van Raaij & Schepers (2008)	n.s.
Provider’s credibility → commitment to use	Lee, Kim and Ahn (2011)	+
	Morgan and Hunt (1994)	+
Provider’s credibility → performance expectancy	Pavlou (2003)	+
Corporate reputation → provider’s credibility	Lee, Kim and Ahn (2011)	+
	Eastlick, Lotz and Warrington (2006)	+
Communication → provider’s credibility	Morgan and Hunt (1994)	+
	MacMillan et al. (2005)	+

In Table 3, I gather reviewed findings from prior studies about construct relations related to my research model. As we can see, authors have mixed results in their studies. Thus, I want to further explore the importance of this constructs and their relations in my study.

4 RESEARCH METHODOLOGY

The structure of this chapter is as follows; first, I describe how research is set, then I demonstrate how the necessary data were collected and finally, I present the methods for data analysis.

4.1 Measurement

To investigate the theoretical constructs of e-materials' acceptance among teachers, a survey was carried out in Slovenia covering elementary-education institutions. In order to develop a valid questionnaire, I first prepared a review of former studies from the technology acceptance area, as well as provider perception field. I tried to identify the right set of questions that would best cover research requirements and, consequently, lead to as credible results as possible. Thus, I used the already well-established, presented in the literature, and empirically tested variables of the constructs of the model discussed to assure findings comparability to results of prior studies.

The questionnaire, which is described in more detailed below, consisted of several closed-ended questions where variables, i.e. performance expectancy; effort expectancy; commitment to use; social norms; personal innovativeness in IT; provider credibility; corporate reputation; and communication, were measured using a seven-point Likert scale, where all the respondents had to indicate the extent to which they agreed with a given statement, ranging from "completely disagree" (1) to "completely agree" (7).

In order to test the instrument, I performed a pilot study; by e-mail, I sent 20 questionnaires, out of which 18 were validly completed and sent back. The results provided evidence that the scales are reliable and valid. Test responses were excluded from the main research. Hereinafter, the variables I used for the purpose of my research are further described in subchapters that follow.

4.1.1 Performance Expectancy

When setting up variables that determine the Performance Expectancy construct, I took as my basis Vankatesh, Thong and Xu's research from 2012, where they examine consumer acceptance and use of mobile internet. I tailored their statements to suit my research best, so I replaced the expression "mobile internet" to subject of my study, i.e. "e-materials". In Table 4, the variables of the construct discussed are shown.

Table 4. Performance Expectancy construct variables

Construct	Variables	Code
<i>Performance Expectancy</i>	Using e-materials increases my productivity.	PE1
	Using e-materials helps me accomplish things more quickly.	PE2
	I find e-materials useful for my teaching lessons.	PE3
	Using e-materials increases my chances of achieving things that are important to me.	PE4

Source: adapted from V. Venkatesh & J. Thong & X. Xu, *Consumer acceptance and use of information technology: extending the unified theory of acceptance and use of technology*, 2012, p. 178.

4.1.2 Effort Expectancy

Same as with the previous construct, the foundation for Effort Expectancy construct was the before mentioned research of Vankatesh, Thong and Xu. Here as well, I adjusted the phrases to cover the needs of my topic. Table 5 encompasses the variables of construct considered.

Table 5. Effort Expectancy construct variables

Construct	Variables	Code
<i>Effort Expectancy</i>	My interaction with e-materials is clear and understandable.	EE1
	Learning how to use e-materials is easy for me.	EE2
	It is easy for me to become skilful at using e-materials	EE3
	I find e-materials easy to use	EE4

Source: adapted from V. Venkatesh & J. Thong & X. Xu, *Consumer acceptance and use of information technology: extending the unified theory of acceptance and use of technology*, 2012, p. 178.

4.1.3 Subjective Norms

Venkatesh and Davis study the perceived usefulness and usage intentions in terms of social influence and cognitive instrumental processes; I developed the variables for Subjective Norms construct with their findings in mind – they can be evidenced in Table 6. To reflect their variables in the context of my master’s thesis, I modified their subject of research – “the system” – into “e-materials”.

