How need for interaction and self-regulated learning influence the acceptance of online education in an UTAUT framework

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Cite as:
Halász Ágnes, Kenesei Zsofia (2022), How need for interaction and self-regulated learning influence the acceptance of online education in an UTAUT framework. *Proceedings of the European Marketing Academy*, 51st, (107245)

Paper from the 51st Annual EMAC Conference, Budapest, May 24-27, 2022

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Abstract:

In the spring of 2020, the COVID-19 virus forced higher education institutions around the world to introduce distance learning, which required a completely new teaching and learning strategy for higher education stakeholders and completely disrupted the traditional framework. The objective of this research is to explore the influence of students' personal characteristics related to education, such as the need for interaction and the ability to self-regulated learning, on the acceptance of online learning. We employ the UTAUT model and propose that these factors influence future intention to use the technology with the mediation of effort expectancy, expected performance and hedonic motivation. We used data from a questionnaire survey and tested the proposed hypotheses with the help of structural equation modelling. Among the factors in the model, expected performance, expected effort required and hedonic motivation had a direct effect on intention to use, while self-regulated learning and personal interaction need had an indirect effect.

Keywords: technology acceptance, online learning, personal characteristics

Track: Public Sector and Non-profit Marketing

1. Introduction

In the spring of 2020, the COVID-19 virus forced higher education staff and students in most countries to switch to online working to keep their physical distance. It has become vital for all universities to ensure students' smooth transition of using online technology in education instead of traditional learning tools, moreover, provide at least the same quality and effectiveness of the education as before in the traditional, face-to-face form.

In our research, we investigate the factors which influence the adoption of online education. Our theoretical model is based on the three variables of the UTAUT model. Our starting point is that the acceptance of online education is fundamentally determined by the extent to which students perceive it as enjoyable, the extent to which it provides high levels of performance, and the effort required to learn online. Since these are essentially perceived variables, we consider it important to explore what influences the perception of these factors. We seek to answer which education-related, personal characteristics influence perceptions of technology, that is, which characteristics help a student to perceive the use of technology as enjoyable, useful, and easy. Answering this question is particularly important if we want students to embrace technological innovation and experience higher rates of success in online education. In our research model, we integrated two variables that are education-specific and describe the personal skills, characteristics of students, the ability of self-regulated learning and the need for interaction

The most important contribution of our study is using the UTAUT model with two, in educational context highly important, student-related variables, and thus explain which factors influence the variables of perception of online education and its adoption. Also noteworthy, the results are based on real experiences. Unlike many studies of technology adoption, we examine not only perceptions of an imagined technological innovation, but also analyse responses that were given by our respondents based on lived experience, so estimates of behavior intention were based on a very real experience.

2. Literature review and hypotheses

2.1 Technology acceptance of online learning in higher education

2.1.1 Performance expectancy

Performance expectancy (Venkatesh et al., 2003) is the degree of the personal user's belief to which the system will help the user to achieve better results and achieve the goals. Venkatesh et al. (2003) find that performance expectancy is the strongest determinant of

technology acceptance and since its development, this variable has been used in several studies. Hoi (2020) in the context of mobile learning, while Nistor et al. (2019) on the use of online learning environments (OLE) have proved the positive significant effect of performance expectancy. On this basis, we assume that if online education is perceived as effective by students, they will intend to use it.

H1: Performance expectancy positively influences the behavior intention.

2.1.1 Effort expectancy

Effort expectancy (Venkatesh et. al., 2003) is the degree of ease with which an individual feels comfortable using the system. Researches by Hoi (2020) show that effort expectancy has a positive significant effect on behavior intention, i.e. the more users think it is easy to use the system, the more they intend to use it. Despite the results of Venkatesh et al. (2012) that the UTAUT model can explain 70% of the variance of the intention to use, there are some studies that have surprising conclusions. Several studies in online, higher educational contexts have found that the effort expectancy had no significant effect on the intention to use (Botero et al., 2018; Nistor et al., 2019; Herting, 2020). Although the results of studies are contradictory for the present, we assume that if online education is perceived as easier by students, they will intend to learn online.

H2: Effort expectancy positively influences the behavior intention.

