JORGE ARENAS-GAITÁN
Department Business Management and Marketing
University of Seville Av. Ramon y Cajal, 1 41018 Seville
SPAIN
Tlf: (+34) 954554427
jarenas@us.es

F. JAVIER RONDAN-CATALUÑA
Department Business Management and Marketing
University of Seville Av. Ramon y Cajal, 1 41018 Seville
SPAIN
Tlf: (+34) 954554427
rondan@us.es

PATRICIO E. RAMIREZ-CORREA
Department Systems Engineering and Computation
University Catholic of the North Av. Angamos 0610, Antofagasta
CHILE
Tlf: (55)355167
patricio.ramirez@ucn.cl

E-Learning and Gender

Abstract: - This study is to examine gender differences and the adoption of technology in tertial education students. We have used TAM model to measure the acceptance and use of e-learning of the respondents. ANOVA and Partial Least Squares (PLS) was used, specifically, the PLS multi-group analysis, to compare differences between groups. In summary, results show that students' behavior of acceptance of e-learning technology do not manifest statistically significant differences between women and men.

Key-Words: TAM model, e-learning platforms, gender analysis, tertiary education, Partial Least Square, multi-group analysis

1. Introduction

The adoption of e-learning environments by university students is growing. While most institutions fully Web programs are less than 5% of total enrollment, the number of students enrolled in at least one course with a relevant online presence would be from 30% to 50% of total enrollment, and this is a growing trend. The purpose of this growth is to supplement traditional instruction (Harris et al, 2003), making possible to develop methods for more portable and flexible learning (Zhang and Nunamaker, 2003). According to this idea, many universities around the world are using e-learning environments in the last decade. Furthermore, in learning platforms where the information is reaching critical amounts, the user demands for more personalized and adaptive system interaction (Aroyo and Dicheva, 2004), and perhaps gender would be one of the variables to use for discriminating information.

In terms of Web technology, (Sanchez-Franco et al., 2006) indicated that women and men would differ on the level of trust, risk aversion and information processing, but also in their attitudes of use and instrumental motives of acceptance of Web environments. In this sense,

we propose that diagnostic usefulness and perceived ease of use of e-learning environments must be a first step towards correcting possible deviations and promoting the appropriate use of these constructs in university teaching. And in turn, results may help to the proper design of such environments to respond to the different motivations of students.

In a broader context, gender is considered a cornerstone to explain the inequalities and identities in modern society (Walby, 1990). In the background of adoption of information technologies, and particularly from the theoretical perspective of Technology Acceptance Model (TAM), the literature recognizes that gender is a key element to understand the differences in perceptions of usefulness and ease of use as determinants of technology adoption (Venkatesh et al., 2003). But with regard to e-learning platforms. Does gender affect on how college students adopt information technology to provide learning solutions efficiently and effectively? Unfortunately, the effect of gender roles in TAM has been scarcely research (Ong and Lai, 2006), even less in relation to e-learning platforms. And as He and Freeman (2009) manifest, evidence on the effect of gender is far from conclusive. This lack of findings justifies the purpose of this work.

The main objective of this study is to explore gender differences in the adoption of technology in virtual learning platforms for a sample of college students. In addition a model based on TAM in this type of educational tools is tested. To achieve these goals, a review of the literature on e-learning platforms and technology acceptance model is developed. Based on such review a model based on TAM to measure the acceptance and use of e-learning by respondents is proposed. Third, the results of applying the Partial Least Squares (PLS) analysis to the TAM model on the entire sample, and the sub-samples of women and men are presented. ANOVA was used to compare constructs measurement, and PLS multi-group analysis was used to compare differences between groups. Finally the main conclusions are exposed