Table 6. Subjective Norms construct variables

Construct	Variables	Code
<i>Subjective Norms</i>	People who influence my behaviour think that I should use e-materials.	SN1
	People who are important to me think that I should use e-materials.	SN2

Source: adapted from V. Venkatesh & F. D. Davis, *A theoretical Extension of the Technology Acceptance Model: Four Longitudinal Field Studies*, 2000, p. 201.

4.1.4 Personal innovativeness in IT

Table 7 contains all the variables needed to measure Personal innovativeness in IT construct. With no modifications needed, I used Agarwal and Prasad's items for evaluating user perception in IT adoption influences in terms of personal innovativeness.

Table 7. Personal innovativeness in IT construct variables

Construct	Variables	Code
<i>Personal innovativeness in IT</i>	When I hear about a new piece of information technology, I generally think about ways I could use and experiment with it.	PIIT1
	Among my peers I am usually the first to try out new information technologies.	PIIT2
	I like to experiment with new information technologies.	PIIT3

Source: adapted from R. Agarwal & J. Prasad, *The antecedents and consequents of user perceptions in information technology adoption*, 1988, p. 28.

4.1.5 Commitment to use

In order to develop the variables for Commitment to use construct, as shown in Table 8, I took an insight from several similar researches, published between 2003 and 2012; as we can see, three variables to be measured were identified. The statements were properly redesigned to be applicable in the context of e-materials.

Table 8. Commitment to use construct variables

Construct	Variables	Code
<i>Commitment to use</i>	I intend to use e-materials within the teaching process in the future.	IU1
	I predict I will use e-materials within the teaching process in the future.	IU2
	My personal level of commitment to using e-materials is low.	IU3

Source: adapted from J. T. Marchewka & K. Kostiwa, *An application of the UTAUT model for understanding student perceptions using course management software*, 2007, p. 102; and V. Venkatesh & F. D. Davis, *A theoretical Extension of the Technology Acceptance Model: Four Longitudinal Field Studies*, 2000, p. 201; and B. C. Hardgrawe & R. A. Johnson, *Toward an Information Systems Development Acceptance Model: The Case of Object-Oriented Systems Development*, 2003, p. 333.

4.1.6 Provider credibility

The groundwork for the Provider credibility construct was the research of Eastlick, Lotz and Warrington, where the statements were drawn from. Even though my research is based on Rokus Klett case, instead of “Company”, I formed the statements using “Provider X” expression for the model to be applicable in some possible subsequent researches.

Table 9. Provider credibility construct variables

Construct	Variables	Code
<i>Provider credibility</i>	Provider X cannot be trusted. (<i>R</i>)	PC1
	I believe provider X is honest and truthful	PC2
	I believe provider X will be sincere in promises.	PC3
	I believe provider X will treat me fairly and honestly.	PC4
	I am able to trust provider X completely.	PC5

Source: adapted from M. A. Eastlick & S. L. Lotz & P. Warrington, *Understanding online B-to-C relationships: An integrated model of privacy concerns, trust, and commitment*, 2006, p. 882.

4.1.7 Corporate reputation

Here as well, the word “company” from the statements was appropriately changed to “provider X” in order to be consistent throughout the entire questionnaire. As a basis for Corporate reputation construct formation, I chose the Nguyen and Leblanc’s research. The variables of the corresponding construct are displayed in Table 10.

Table 10. Corporate reputation construct variables

Construct	Variables	Code
<i>Corporate reputation</i>	In general, I believe that provider X always fulfils the promises that it makes to its customers.	REP1
	Provider X has a good reputation.	REP2
	I believe that the reputation of provider X is better than other providers'.	REP3

Source: adapted from N. Nguyen & G. Leblanc, *Corporate image and corporate reputation in customer' retention decisions in services, 2001, p. 235.*

4.1.8 Communication

The variables of the last construct of my model – Communication construct – were derived from MacMillan’s et al. study, where they studied the commitment-trust theory in the non-for-profit sector. Modification of the statements covered the suitable words replacement. Variables of the Communication construct are gathered in Table 11.

