

The Role of ICT in Education: a Longitudinal Study Based on Tourism Students Perceptions

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Abstract: *The purpose of the paper is focused on information and communication technology (ICT) and its incomprehensible supporting role in the education process. In the empirical part of the paper are presented the results of five - years research conducted among the students of the University of Split/ Faculty of Economics. The research is based on tourism students' perceptions of certain factors which influence the process of e-learning. In that context, the authors examine the relationship between perceived ease of use and IT literacy on satisfaction as a predictor of behavioral attitude as well as the relationship between perceived usefulness and the achieved student performance expressed in values of final grade. Additionally, the authors also identified the possible differences between professional and undergraduate students regarding the above mentioned relationships. In the conclusion section, the empirical results are interpreted in the context of current trends in education, especially tourism studies education.*

Keywords: Information and communication technology, education process, study outputs, tourism and hospitality

JEL Classification: I23, O14

Introduction

The education supported by ICT (Information and Communication Technology) is almost *sine non que* in the higher education process. In this context, the term ICT can be considered as IT system (i.e. Learning Management System or e-learning platform) used to teach students at a distance, using internet environment and enabling users to easily develop, deploy, manage and report a comprehensive learning program (Paulisse and Polik, 1999; Mishra, 2002; Siemens, 2008; Rosen, 2009; Saeed et al.,

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2009; Scheuer et al., 2009). In the same context, the term e-learning is referred to e-learning as instruction delivered via all electronic media such as the

Internet, Intranets, extranets as well as hypertext/hypermedia documents (Govindasamy, 2002)

Relatively long time ago, Kupsh and Rhodes (1987) recognized the e-learning platforms as a value added element in the higher education and wider. In time, expanding number of e-learning platforms such as Moodle, Expertus, Blackboard, or Elluminate, have been exerting a significant impact on the educational process. Use of tools and capabilities available through such platforms provide wide spectrum of opportunities for improvement and updating the educational process in a traditional classroom (Mortera – Gutierrez, 2006; Marcelo, 2006). E-learning platforms have been developed into a valuable source of search, interaction and dissemination of educational material, also used as a platform for teaching that enables the development of interactive and cooperative learning (Sivan et al., 2000; Curtis and Lawson, 2001).

Website courses, discussion groups, collaboration via web, and online educational model as a whole significantly influenced the process of instruction in all disciplines and at all levels (McConnell et al., 1996; Law, 1997; Veldenz and Dennis, 1998; McCornell, 2002; Olrich et al, 2004; Mankel, 2006; Seitzinger, 2010). According to all these studies, it is evident that e-learning platform offers a huge set of teaching possibilities that upgrade education on a daily base. The students, on the other side, may perceive the usefulness of educational materials and web based learning environment differently (Prince, 2003; Young and Norgard, 2006).

The main research question in this paper is focused on the tourism and hospitality educational process and its e-learning platform supporting role. In many studies and discussions tourism has been illustrated as an information intensive domain (Gretzel et al., 2000, Buhalis, 2003) radically reshaped by appliance of new technologies. From one point of view, the tourists are using intensively Internet and social media for communication purposes, satisfying their information needs inside guest cycle and during consumption of other tourism goods (Gretzel et al, 2006). From the other point of view, tourism managers perceived that, if properly used, new technologies can generate high added value for their business.

Recently, technological developments and the broadband access to the Internet have done a significant impact on the education process by upgrading educational curricula, learning materials and instructional practices (Sigala, 2002). With purpose to “be properly use”, technology have to be incorporated in the tourism and hospitality education program via one of the mentioned e-learning platforms. The researchers then have to analyze either the benefits of learning in such designed digital environments either its possible disadvantages.

To a certain extent, the research attention has already been paid to the ICT role in tourism and hospitality education process. Due to the fact that student population may differently perceive the e-learning environment, the purpose of this paper is:

(i) to overview the present relating studies and (ii) to add a little contribution to the related knowledge base with regard to the students' perceptions of some online attributes that may influence the knowledge acquisition within the tourism and hospitality courses.