2. Literature review

2.1. E-Learning in higher education

E-Learning is defined as an Internet-enabled learning process (Gunasekaran et al., 2002). The

first courses over the Web started to emerge in 1995 and there has been a rapid expansion of on-line learning since then. One of the main reasons for the widespread use of on-line learning in many institutions is that most students now have access to the Internet. The University of British Columbia, in Vancouver, Canada, offered its first credit courses delivered entirely over the Internet to distance education students in 1996. The same year Murray Goldberg developed a software package called WebCT designed to enable Web based courses to be offered over the Internet (Bates, 2005). In order to support e-learning, various Web-based learning systems have been developed for colleges and universities. Such as the Web Course Homepage System (WebCH), Blackboard Learning System, the System for Multimedia Integrated Learning (Smile) and Web Course Tools (WebCT). However, Web-based learning must take into consideration that education has activated a shift from the teaching paradigm to the learning paradigm. As a result, students are becoming more independent from the teacher. Of course, there are many benefits of using online technologies in higher education, all students are guaranteed to receive the same presentation material and get the same view of the professor and material. Course information can be viewed at students' convenience and as many times as they wish (Bender and Vredevoogd, 2006).

Unfortunately, much of the development of Web-based learning is carried out without a true understanding of issues that are proper to Web-based learning (Hadjerrouit, 2006). In general, Internet-based activities have been incorporated into regular face-to-face classes as an added resource, without reducing classroom time, but in many cases teachers have reduced the number of face-to-face classes (Bates, 2005). A popular format for teaching both in the classroom and online is blended learning. This type of learning involves both traditional face-to-face instruction, where both students and faculty are present at the same time in a traditional campus of "brick and mortar", supplemented with communication via the Internet in a electronic classroom of "wire and chip" (Bender and Vredevoogd, 2006).

For lecturers and students, the implications of e-learning are extensive. However, in the case of the former some studies (Alonso Diaz y Blazquez Entonado, 2009) have found no important differences between the functions of teachers in the online teaching and face-to-face teaching. And if these differences do exist, they are likely to be due to the teacher's involvement and the institution's commitment in the programming of the instruction method. With regard to the latter, increasingly universities must provide quality and flexibility to meet the diverse needs of students – this will inevitably involve tailoring courses to suit differing

educational needs and aspirations. Another implication of virtual learning is the increase of international competition for students by many universities; new communication methods are useful tools that encourage internationalization of tertiary learning (O'neill et al., 2004). Furthermore, e-learning reflects the new dynamic response to the needs of a knowledge society and implies freedom and equality to access knowledge beyond cultural and social boundaries (Raza and Murad, 2008). Therefore, it is necessary to investigate whether there are gender differences in the use or perception of e-learning. In case they exist it would be indispensable to implement policies of integration or adaptation of these technologies.

2.2. E-Learning and TAM

Proposed by Fred Davis (Davis, 1989), TAM posits that individual behavior intention to use information technology is determined by the perceived usefulness and perceived ease of use. Also, perceived ease of use is directly impacted by perceived usefulness. Since then, several revisions and expansions have developed the original model. The most popular developments have been TAM2 (Venkatesh and Davis, 2000) and TAM3 (Venkatesh and Bala, 2008).