Table 11. Communication construct variables

Construct	Variables	Code
<i>Communication</i>	Provider X keeps me informed about new developments which are relevant to me.	COM1
	Provider X provides frequent communication about issues which are important to me.	COM2
	Even when things do not go quite according to plan, provider X does its best to listen to me.	COM3
	Whatever the circumstances, provider X usually takes notice of the suggestions.	COM4

Source: adapted from K. MacMillan et al., *Relationship marketing in the not-for-profit sector: an extension and application of the commitment–trust theory, 2005, p. 813.*

4.2 Data collection

E-mails with the link to the online questionnaire were sent to all the teachers who taught at elementary level and were active users of e-materials at that time. The list of 2,693 teachers was provided to me by the major publishing company, specialized in teaching materials – Rokus Klett Publishing Ltd.

Data were collected in February 2014, particularly in the 8th calendar week of the precise year. To determine a correct sample size for the given population, I visited the CheckMarket’s website and used their Sample size calculator; for the population of 2,693, with the 5-percent error margin, and a confidence level of 95 percent, I needed to obtain 337 responses at least. In order to stimulate participation, I gave all the participants the opportunity to receive the conclusions of my research.

However, 517 responses were received, out of which 473 were valid; thus, the overall response rate was 17.6 % which illustrates statistically representative image of the population under consideration. In Table 12, I demonstrate the mailing report, where we can see in detail the successfulness of the mailing carried out.

Table 12. E-mailing report

	Contacts	% of population
Number of sent e-mails:	2,693	100
Number of delivered e-mails;	2,651	98.4
Number of viewed e-mails:	1,405	52.2
Number of read e-mails:	1,164	43.2
Number of clicks on survey:	658	24.4
Number of completed surveys:	517	19.2
Number of valid surveys:	473	17.6

The profile of the sample is presented below in Table 13, where we can see that out of 473 valid responses, two age groups presented the majority of all response, namely 40.4 percent of teachers were 46–55 years old, and 38.4 percent of them were 36–45 years old. According to the prevailing age, results of the sample show the expected characteristics of the sample about the years of proficiency, where 69.7 percent of teachers have worked in the educational area for more than 15 years. The sample was concluded from experienced teachers with e-materials; most of them had used e-materials for about a year (38.7 %), 32.8 percent of them were even more experienced with e-materials as they used them for over two years.

Table 13. Main characteristics of the sample

Sample characteristics	(%)
Age of the teacher	
from 26 to 35 years	14.9
from 36 to 45 years	38.4
from 46 to 55 years	40.4
56 years and more	6.3
Years of proficiency	
less than 5 years	3.0
from 5 to 10 years	8.5
from 11 to 15 years	18.8
more than 15 years	69.7
Period of e-material use	
less than 3 months	2.4
from the beginning of this school year	26.1
from the last school year	38.7
for more than 2 school years	32.8

4.3 Data analysis methods

To analyse the collected data of 473 valid questionnaire responses and to empirically assess the relationships defined by my research model I used descriptive statistics and applied the structural equation model (SEM). For the best method for empirical testing of structural models authors expose partial least squares (PLS), thus and due to that the research model is complex, I selected to use PLS for data analysis in my research.

Firstly I assessed the quality of measurement model to provide validity of constructs and reliability of the measurements and by that I followed literature tradition of structural equation modelling (Dinev & Xu & Smith & Hart, 2013, p. 305). Then structural modelling followed, where I tested the study hypothesis and the quality of the proposed research model.

5 RESULTS

Evaluation of the research model was conducted in two stages. First, the measurement model was assessed, where I started with the analysis of the proposed research model by

checking the reliability and validity of model constructs. In second part, the structural model with hypotheses was tested.

