



# Modeling the acceptance of e-learning in mandatory environments of higher education: The influence of previous education and gender



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## ABSTRACT

E-learning systems and technologies are playing an increasing role in different educational environments around the world. The acceptance of such technologies is tested with different models that use different criteria. Among them, the Unified Theory of Acceptance and Use of Technology (UTAUT) is one of the more studied theories, but its validity should still be tested in e-learning environments, especially mandatory ones.

The purpose of the research was to assess and evaluate the appropriateness of UTAUT within a specific mandatory e-learning environment in higher education and to research the influence of gender and students' previous education on the acceptance and use of such technology. The empirical research, which was based on the theoretical background, included a data collection method using a survey, a data validation method using factor analysis, and structural equation modeling.

The results prove the general applicability of the UTAUT model in e-learning settings and demonstrate that social influence and performance expectancy significantly influence the intention to use the technology. Results also prove no significant influence of students' previous education or gender on the model fit. The results suggest that young people think that they handle modern technology well and are ready to use it if only an increase in performance is expected.

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## 1. Introduction

E-learning is a part of the educational process on many levels of education, from primary to higher education, extending to the post-graduate level. It is important even in the corporate training environment within organizations that want to provide consistent, worldwide training, reduce delivery cycle time, reduce information overload, lower expenses, etc. (Welsh, Wanberg, Brown, & Simmering, 2003). Developed on the findings and achievements of distant learning, that “defied distance” with “snail mail” packages of workbooks, audiotapes, and later videotapes, today e-learning is based on fast internet, modern Web 2.0 technologies, social networks, and mobile technology. It uses the know-how and knowledge of computer conferences, which according to Cleveland-Innes and Garrison (2010) represent the basis of today's e-learning. Today extreme cases of online courses with more than 10,000 students (MOOC) test the boundaries of what is possible. At the same time, online education is becoming a part of classical education, where students are offered the flexibilities of the educational process in the form of blended learning, also gaining new competences and

skills, immediate and anywhere access, and the possibility to understand and learn better (Ginns & Ellis, 2007).

But e-learning technologies must first be well accepted among their potential users, who will, as with any other technology, set the level and extension of usage based on different criteria, such as usability, efficiency, and reasonability. Since the research of user technology acceptance is of concern to researchers, on one hand, and developers and vendors of information technologies on the other, one can find a myriad of theories that deal with this issue. Among the most well-known, we have noted the Technology Acceptance Model (TAM) (Davis, 1989), Theory of Planned Behavior (TPB), Unified theory of Acceptance and Use of Technology (UTAUT), and others that are based on behavioral theories from different areas of the social sciences. We can therefore trace a series of papers that study technology acceptance in different areas, education being one of them (Chen, 2011; Lin, Lu, & Liu, 2013; Ong & Lai, 2006; Šumak, Heričko, Polančič, & Pušnik, 2010). The area of e-learning and e-learning technology acceptance has become especially relevant in recent years, when the phenomena of the internet and Web 2.0 has forced many higher educational institutions to become involved in such environments and execute higher education as blended learning or online learning. Its relevance is even higher because the first “digital natives” are entering

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university level education and are known for their dependency on information technology and lower attention span.

A recent boom in Massive Open Online Courses (MOOC) additionally entails another move into the new paradigm shift of global education, which is considered by many educational institutions as well. The MOOC concept tries to offer more or less free online content and activities to tens of thousands of users around the world with the help of modern information and communication technologies, semantic content, search capabilities, online communication, group work, and networking (Allison, Miller, Oliver, Michaelson, & Tiropanis, 2012). However, the MOOC concept and its business model are not precisely defined and one of the mysteries is above all the user – the student (Hyman, 2012). At the same time, skeptics determine that MOOC is not a concept for everyone, nor even for every educational institution (Martin, 2012).

To test the e-learning environment from the viewpoint of students' technology acceptance, we chose UTAUT theory, since it is the most up to date and well-known technology acceptance theory, merged from other recognized acceptance theories. The existing latest meta-analysis of findings of UTAUT studies (Dwivedi, Rana, Chen, & Williams, 2011; Taiwo & Downe, 2013) show all relationships between the model's constructs to be significant, but stress the absence of moderator testing in the majority of studies. Although our tested environment could not provide many possible moderators (the equal age of students and mandatory use), we chose gender and students' previous education to be interesting enough to research.