Theoretical Background

Both teaching via the Internet and teaching supported via different kinds of e-learning platforms have been introduced in the tourism and hospitality education gradually, imposing concurrently students to technological applications and giving them the opportunity to acquire technical skills that are increasingly required in the tourism and hospitality industry (Sigala, 2001). One of the most important advantages of learning supported by the Internet and multimedia instruction to traditional tourism and hospitality classroom is the ability to foster the current trend of pedagogies and learning environments (Harasim, 2000; Sigala, 2002). The other advantages are: a) development of collaborative spirit and motivation to learn (Fynn, 1992), b) increased efficiency of teaching and individual achievements (Abrami and Bures, 1996), c) increased interest of students and their engagement in learning process (Neuhauser, 2002), and d) lower total cost of tuition and less time teaching (Kasavana, 1999; Cho and Schelzer, 2000; Benbunann-Fich et al., 2005). The use of the Internet in teaching tourism and hospitality include modules and courses that allow teachers to control, monitor, and test the student's progress and the use of teaching materials.

Time ago, this technology was identified as capable to stimulate, engage, and motivate each student, by allowing teachers to adjust teaching material and content according location, time and students (Law, 1997). A number of papers on this subject argued that the benefits of the Internet in teaching tourism and hospitality industry is increasingly recognized (Cho and Schmelzer, 2000) and identified virtual university as a challenge that tourism and hospitality education face (e.g. Sigala and Baum, 2003). Some others contributions discussed (with acclamation) the use of blogs by hospitality management students (e.g. Cobanoglu, 2006), compared the attitudes of students traditional versus video-conferencing teaching methods (e.g. McDowall and Lin, 2007), and assessed the effectiveness of internet-based version of food safety training course versus traditional lecture-based one (e.g. Feinstein et al, 2007).

Generally, the program of tourism and hospitality studies, beginning from the 90s of the last century, intends to prepare students for careers in the tourism and hospitality industry and to motivate them to be strictly service-oriented (Pavešić, 1993; LeBruto and Murray, 1994) with wide knowledge base which allows them creativity, flexibility, adaptability (Baum, 1990), and interpersonal skills (Martin and Cumming, 1994).

Over time it became also evident that the use of the Internet tools will not result in any benefits automatically. Only innovative use of the Internet through innovative teaching initiatives can encourage and enable complete transformation of educational experiences. In that context, Harasim (1996) claimed that teaching supported by the Internet promotes a completely new paradigm in learning, resulting in new methods of knowledge transfer, learning domains, processes and learning outcomes. Sigala (2001) also argues that the Internet encourages the re-engineering and restructuring of the entire educational process by changing the definition, structure, and teaching within the tourism and hospitality studies.

In this sense, an interesting example is a Spanish University – the Universitat Oberta de Catalunya (UOC), which was designed from the outset as a distinctly new virtual university with innovative teaching initiatives (Sangrgrave, 2002). When it was created in 1995, UOC served only 200 students and offered two degrees. Today, according to the data published on the UOC's web page¹, more than 50,000 students joined this University and its 16 graduate program studies, 33 master program studies, and 3 PhD program studies.

Therefore, to realize all innovative potential of e-learning and Internet as its basis, the students, as well as the teaching staff, have to perceive it positively and integrate it as a peer to peer segment of the education process.

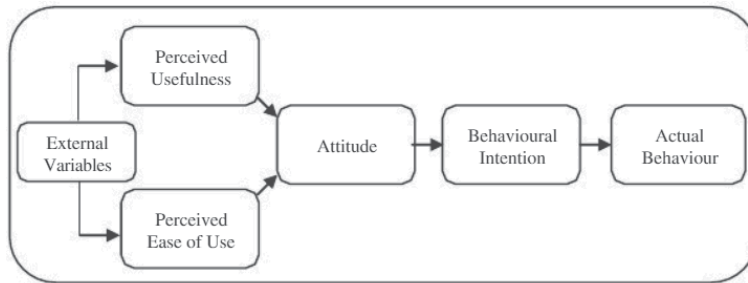
Factors Which Influence the Process of E-learning

In this section, some of the most recognized and respected studies conducted regarding the factors that predict whether individuals will accept and voluntarily use information technology (IT) are described. For example, Davis (1989) in the study on the impact of the perceived benefits and ease of use of the application has developed a measuring instrument for the assessment of user acceptance of IT technology acceptance model called (Technology Acceptance Model – TAM). The factor perceived ease of use is formulated as the degree to which the user expects the target system does not pose any effort (Davis et al., 1989.) The formulation of other factor named the user's perceived usefulness has been expressed as: subjective probability that by using a specific application the user will improve its work within an organizational context (Davis et al., 1989) and/or as: person's salient beliefs that using the technology will enhance his or her job performance (Davis, 1989).