5.1 Measurement model

When determining construct validity, I examined two elements of factorial validity, particularly convergent and discriminant validity. These two validities show how well the measurement items relate to the constructs. Convergent validity is proved when every measurement item strongly correlates with its assumed theoretical construct, while discriminant validity is proved when every measurement item correlates weakly with all other constructs expected for the one to which it is theoretically associated (Gefen & Straub, 2005, p. 92).

I examined convergent validity with Average Variance Extracted (AVE). Value of AVE should be greater than 0.50, to ensure a sufficient degree of convergent validity (Gefen & Straub, 2005, p. 94). As we can see in Table 14, all items have AVE greater than 0.6, in general over 0.7, which demonstrates convergent validity.

Discriminant validity of the constructs was assessed using Fornell and Larcker test. The method impose that the square root of the AVE of each construct exceeds the correlation shared between the construct and other constructs in the model in order to achieve discriminant validity (Van Raaij & Schepers, 2008, p. 845). In Table 15, results show that all constructs satisfactorily pass the test, as the square root of the AVE is larger than the cross-correlations with other constructs, which proves validity of all constructs.

To analyse reliability, composite reliability (CR) was assessed. The minimum value that still justifies reliability is 0.7 (Van Raaij & Schepers, 2008, p. 845). The corresponding fit measures can be found in Table 14, where we can see that CR values vary from 0.88 to 0.97. The results are higher than 0.7 and are in general above 0.9, suggesting that the scales are reliable. Also, all Cronbach's alphas exceeded the recommended value of 0.7 and all values were higher than 0.8, which indicates that model constructs are reliable and show good internal consistency.

To verify validity and reliability of the measures, I also observed factor loadings. The factor loadings are shown in Table 16 where we can see that all items load sufficiently high on the corresponding constructs, which demonstrates convergent validity, with two exceptions: one provider credibility item and one performance expectancy item were deleted due to its low loadings and high cross-loadings. Other factor loadings vary from 0.67 to 0.96 and they all exceed the minimum edge value of 0.50 suggested by Peterson (Van Raaij & Schepers, 2008, p. 845).

All fit criteria exceeded the threshold values proposed in the literature and indicated strength of reliability and validity of all constructs. Thus, constructs developed by this measurement model could be used to test the proposed research model.

I also controlled for important factors that might influence commitment to use e-materials, to account for alternative explanations. Those control factors are age (AGE), prior use time (PRI) and years of proficiency (PRO). As we can see in Table 17, results show that none of control variables influence teacher's acceptance and commitment to use e-materials, thus I consider the proposed research model to be valid for all age groups, regardless to years of proficiency, and for e-material users irrespective of the prior use time.

Table 14. Reliability indicators

Constructs	AVE	Composite Reliability	Cronbach's Alpha
Communication (COM)	0.75	0.92	0.89
Commitment to use (IU)	0.73	0.89	0.81
Effort expectancy (EE)	0.65	0.88	0.82
Personal innovativeness in IT (PIIT)	0.78	0.91	0.86
Performance expectancy (PE)	0.76	0.90	0.84
Corporate reputation (REP)	0.77	0.91	0.85
Social norms (SN)	0.85	0.92	0.83
Provider credibility (PC)	0.88	0.97	0.95

Table 15. Correlations and AVEs

Constructs	1.	2.	3.	4.	5.	6.	7.	8.
1. Communication (COM)	0.87							
2. Commitment to use (IU)	0.33	0.86						
3. Effort expectancy (EE)	0.39	0.49	0.80					
4. Personal innovativeness in IT (PIIT)	0.22	0.53	0.37	0.88				
5. Performance expectancy (PE)	0.37	0.63	0.54	0.41	0.87			
6. Corporate reputation (REP)	0.71	0.32	0.38	0.26	0.42	0.88		
7. Social norms (SN)	0.18	0.36	0.24	0.17	0.38	0.23	0.92	
8. Provider credibility (PC)	0.68	0.35	0.42	0.23	0.43	0.70	0.18	0.94