The following paper therefore uses the UTAUT model on concrete empirical research of 228 students for modeling the acceptance of e-learning with the intention to analyze a connection between the area of e-learning and technology acceptance. It focuses on the aspect of mandatory environment of technology use, which e-learning usually entails. While testing the fit of such model within this environment, it tests the influence of gender and "students' previous education" (SPE) factors. To the best of our knowledge, SPE as moderator has not been tested in UTAUT studies on e-learning before. In the second chapter, the theoretical model is described and an extension of the model is suggested to test the model itself and the influence of students' previous education and gender on the intended use of technology. The hypotheses are defined in the third chapter, followed by a description of the methodology and an analysis of the empirical research conducted. Hypothesis testing by the structural equation modeling method and discussion are presented next, with the final conclusion at the end.

## 2. The theoretical background of the Unified Theory of Acceptance and Use of Technology

The Unified Theory of Acceptance and Use of Technology (UTAUT) is one of many technology acceptance theories developed on the bases of the Technology Acceptance Model (TAM), the Theory of Reasoned Action (TRA), Diffusion of Innovations (DOI), Theory of Planned Behavior (TPB), and others. The goal of UTAUT (Venkatesh, Morris, Davis, & Davis, 2003) was to explain the impact of user intentions toward the use of a technology or a system and his or her usage behavior (Fig. 1). The included constructs fit well into the discussed e-learning environment. The UTAUT model links gender, age, experience, and voluntariness of use as moderators of the impact of the four key constructs on behavioral intention and use behavior. Different improvements of this model in the recent years also stress the importance of other factors such as hedonic motivation, price value, and habit (Pahnila, Siponen, & Zheng, 2011; Venkatesh, Thong, & Xu, 2012), cognitive individual differences, learning, and teaching styles (Lin et al., 2013), and trust (Shibl, Lawley, & Debuse, 2013).

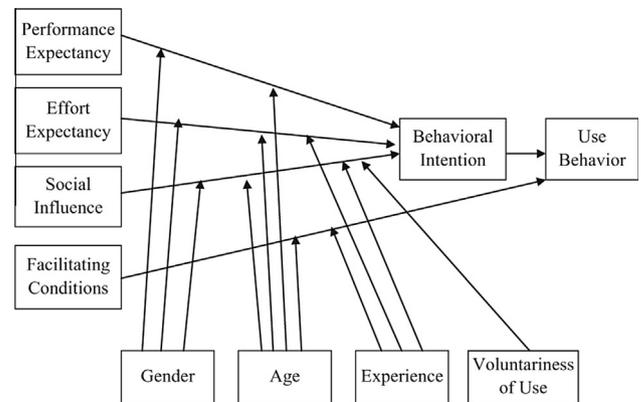


Fig. 1. The general UTAUT model.

The meta-analysis of UTAUT studies by Taiwo and Downe generally confirms the initial findings of Venkatesh et al. (2003) with regard to the relationships among the five constructs of UTAUT, but stresses that the outcome of empirical studies has been inconclusive, especially in the field of the social sciences, undermining the accuracy of the models.

Research within the e-learning environment using the UTAUT model and technology acceptance in general has increased in recent years. Pynoo et al. (2011) claims that two major lines of research can be noticed. On the teacher side, namely acceptance studies and educational research are studied, in which computer attitudes, teacher beliefs and the integration of computers in the classroom are the main focus. On the student side, technology acceptance studies testing the original model were published by Im, Hong, and Kang (2011), Maldonado, Khan, Moon, and Rho (2011), and others, accompanied by those who tried to extend the model or adapt it to specific environments (Chen, 2011). Lin et al. (2013) even suggested that the teaching style, which every student perceives, is different, and that this factor will influence the student's adoption and usage of e-learning systems.

Compared to the TAM model, UTAUT includes a social component which is very important in learning environment. Even if e-learning is online and unphysical, the importance and the extension of use of social networks and online communication in today's society shows the significance of a social component. The importance and impact of TAM is impressive, yet Bagozzi (2007) warns that although the strength of TAM is its parsimony, the parsimony itself is its weakness. It is unreasonable to expect that such a simple model would explain decisions and behavior fully across a wide range of technologies and adoption situations. As stated by Benbasat and Barki (2007) we currently have a number of versions of TAM and TAM-like models, causing researchers to be at a loss to decide on which adoption model to base their new work. Although UTAUT and its original model are often cited in scientific papers, less than 10% actually utilize the theory or its constructs (Williams, Rana, Dwivedi, & Lal, 2011). Although Šumak, Heričko, and Pušnik (2011) state that TAM is the most-used acceptance theory in e-learning acceptance research, their findings show that literature in the field of e-learning acceptance and use calls for studies that would be based on acceptance theories other than TAM. These reasons and arguments persuaded us that UTAUT is an appropriate theory for our empirical research.

## 3. Research model and hypotheses

Considering the specific environment of the e-learning system in the tested higher education institution, we based our model on the standard UTAUT model and then adapted the model to test it in this environment. On one side, we tested the students' previous

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