Hendrickson and Collins (1996) argued that perceived usefulness affects perceived ease of use showing that both elements affect the level of the IT use. Using regression analysis Davis et al. (1989) have also determined the relationships within the Model, predicting the use of the system accordingly. Some other authors provided positive support to determine causality relationships within the TAM model (e.g. Hendrickson and Collins, 1996; Igbaria et al., 1997). Finally, Mathieson et al. (2001)

recognized and specified the strengths of the above mentioned model, such as: a) specific emphasis on the use of IT, b) foundation of the theory of social psychology, and c) validity of the developed measurement instrument.

Figure 1: Technology Acceptance model (Davis et al. 1989)



Source: Shumaila Y. Yousafzai, Gordon R. Foxall and John G. Pallister. (2007), Technology acceptance: a meta analysis of the TAM: Part , *Journal of Modelling in Management*, 2(3): 251-280.

The limitation of the Model is the assumption that there are no obstacles that would prevent the individual use of IT. Taylor and Todd (1995) denied the mentioned assumption and underlined that an individual's access to resources still affects the use.

A valuable addition to the model is also presented by Mathieson et al. (2001). These authors extend the TAM model by including the impact of the resources enabling the use of IT. This factor, more environmental than technical, is defined as the degree to which an individual believes that he/she has the resources necessary for the use of IT. These findings approved that the perceived ease of use, perceived usefulness, and application of IT are significantly affected by: a) user attributes (i.e. characteristics of users of IT that reflect aspects of the user's expertise with the systems), b) support by the IT staff and, c) attributes of the system (i.e. availability and cost approach).

Few years later, some authors (e.g. Lee et al., 2003; Ma and Liu, 2004) made the retrospective of the TAM related studies and claimed confusing findings in terms of statistical significance, caused by different methodological and measurement factors which additionally cause efforts for IT researchers to better understand users' technology acceptance behavior.

Apart from the TAM model, several studies emphasize that satisfaction is a strong indicator of continuance individual intention. In this sense, researchers found that there is a strong link between satisfaction and continued use of an e-learning system or an online program (Khalifa and Liu, 2002; Roca et al., 2006; Liao et al., 2007).

ICT Survey in the University of Split, Faculty of Economics

In the beginning of the academic year 2008/2009 the Faculty of Economics introduced the Moodle system as a preferred e-learning platform with authorized access. The majority of teaching materials have been uploaded on the system with intention to be downloaded by students. In addition, all student assignments have been uploaded through the system. Some exercises required additional web search and the students have been advised to use open access to Internet accordingly.

This survey was conducted within the hybrid teaching model defined as the classroom teaching supported by Moodle system and other material available through web free access.

The objectives of the research, based on the partially modified TAM (Davis, 1989), are as follows:

- to examine the relationship between perceived ease of use and IT literacy on satisfaction as a predictor of behavioral attitude.
- to examine the relationship between perceived usefulness and the achieved student performance expressed in values of final grade.
- to identify possible differences between professional and undergraduate students regarding the above mentioned relationships.

On the conceptual level, in this study, IT literacy as the user attribute corresponds to the characteristics of IT users that, as cited before, reflect aspects of the user's expertise with the systems defined by the extended TAM model (Mathieson et al., 2001).

Research Design

In accordance with the above text, the adapted definition of treated variables in this study are: a) *perceived IT literacy* – related to the skills and knowledge which the students have previously achieved, b) *perceived ease of use* - refers to searching and downloading of the education materials, c) *perceived satisfaction* – considered as the pleasure of learning in on line environment in a hybrid model of teaching, d) *perceived usefulness* - includes perceived usefulness of Moodle as a learning platform and usefulness of education material available by free access on the Internet, and d) *final grade* – meant as the formal assessment of both mandatory and facultative student activities.

The authors supposed, before the data processing, that the undergraduate student perceive the Moodle system and additional web resources as more useful in education process then the professional students do. In addition, the higher perceived usefulness is expected to result with the higher final grade.

Method and Hypotheses

The questionnaire was used as the research instrument, containing questions relevant for the analysis of the previously defined variables. Due to the low response rate obtained in previous studies, for the purpose of this one the authors designed as more as possible time consuming questionnaire which at the same time covers the main research purpose as well as the result with relevant response rate.

The previously defined objective of this research can be summarized in two set of hypotheses.