2.1.1 Hedonic motivation

The pleasure of learning is represented in the UTAUT-2 model by the hedonic motivation variable. The variable is the extent to which the user perceives the use of the system as enjoyable or fun (Venkatesh et al., 2012). In the present research, we assumed that individuals may like to learn and find pleasure in learning, even if they may not find easy to achieve the learning goal. Based on former findings (Sharif and Raza, 2017; Tamilmani et al, 2019), we hypothesize that perceiving enjoyment, fun during online education positively influences and motivates the student to use and adopt online education. Thus, like Venkatesh et al. (2012) in our research model, hedonic motivation has a direct influence on intention behavior.

H3: Hedonic motivation positively influences the behavior intention.

2.2 Influence of personal characteristics on technology acceptance of online learning in higher education

While the perception of how easy, efficient, and enjoyable the technology is affects future behavior, it is also necessary to understand what influences how students perceive these features. Students' personal characteristics regarding education may have major influence on how they evaluate technology.

2.2.1 Need for interaction

Although internet technologies were already being used to contact people before the COVID-19 pandemic, it is likely that most users had already organised face-to-face meetings to stay in touch. Distance learning thus posed a new challenge for participants, who could only work and learn together through online communication, with all its advantages and disadvantages. Some forms of online communication – interactivity (Chavoshi and Hamidi, 2019), interaction with other educational actors (Alalwan et al. 2019) collaboration (Alalwan et al., 2019) – have been included in research on online teaching or learning, most often with a significant positive effect on actual use. If during interaction and collaboration, students can share information and knowledge easily and quickly with each other or with the instructor, they will evaluate the use of the system as positive (Chavoshi and Hamidi, 2019; Alalwan et al., 2019). Besides these interaction focused studies, as far as we know, the personal need for interaction in an educational context of technology acceptance has not been studied.

The need for interaction is a widely studied factor in the acceptance of self-service technology (SST) (Dabholkar and Bagozzi, 2002; Rose and Fogarty, 2006). The variable refers to the personal characteristic that determines how important the consumer considers personal contact using the service (Dabholkar and Bagozzi, 2002). Our hypothesis is that in an educational setting the importance and need for interaction have a negative impact on the student's effort expectancy and performance expectancy and hedonic motivation.

H4a: Need for interaction negatively influences effort expectancy.

H4b: Need for interaction negatively influences performance expectancy.

H4c: Need for interaction negatively influences hedonic motivation.

2.2.1 Self-regulated learning

In the spring of 2020 with the introduction of distance education, the traditional role of instructor has been transformed, giving students more responsibility to acquire the course

material. Responsibility for learning, self-regulation, self-direction, autonomous learning, and in general the clarification of the differences between the concepts have been addressed by many researchers, but there does not seem to be a unified conceptual framework in this area (Loyens et al, 2008; Murray, 2014; Saks and Leijen, 2014). Self-regulated learning (SRL) and self-directed learning (SDL) are similar in terms of active engagement, goal-oriented behavior, use of metacognitive skills, and intrinsic motivation (Murray, 2014). Nevertheless, SRL can be considered only a personal characteristic in contrast to SDL, because the self-regulated learner has no authority to formulate or change the task, and cannot shape the learning environment (Loyens et al., 2008; Murray, 2014; Saks and Leijen, 2014). Since in higher education students have to comply with similar expectations and frameworks – both online and in traditional forms of education – and because of this external control, we will use the concept of self-regulated learning in the formulation of our hypotheses. Based on the literature, both SDL (Zhu et al., 2020) and SRL (Eitel et al., 2020) involve self-control through self-management and responsibility through self-monitoring. While SRL can represent a key individual characteristic in research on online education's acceptance, the variable is rarely used in this context (Al-Adwan, 2020), or researchers more likely use only the part of it, for example, the variable of self-management (Al-Adwan et al., 2018; Eom, 2012). In our research, we assume that students who are able to organise and control their own learning process, taking responsibility for their own learning, and thus adapting their learning to their own pace, schedule, and preferences, online learning will be perceived as more effective, easier and enjoyable.

H5a: Self-regulated learning positively influences effort expectancy.

H5b: Self-regulated learning positively influences performance expectancy.

H5c: Self-regulated learning positively influences hedonic motivation.