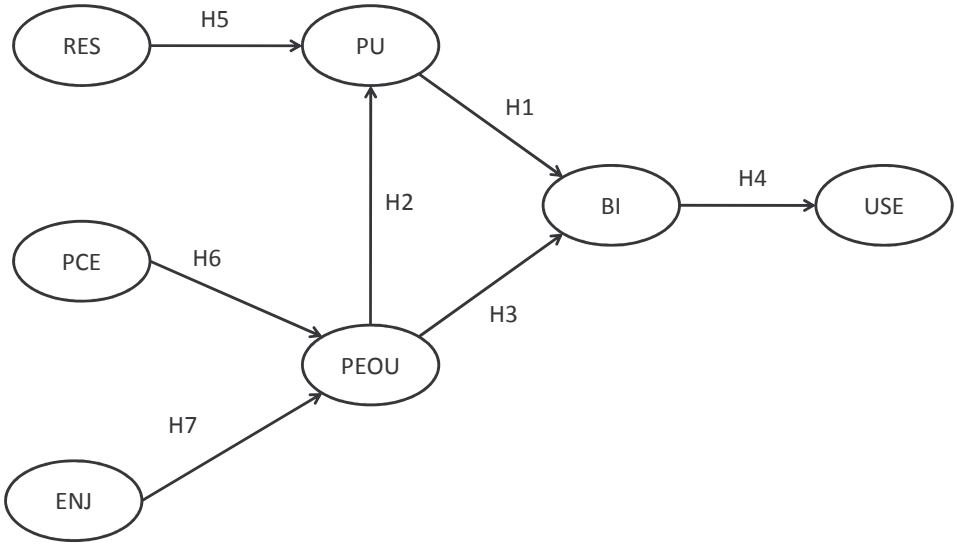
The literature presents several studies using TAM to assess users' acceptance of e-learning technology. In most of these studies, TAM was extended using factors predictors or moderators, such as: subjective norms (Van Raaij and Schepers, 2008; Park, 2009); computer self-efficacy (Ong and Lai, 2006; Chang and Tung, 2008; Park, 2009); perceived playfulness; (Roca and Gagné, 2008); cognitive absorption (Saade and Bahli, 2005); (Liu et al., 2009); system features (Chang and Tung, 2008); (Liu et al., 2009); (Park, 2009); computer anxiety (Van Raaij and Schepers, 2008); gender (Ong and Lai, 2006); motivational factors (Park et al., 2007; Roca and Gagné, 2008); personal innovativeness (Van Raaij and Schepers, 2008); technical support (Ngai et el., 2007); perceived credibility; and compatibility (Chang and Tung, 2008).

2.3. Proposed Model

We have proposed a model based on the basic TAM, which relates the constructs of Perceived Usefulness (PU), Perceived Ease of Use (PEOU) and Behavioral Intention (BI). It also includes the effect of BI on the Use of the Platform e-Learning (USE). This basic TAM model is enriched with three antecedents on the one hand, result demonstrability (RES) precedes PU,

and secondly, Perception of External Control (PCE) and Perceived Enjoy (ENJ) precede PEOU. The proposed TAM model including 7 hypotheses is shown in Figure 1.

Figure 1: Proposed Model



The TAM model has been used successfully in the context of e-learning (Saadé et al., 2007). In particular, Halawi & McCarthy results (2008) suggest that students use e-learning environment (USE), if they perceive it useful (PU) and easy to use (PEOU). Previously, Ngai et al. (2007) indicate that the perceived ease of use (PEOU) and perceived usefulness (PU) are the main factors affecting the attitude of university students to use e-learning (BI). Also, Hayashi et al. (2004) had verified that the perceived usefulness (PU) directly affects student's intention to continue using e-learning (BI). Considering the importance of a replica in a sample culturally different from those already explored, and based on these previous studies, the following hypotheses are proposed:

H1: PU is positively related to BI in adopting e-learning in higher education.
H2: PEOU is positively related to PU in adopting e-learning in higher education.
H3: PEOU is positively related to BI in adopting e-learning in higher education.
H4: BI is positively related to USE in adopting e-learning in higher education.

Venkatesh and Bala (2008) proposed that result demonstrability (RES) is an antecedent of perceived usefulness (PU). On the other hand, the same authors proposed that perception of external control (PCE) is an antecedent of perceived ease of use (PEOU). Perceived enjoyment using information technology (ENJ) is defined by Roca and Gagné (2008) as the degree to which the activity of using an information technology is perceived as pleasant by itself, apart from the intrinsic instrumental value of the technology. Venkatesh and Bala (2008) proposed that perceived enjoyment using information technology (ENJ) is positively related to perceived ease of use (PEOU). In the context of e-learning environments, results of (Roca and Gagné, 2008) reported that perceived enjoyment (ENJ) directly affects perceived ease of use (PEOU). Based on these results, the following second group of hypotheses are proposed:

H5: RES is positively related to PU in adopting e-learning in higher education.
H6: PCE is positively related to PEOU in adopting e-learning in higher education.
H7: ENJ is positively related to PU in adopting e-learning in higher education.