The first set of hypotheses considers that the student population will perceive and feel more satisfaction in technology supported learning if they know how to use technology easily and if they have particular technical skills. The process of knowledge acquisition is time-demanding, ambition-demanding and discipline-demanding process which, generally, corresponds more with the profile of undergraduate students than with the professional students one. Thus we posit that IT literacy and perceived ease of use affect the satisfaction (H1a) and that this impact is more intensive among the undergraduate students than the professional ones (H1b).

The second set of hypotheses assumes that students will finish the course with higher assessment of all student activities if, during their study, they recognize the utility of web material for their practical and theoretical assignments. As the professional students are focused more on practical activity, the utility of web material covering some theory concepts may be perceived lower by these students than by the undergraduate students. Thus, we claim that perceived usefulness of the web material affects the final grade (H2a) and that the relationship between the usefulness and the final grade will be more intensive for the undergraduate students than for the professional students (H2b).

Methodology and Data Analysis

The empirical part of the paper presents the results of five – academic years of research (from 2008/2009 until 2012/2013) conducted among the third-year students at the University of Split, Faculty of Economics. The students that participated in this work were attendees of the third year of both professional study program named „Information systems in tourism and hospitality“and undergraduate study program named „Information technology for destination“. The questionnaire was distributed as a voluntary option to the basic set of 571 students. The total of 318 (55%) students fulfilled the questionnaire, more specifically, 139 (43%) undergraduate students and 179 (57%) professional students.

For processing the collected data SPSS 17.0 is used. To test the posited hypotheses, descriptive statistics analysis, and correlation matrix were performed on the data sets from the 2008/2009 academic year until the 2012/2013 academic year.

The structure of the questionnaire output by the study program/course and by observing academic year is enclosed in Table 1.

Table 1: The percentage (%) of return rate by study program and by academic year

Academic year	Tourism study program/course	
	Professional (%)	Undergraduate (%)
2012/2013	29,33	81,63
2011/2012	35,71	76,74
2010/2011	36,90	33,33
2009/2010	43,02	52,63
2008/2009	63,16	90,91

Source: Source: Authors' research (N=318)

It is evident from the Table 1 that the research sample is representative for each academic year as well as for each observed tourism and hospitality study program.

Research Results

The results enclosed in Table 2 indicate the positive correlation between each of the observed independent variables (IT literacy and ease of use) and dependent variable (satisfaction). More specifically, regarding the variable IT literacy, more intensive correlation is inherent for the undergraduate (0,318) than for the professional (0,292) students. As far as the variable "ease of use" is considered, again the stronger correlation is evident for the undergraduate (0,538) than for the professional (0,458) students. The empirical values of correlation coefficients support the hypothesis H1a.

Table 2: Correlations between IT literacy and perceived ease of use and satisfaction

		Study	Satisfaction	
Spearman's rho	professional	IT literacy	Correlation Coefficient	,292**
			Sig. (1-tailed)	,000
			N	179
		Ease of use	Correlation Coefficient	,458**
			Sig. (1-tailed)	,000
			N	179
	undergraduate	IT literacy	Correlation Coefficient	,318**
			Sig. (1-tailed)	,000
			N	139
		Ease of use	Correlation Coefficient	,538**
			Sig. (1-tailed)	,000
			N	139
**. Correlation is significant at the 0.01 level (1-tailed).				

Source: Authors' research (N=318)

In spite of different correlation values (Table 2), the absolute difference value is small (Table 2) and the value of student t-test (Table 4) indicates that there is no significant difference in correlation values between the two study programs examined here.

Additionally, we observe that the same growth in perceived IT literacy and in perceived ease of use should produce the higher satisfaction between the students of undergraduate students than between the students of the professional study program.

Table 3: The difference between relating mean values

		Satisfaction		
		Count	Mean	Standard Deviation
Study	Professional	179	4,64	0,62
	Undergraduate	139	4,66	0,58

Source: Authors' research (N=318)

Table 4: Independent Samples Test

Satisfaction	Levene's Test for Equality of Variances		t-test for Equality of Means			
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference
Equal variances assumed	,444	,506	-,367	316	,714	-,025

Source: Authors' research (N=318)

Having in mind that each new generation of students is more familiar with technology than the previous one, we expect to find differences in satisfaction among students regarding different academic years. According to the results in Table 5 (descriptive statistics) and Table 6 (ANOVA-Analyses of variance) it can be concluded that there is no significant difference in student satisfaction according to the academic year, which is why the hypothesis H1b cannot be accepted.