Table 16. PLS loadings

Constructs	Items	Loading	T-statistic
Communication	COM1	0.85	31.25
	COM2	0.84	29.32
	COM3	0.90	69.40
	COM4	0.88	37.03
Commitment to use	IU1	0.94	121.03
	IU2	0.92	66.58
	IU3	0.69	14.96
Effort Expectancy	EE1	0.81	37.72
	EE2	0.66	12.56
	EE3	0.85	48.35
	EE4	0.88	46.57
Personal innovativeness in IT	PIIT1	0.88	57.90
	PIIT2	0.84	44.50
	PIIT3	0.92	107.63
Performance Expectancy	PE1	0.84	41.42
	PE2	0.88	57.15
	PE3	0.90	61.51
Corporate reputation	REP1	0.88	63.73
	REP2	0.93	111.17
	REP3	0.83	52.89
Subjective Norms	SN1	0.90	39.76
	SN2	0.95	104.26
Provider credibility	PC2	0.94	45.73
	PC3	0.96	103.22
	PC4	0.95	97.90
	PC5	0.91	56.68

5.2 Structural model

After determining validity of the measures, I tested the structural paths in the research model to examine the significance of the path coefficients and to analyse placed hypotheses. The results of the analysis are summarized in Table 17, where we can see the explanatory power and significance of the hypothesized paths. Based on the amount of

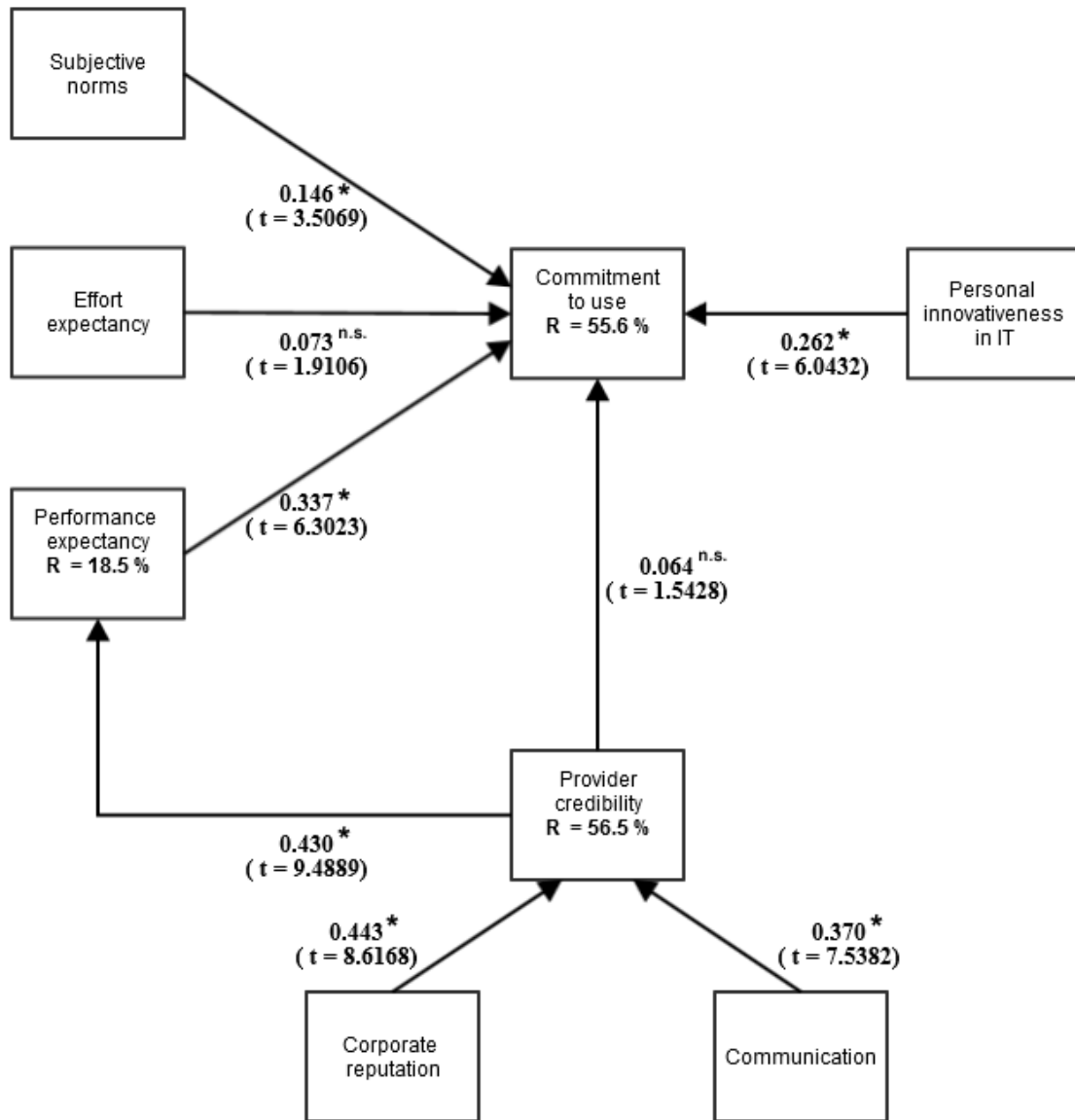
variance explained in the endogenous construct, the explanatory power of the structural model is assessed. From the table we can see that the proposed research model shows a high explanatory power for IU (0.56) and TP (0.57), and the explanatory power for PU (0.19) is still relevant even though smaller. The determination coefficient (R^2) values are comparable to those found in prior studies in the educational field related to acceptance of e-teaching technologies (Van Raaij & Schepers, 2008, p. 845). The outcome of the research model test are also graphically represented in Figure 10 and Table 17. The statistical significance of each path was estimated using a PLS bootstrapping method utilizing 500 resamples to obtain standard error estimates and t-values. The statistical significance of the path coefficients allows us to see which hypotheses were supported and which were not.