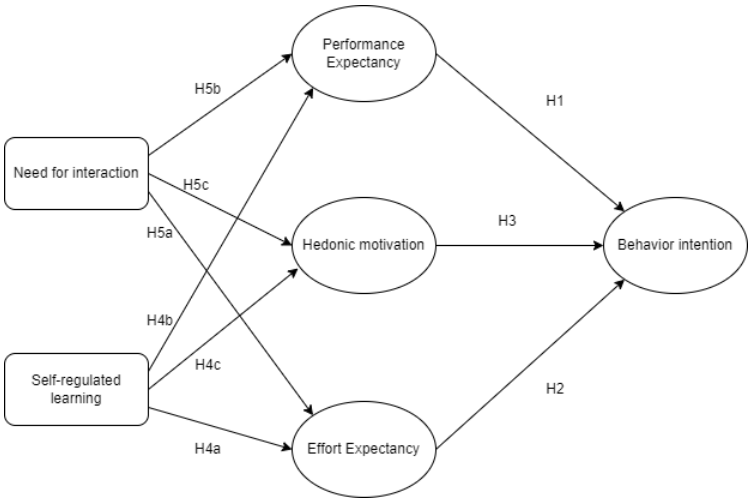

Figure 1. Research model for acceptance of online learning

3. Research method

3.1 Data collection

To test our theoretical model, data were collected through a questionnaire survey of students (using the Qualtrics web-based program), organized by the Marketing Institute of the Corvinus University of Budapest. The questionnaire was filled in by 334 students in higher education in Hungary, from which, after data cleaning 307 valid responses were analyzed. The average age of the respondents was 23 years (SD = 1.74) and 67% of the sample was female. Responses were received from 23 higher education institutions, mainly from students enrolled in master's programs (62%).

3.1 Measures

In order to measure the constructs of the research model presented earlier and to test the hypotheses formulated, it is essential to develop measurement tools and scales. As discussed earlier in this paper, several researchers have investigated the factors that lead to higher education students' intention to learn online, and therefore we have drawn from a number of sources to develop the scales. The variables measured on the seven-point Likert scale based on Decman (2015) (performance expectancy, effort expectancy, hedonic motivation, and behavioral intention), Dabholkar and Bagozzi (2002) (need for interaction), Al-Adwan et al. (2018), and Eom (2012) (self-regulated learning).

4. Results

4.1 Confirmatory factor analysis

The internal consistency and reliability of the composite measures were tested. The scales were assessed through confirmatory factor analysis (CFA) using SPSS 25.0 and AMOS 25.0. Table 1 shows that the average variance extracted (AVE) values are above the 0.5 threshold value, fulfilling the convergence validity criterion. The composite reliability (CR) indicators are above 0.7 for each variable, thus corresponding to the threshold. In addition, the correlation between any two constructs was less than the square root of the AVE value, i.e. discriminant validity was satisfied, i.e. the scales were sufficiently different from each other. The confirmatory factor analysis was also used to examine model fit. The $\chi 2$ was 325.954 with df=174 degrees of freedom, and their ratio was 1.873 (p=0.000), which is less than 3, thus meeting the criterion. The comparative fit index, CFI=0.963 is above 0.9, thus meets this

requirement. The standardised root mean square residual (RMSEA) in present calculation was 0.053, which was below the threshold of 0.08.

	CR α	CR	AVE	NI	PE	SRL	EE	HM	BI
NI	0.900	0.901	0.647	**0.805**					
PE	0.908	0.91	0.718	-0.588***	**0.848**				
SRL	0.774	0.778	0.54	-0.404***	0.500***	**0.735**			
EE	0.747	0.749	0.501	-0.283***	0.363***	0.386***	**0.707**		
HM	0.913	0.915	0.783	-0.578***	0.771***	0.434***	0.426***	**0.885**	
BI	0.824	0.823	0.608	-0.663***	0.779***	0.460***	0.401***	0.728***	**0.78**

Table 1. Results of confirmatory factor analysis

4.1 Structural model assessment

After model testing, the $\chi 2$ was 358.956 with df=178 degrees of freedom, and the ratio of these was 2.017 (p=0.000), which is less than 3 and thus meets the. The CFI=0.963 also meets the criterion (above 0.9). RMSEA was 0.053 for the model, which was below the threshold of 0.06. The predictive index for the model strength is R_2= 0.664. The exogenous variables thus explain 66.4% of the variance of the endogenous variable, ceteris paribus.