Table 5: Mean and Standard Deviation values

		Satisfaction		
		Count	Mean	Standard Deviation
period	1	90	4,71	0,55
	2	60	4,65	0,66
	3	44	4,61	0,58
	4	60	4,62	0,49
	5	64	4,61	0,73

Source: Authors' research (N=318)

Table 6: ANOVA results

Satisfaction					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	,565	4	,141	,388	,817
Within Groups	113,988	313	,364		
Total	114,553	317			

Source: Authors' research (N=318)

The next objective of the research was to identify the possible correlations between perceived usefulness and the assessment of student activities (the final grade).

Namely, perceived usefulness is not observable variable but it can be measured by using min-max normalization and combining two manifest variables, i.e. Moodle usefulness and Internet usefulness. In addition, a new created variable, called "usefulness" in general, will be tested against the final grade variable, regarding the particular study program (Table 7).

Table 7: Correlations between the usefulness and the final grade

		Study		Usefulness	Final grade
Spearman's rho	professional	Usefulness	Correlation Coefficient	1,000	,157*
			Sig. (1-tailed)	.	,018
			N	179	179
		Final grade	Correlation Coefficient	,157*	1,000
			Sig. (1-tailed)	,018	.
			N	179	179
	undergraduate	Usefulness	Correlation Coefficient	1,000	,157*
			Sig. (1-tailed)	.	,032
			N	139	139
		Final grade	Correlation Coefficient	,157*	1,000
			Sig. (1-tailed)	,032	.
			N	139	139

*. Correlation is significant at the 0.05 level (1-tailed).

Source: Authors' research (N=318)

The results from the Table 7 indicate a positive but lower intensity of correlation between usefulness as independent variable and final grade as dependent variable. Surprisingly, the approved correlation values are the same for the undergraduate students (0,157) and for the professional (0,157) students. Those results imply the acceptance of the hypothesis H2a and the rejection of the hypothesis H2b.

In addition, we analyzed if there are any differences in correlation between usefulness and final grade regarding the access on Internet. In accordance with the results provided in Table 8, we conclude that if the students without access to Internet

from home are excluded from the sample, the correlation between the variable usefulness and the variable final grade is higher (0.174).

Table 8: Correlation between usefulness and final grade with exception the students without access to Internet from home

		Access to internet from home		usefulness
Spearman's rho	No	Final grade	Correlation Coefficient	-,125
			Sig. (1-tailed)	,357
			N	11
	Yes	Final grade	Correlation Coefficient	,174**
			Sig. (1-tailed)	,001
			N	307
**. Correlation is significant at the 0.01 level (1-tailed).				

Source: Authors' research (N=318)

We also assumed some differences in perceived satisfaction and final grade regarding the mode of access to Internet. The values from the Table 9 indicate that there are no significant differences regarding the last observed set of variables.

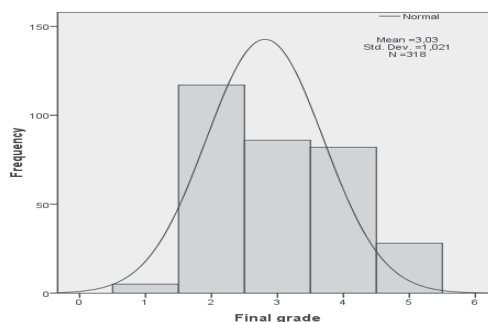
Table 9: The mean values (satisfaction and final grade vs mode of Internet access)

		Satisfaction	Final grade
Mode of internet access	modem	4,62	2,96
	ISDN	4,33	3,67
	ADSL	4,60	3,07
	wireless	4,75	2,97

Source: A Authors' research (N=318)

And lastly, the final grade distribution indicates the deviation of normal distribution (Figure 2), which indicates that the teaching process in not controllable. This should be a helpful feedback for teachers to improve particular elements in the wider education cycle.