Table 17. Relevant constructs for the structure model

Criterion	Predictors	R²	Path coefficient	T-value
IU	PIIT	0.556	0.262 *	6.0432
	EE		0.073 ^{n.s.}	1.9106
	PE		0.337 *	6.3023
	PC		0.064 ^{n.s.}	1.5428
	SN		0.146 *	3.5069
Control variables				
	AGE		-0.072 ^{n.s.}	1.665
	PRI		0.015 ^{n.s.}	0.625
	PRO		0.063 ^{n.s.}	1.588
PC	REP	0.565	0.443 *	8.6168
	COM		0.370 *	7.5382
PE	PC	0.185	0.430 *	9.4889

Note: (n.s.) non-significant; * significance at: $p < 0.01$

Figure 10. The structural model - PLS results



Note: (n.s.) non-significant; * significance at: $p < 0.01$

The hypothesis of performance expectancy as a predictor of the commitment to use e-materials (H1) is confirmed, as path coefficient was significant ($\hat{\beta} = 0.337$). H2 states that effort expectancy will positively affect commitment to use e-materials. Results show that the path coefficient was not significant ($\hat{\beta} = 0.073$), thus H2 cannot be supported. When comparing this result with prior studies, I found similarity with studies that research among current users or participants who are already familiar with the technology, where authors also did not find effort expectancy a significant determinant of user's intention to use technology (Van Raaij & Schepers, 2008, p. 847; Anderson & Schwager & Kerns, 2006, pp. 433-434).

The relation between personal innovativeness in IT and commitment to use e-materials is concerned in H4, which states that personal innovativeness in IT will positively impact teacher's commitment to use e-materials. The path coefficient was significant ($\hat{\beta} = 0.262$), thus results support the H4. Nevertheless the path coefficient of subjective norms ($\hat{\beta} = 0.146$) was smaller than those of performance expectancy, effort expectancy and personal innovativeness in IT, it still is significant and important, thus results support H3.