The path coefficients are listed in Table 2. The effects of the antecedent variables on the endogenous variables are significant at a 5% significance level. With one exception, where the relationship between effort expectancy and behavioral intention has a significance level of 5.2%, thus the relationship is only marginally significant. Hypothesis H1 is accepted, i.e. it is true that performance expectancy has a positive effect on behavioral intention (β=0.533; p<0.001). Unfortunately, hypothesis H2 has to be rejected, thus it cannot be confirmed that effort expectancy has a positive effect on behavioral intention (β=0.103; p=0.052). However, our hypothesis H3 is also supported: the experienced joy, pleasure while learning online has a positive effect on behavioral intention (β=0.291; p<0.001). The hypotheses H4a (β= -0.471; p<0.001), H4b (β= -0.161; p<0.001) and H4c (β= -0.482; p<0.001) regarding the need for interaction were also supported, as the variable has a negative effect on performance expectancy, effort expectancy, and hedonic motivation. Self-regulated learning also has a significant effect on the latter three variables, the hypothesized positive effects in H5a (β=0.321; p<0.001), H5b (β=0.338; p<0.001), and H5c (β=0.256; p<0.001) were all supported.

->		β	St. β	S.E.	C.R	P	Result
NI	PE	-0.6	-0.471	0.081	-7.395	***	H4b is supported
NI	EE	-0.145	-0.161	0.067	-2.156	***	H4a is supported
NI	HM	-0.64	-0.482	0.086	-7.433	***	H4c is supported
SRL	PE	0.33	0.321	0.065	5.114	***	H5b is supported
SRL	HM	0.275	0.256	0.067	4.073	***	H5c is supported
SRL	EE	0.245	0.338	0.061	3.992	***	H5a is supported
PE	BI	0.561	0.533	0.087	6.44	***	H1 is supported
HM	BI	0.294	0.291	0.08	3.681	***	H3 is supported
EE	BI	0.154	0.103	0.079	1.943	0.052	H2 is not supported

Table 2. Results of hypothesis testing

5. Discussion and conclusion

After hypothesis testing, expected performance of online learning had a positive, significant effect on online learning intention. Students who perceived distance education as effective based on their experiences of 2020 are more likely to choose it in the future. Effort expectancy has a positive, marginally significant effect on online learning intention. This result is not surprising based on the literature (Botero et al., 2018; Herting, 2020). Botero et al. (2018) explained non-significance with the suggestion of Venkatesh et al. (2003), who argued that effort expectancy becomes irrelevant over time since students are aware of technology before they actually use it, so they have no difficulties using it. Many of the students have already completed a bachelor course, they have cognitive and metacognitive techniques and strategies to accept the change and to learn online. Thus, students can be considered "advanced" users, so this weak, non-significant or marginally significant effect is interpretable and acceptable. The hedonic motivation construct also has a positive, significant effect on behavioral intention, so the more enjoyable students perceive online learning to be, the more they will intend to learn online.

Self-regulated learning variable has direct significant positive effects on performance expectancy, effort expectancy, and hedonic motivation. Thus, students who are able to manage their time and tasks well, perceive online learning as more effective, enjoyable, and easier, and thus more willing to learn online. In distance learning, the role of the instructor changes, the traditional framework of education is transformed and disappears, so for a student who does not have the ability to manage tasks and deadlines independently, it is highly important to take the self-regulated learning factor into account by managing an online course.

Need for personal interaction has direct significant negative effects on performance expectancy, effort expectancy, and hedonic motivation. Thus, students who assess personal interaction and communication with peers and the instructor as important, and students who perceive personal interaction and communication with peers and the instructor as important, will be less likely to perceive learning online as enjoyable, effective, and easy. This finding is also consistent with the results of previous research (Dabholkar and Bagozzi , 2002; Rose and Fogarty; 2006), as well as with Kuong (2015), where the students highlighted that the lack of face-to-face communication was a frustrating experience for them and they would probably not use distance learning in that form in the future.

6. Implications

An important finding was that the need for personal interaction has direct significant negative effects on performance expectancy, effort expectancy, and hedonic motivation. In addition, the importance of self-regulation was also highlighted in the model: students who are able to take responsibility for and control their learning processes will find online learning easier, more effective, and enjoyable. For this reason, it may be practical to introduce blended learning, where students can meet each other personally but also can prepare for the course at their own pace online. It may be worthwhile to change the structure of online classes or communication blocks (Chavoshi and Hamidi, 2019), combining synchronous and asynchronous forms of communication can provide more favourable learning conditions. The emotional charge of interactions, for example, is stronger in the synchronous form, while task-related matching is more effective in asynchronous learning. (Tu and McIsaac, 2002). It is also important to consider providing schedules, monitoring, and consultation for those who find it more difficult to manage their learning independently.

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