Figure 2: Final grade distribution



Source: Authors' research (N=318)

Discussion and Conclusion

As shown in the previous sections, the first set of hypotheses supposed that the student population will perceive and feel more satisfaction in learning supported by technology if they know how to use technology easily and if they have particular technical skills and knowledge. The empirical results supported the hypothesis H1a, which means that IT literacy and perceived ease of use affect the satisfaction, although with the low level of intensity. Since each new student generation is more advanced in digital skills than the previous one, it can be concluded that the level of satisfaction should grow up in time. Subsequently, this could stimulate a greater uploading and downloading of materials, thus providing tourism and hospitality students with new opportunities to acquire technical skills and abilities that are permanently required in the “information intensive” tourism and hospitality industry. The rejection of H1b hypothesis requires a detailed explanation of the lack of differences between the undergraduate and professional students. This could mean that the profile of the professional students is changing and that they become more responsible and more agile in their studying. In a less positive context, it should also mean that the undergraduate students do not use sufficiently online educational resources; neither examine their managerial role inside the current paradigm of e-tourism. The undergraduate study program requires from students more investing time and more efforts in the learning process. These students are expected to constantly improve their understandings of technology and tourism synergy. The step towards this should be a high satisfaction during learning process either inside the hybrid model of teaching, either inside the full online course. However this does not imply that the professional students are not expected to do the same. On contrary, it is anticipated by the teaching staff that each student should be familiar with technology able to stimulate, engage, and motivate the users for further education activities in the online environment. Since the undergraduate students after graduation, usually, apply for generally more responsible positions than the professional students, its research interest for innovative solutions in tourism and hospitality should be higher than resulted in this study.

The second set of hypotheses tested the assumption that final grade is determined by the perceived utility of web materials. It was argued that students should finish the course with higher assessment of all student activities if they recognize the utility of web material for their practical and theoretical assignments. This assumption (H2a) is approved, although the expressed correlation with low intensity value is obtained, which might be explained as follows. Firstly, this may indicate that perceived usefulness of using online educational materials available in different forms (text, tables, graphics, and/or hypermedia) is not used and searched enough to produce the stronger effect on the final grade level. Secondly, it may also indicate that online materials regardless of its design, friendly environment, and/or virtual nature are just some of

the few (are not the final number of) supporting segments to the education process. This dilemma should be the trigger for new, more complex future research.

The rejection of H2b hypothesis indicates that the correlation between the usefulness and the final grade is almost the same for the undergraduate and the professional students. Evidently, both groups were examined under the similar conditions. The authors assume that, according to the final grade distribution and detected deviation of normal distribution (Figure 2) certain educational segments need improvements.

From the final grades distribution graph, is evident that web material availability is in positive correlation with pass, meaning that number of students unable to pass is lower than expected according to the normal distribution. However, higher number of students with lower grade implies the possibility that web material could be enhanced with the purpose of capturing more attention of students with lower level of motivation (and lower grades) helping them achieving better results. These might be the future research lines on this subject.

Furthermore, the results of this study suggests that the teaching staff has recognized the advantages of the e-learning practice, by implementing it in the hybrid model of teaching and by presenting students its functionalities and involving them in this new way of study. On the other hand, the students accepted it without any significant complaints, and perceived positively its attributes, such as ease of use and usefulness. These results are in accordance with some previous studies that indicate the increasing advantages and recognition of the technology supported learning within the tourism and hospitality education process (Cho and Schelzer, 2000; Harasim, 2000; Sigala, 2002; Benbunann-Fich et al., 2005).

The results of the study also anticipate that perceived ease of use and usefulness toward using online segments determines behavioral intentions and, consequently, the actual behavior. It in turn encourages users (as students) toward an increasing use of the online material in the higher education. In future it should encourage the same users (as employees) to use increasingly e-business models in the „information intensive“tourism market.

Finally, it can be resumed that in a nowadays rapidly changing world and circumstances, new revised learning models and new virtual university that allow the widest possible access to knowledge are constantly required. To meet this need for more flexible learning systems, different universities all over the world are implementing e-learning programs, either evolving from traditional face-to-face universities, either operating as online universities from their early beginning. All these tendencies could generate new modifications of the TAM concept, while in the context of tourism and hospitality it should prepare the student to work and act properly within the “information intensive industry”.

Additionally, on a social level, learning in online environments increasingly corresponds with the concepts of “Learning Networks” (Hummel and Burgos, 2005). Within that framework a social environment is established, where motivation and

personal advancement have been constantly generated through peer collaboration, group support, and a quite short feedback cycle. Considering this, understanding and implementing innovative e-learning concepts in the current paradigm is not only a challenge, but a responsible behavior within the academic community.

NOTES

¹ <http://www.uoc.edu/portal/ca/estudis/tots-els-estudis/index.html>

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