The results expectedly show and confirm the correlation between corporate reputation and provider's credibility. The coefficient path is significant ($\hat{\beta} = 0.443$), thus supporting H6. The results also support H7, which concerns the relation between communication and provider's credibility, as the path coefficient was significant ($\hat{\beta} = 0.37$).

The results unexpectedly showed that there is a weak correlation between provider's credibility and commitment to use and consequently the path coefficient ($\hat{\beta} = 0.064$) was not significant, thus H5 was not supported. However, results revealed the relatively weak impact of provider's credibility indirectly on commitment to use through performance expectancy.

6 DISCUSSION

Teachers are decision makers about which teaching materials they are going to use for their lectures, therefore their choice is autonomous. Thus, it is vital for all other stakeholders involved in the educational processes to understand the determinants of e-materials acceptance among teachers.

The goal of this research is to understand the determinants of e-materials acceptance by integrating teacher's expectations, opinions of relevant persons, personal innovativeness and provider credibility. Results show that effort expectancy does not significantly impact the teacher's intention about use, but all other constructs do determine the acceptance of e-materials. The exception is only provider credibility, which does not impact the teacher's commitment to use directly, but it does influence it indirectly through performance expectancy (see Table 17). Thus, my findings reveal important insights for conceptualizing teachers' acceptance of e-materials.

Results also confirm importance of communication between the e-material provider and the teacher. Informing teachers about the latest novelties, important information about e-materials and solving issues regarding the use of e-materials significantly influence provider credibility and increase it. Like communication, it is also corporate reputation that has a significant impact on perceived provider credibility. As expected, corporate with high reputation is by the teacher perceived as more credible.

6.1 Implications for theory

Findings of the study make important contributions to the understanding of technology acceptance in elementary education, especially when considering e-materials. This study extends the frames of prior studies by combining the well established UTAUT model with trust-commitment theory to develop the research model.

The research model combines UTAUT constructs, personal innovativeness with IT and provider credibility. This model differs from others because it, in addition to UTAUT constructs, considers the importance of personal innovativeness in IT as an important factor of teacher's acceptance of e-materials.

Authors in prior studies mostly examine and validate the influence of personal innovativeness in IT as an extension of the TAM model to explain higher variance of technology acceptance (Van Raaij & Schepers, 2008, p. 847; Smet et al., 2012, p. 694). However, many of them do not find a significant impact on acceptance of technology, especially in the educational context, where authors find mixed results of impacts of this construct. In the educational context authors who used UTAUT as a research model do not include this factor into research. In my model I consider personal innovativeness in IT important, therefore I validate its influence on commitment to use (H4) and results show the significance and by that justify the examining of this construct in technology acceptance studies.

However, the main difference of this research model from others especially shows in consideration of provider credibility in relation to technology acceptance. In the educational field, prior studies recently have not empirically studied and validated the influence of provider credibility on use of technology. As a main contribution of this study I examine the impact of provider credibility directly on teacher's commitment to use (H5) and indirectly through teacher's performance expectancy (H6). As already exposed, results do not confirm the significance of direct influence of provider credibility on commitment to use and thus H5 is not supported. However, indirect influence has been proved as important and significant, thus H6 is supported.

Results of this study have been verified as reliable and valid, thus, the research model can be proclaimed as a model for understanding the determinants of e-materials acceptance in elementary education and it can be used in future studies.

6.2 Practical implications

The use of e-materials is growing in the educational sector at all levels. According to Gartner (2013, p. 7), expectations about e-materials in the next ten years are high. In the education context a lack of understanding of the challenges and constraints in

implementing technology in teaching processes has in many times resulted as failure. The findings of this study provide useful and helpful information for e-material providers, especially for Rokus Klett Publishing Ltd., who seek to offer teachers a contemporary technology-supported teaching material. By exploring drivers of e-material acceptance among teachers, this study suggests how to promote acceptance enablers by several implications for practice.

Despite, effort expectancy was not supported as significant factor of e-material acceptance, which presents an important finding. Ease of use of e-materials is not a factor that would persuade a teacher to accept the e-material. Providers of e-materials should rather focus on the teacher's performance expectancy, which was found to be the major determinant of teacher's acceptance of e-materials. Therefore, it is of paramount importance that providers expose usefulness of e-materials and how the use of e-materials increases teacher's productivity and contributes to accomplish things quicker.

Providers of e-materials could increase teacher's performance expectancy by organising workshops, where teachers would get in touch with the technology which is required to use e-materials and get familiar with its proper use to optimize the performance of e-materials. But mainly, teachers would see how e-materials make improvements in educational processes, namely how they would increase productivity and involve students in active participation, which would result in a quicker acquisition of knowledge.

When considering increasing teacher's performance expectancy, providers should be aware of the study findings that provider credibility influences it. As results show, provider credibility is highly dependent of provider's reputation and its communication with teachers. Thus providers should work on utilization of quality, informative and personal communication with its customers – teachers. For personal treatment of teachers and regarding the high number of teachers employed in the educational system, the CRM system plays a crucial role to control such amount of data and enables required management of relations.

Results of the study also reveal the importance of teacher's personal innovativeness in IT, where provider of e-materials does not have a significant impact on it, as this is a personal trait. However, since this determinant of e-material acceptance has an important role, provider of e-materials could try to influence it by suggested proposal. Provider could implicate teachers to test novelties from IT field, for example: provider would send to a group of teachers tablet computers to test their capabilities. By that, teachers might increase their attitude toward technology and to be more innovative with its use.

Moreover, research suggests that opinions of teacher's superiors have an influence on teacher's acceptance of e-materials. Thus providers should also focus on headmasters to motivate them for use of e-materials. The provider could organize symposiums for

headmasters and subject team leaders, where they would be familiarized with benefits of e-material usage. Since the target group for these events is the board of the school, subject of events should be focused on wider impact of teaching with e-materials. For example, those students whose teachers use e-materials with their lectures achieve better results than those whose schools still use traditional teaching methods. So they get the added value feeling.

6.3 Limitations and future research

Despite the contributions to practice and theory, this study is not without limitations and it also provides opportunities for future research. The first limitation is that the sample is limited to the users who are already familiar with e-materials and they are using them in the teaching processes. Another limitation is that the research is limited to elementary schools in Slovenia, which implies that the research reflects only the Slovenian reality in the segment of elementary education.

Therefore, in the future, research model could be also tested among teachers that are not familiar and are not active users of e-materials. Also, the model could be tested on other educational levels and across countries as well. Later on comparison between findings could be designed and the model could be evaluated in a broader environment.

The proposed research model provides a basis for future researches in this field. According to limitations and possibilities of the current model I suggest extending it to involve additional constructs to explain higher variance of acceptance. For instance organizational readiness; where future study could explain how financial and IT resources influence adoption and acceptance of e-materials, and external pressure; which would explain the impact of competitive pressure of other providers of teaching materials on teachers' adoption and acceptance of e-materials (Oliveira & Martins, 2011, pp. 116-117).

CONCLUSION

E-materials are one of the most important cornerstones in the evolution of teaching-learning materials, which are based on technology use. The perspectives of e-material use in educational context are high, thus understanding the determinants of the teacher's acceptance of e-materials is paramount. Understanding the determinants of use of e-materials is especially important when considering that acceptance requires the teacher's change of teaching methods.

To determine factors influencing the use and to explain higher variance of teacher's acceptance of e-materials I combined the well established and widely used model – UTAUT, with the commitment-trust theory and proposed the research model which reveals the importance of provider's credibility in terms of teacher's perception and acceptance of e-materials.

By assessing the above mentioned research model in the context of Slovenian elementary education institutions, I determined performance expectancy to be the factor with the highest influence on teacher's commitment to use e-materials at lectures. Furthermore, I realized that personal innovativeness in IT, subjective norms, and provider credibility also positively affect the commitment to use. The latter does not impact commitment to use directly, however, its inclusion into the model seems wise since it is closely related with performance expectancy, and therefore makes the model unconventional compared to prior developed models.

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