The evidence about the effect of gender on the acceptance of information technology is not conclusive (He and Freeman, 2009). Results of previous studies show conflicting evidence in relation to whether gender affects or not the likelihood of using a computer system. For example, results of Taylor (2004) indicate the existence of such effects, and on the contrary, results of Morris et al. (2005) indicate that these effects may disappear, especially in a young population. Also in Web environments not clear evidence on gender-related effects exists. Kim and Forsythe (2000) reported not statistically significant differences between men and women in the process of adopting a particular Web technology. In contrast, there is previous evidence of gender-related effects in the context of the adoption of e-learning. Particularly, Ong and Lai (2006), based on a sample of Taiwanese workers, show that men's scores on the perceived usefulness (PU), perceived ease of use (PEOU) and behavioral intention to use e-learning (BI) are higher than scores of women. In addition, perceived usefulness (PU) influences the behavioral intention to use e-learning (BI) more strongly for men than for women. And, similarly, perceived ease of use (PEOU) influences the perceived usefulness of e-learning (PU) more strongly in women than in men.

Considering the controversy explained above and the importance of a replica in a culturally

distinct sample, and based on the study of Ong and Lai (2006), the following hypotheses are proposed:

H0a: Statistically significant differences between men and women exist in the scores of adoption of e-learning variables in college students.
H0b: Statistically significant differences between men and women exist in relationships between variables of the adoption of e-learning in college students.

3. Methodology

Empirical research was based on a nonrandom sampling method. Data were collected in Spain and Chile through an online questionnaire from May to July 2009. The online questionnaire was sent to students of a main University from south of Spain and of a main University from north of Chile. Spanish respondents were taking courses in the areas of Marketing and Business Management using e-learning platform WebCT. Chilean respondents were enrolled in courses of Engineering using e-learning platform ClaroLine. The exclusion of invalid questionnaires provided a final sample size of 389 students, 201 males and 188 females.

The average age of interviewees was 23.12 years old and they have been studying for 4.03 years (on average) at the University. So, they are students with extensive experience as college students.

The applied measurement scales have been widely tested in other research. Specifically, to measure TAM construct the scales proposed by Venkatesh and Bala (2008) have been adapted. Partial Least Squares (PLS) approach is a type of Structural Equation Modeling (SEM) that was used to test the proposed research model (Chin, 1998; Tenenhaus et al., 2005). Initially, the proposed model was validated for the whole sample (389 cases). Then the sample was divided into two groups: males and females. T Student test was used to analyze if gender differences in the different constructs of the model exist. Then Multi-group PLS analysis was run to compare differences between groups. SmartPLS software was used for this analysis (Ringle et al., 2005).

4. Results

Results of the descriptive statistics are shown in Table 1. The scale used is a 5-point Likert type, except variable USE that is measured in minutes per week. SPSS software was used for this test.

As you can see in Table 1, T test results indicated statistically significant differences between the scores of men and women in some variables: use, perceived ease of use, perception of external control and behavioral intention (this one near the limit of 95% of confidence level). As the variables did not meet the requirement of normality, nonparametric techniques, specifically Mann-Whitney test, were applied to corroborate T test results. The estimates provided similar results. Therefore, hypothesis H0a is partially accepted. Scores for females in the four significantly different variables are higher than for males.

Table 1: Descriptive Statistics and T Test

	Gender	Mean	Tip. Dev.	T test (sig.)
PU	**Male**	3.8520	.85450	-1.327
	Female	3.9574	.69964	(0.183)
PEOU	**Male**	4.1306	.81512	-1.327
	Female	4.3019	.64814	(0.022)
PCE	**Male**	3.8934	.63170	-1.327
	Female	4.0536	.60668	(0.011)
ENJ	**Male**	3.2289	.94141	-1.327
	Female	3.2801	.72524	(0.546)
RES	**Male**	3.4301	.89195	-1.327
	Female	3.5780	.74044	(0.077)
BI	**Male**	4.0471	.83089	-1.327
	Female	4.2041	.79955	(0.060)
USE	**Male**	56.77	55.232	-1.327
	Female	84.77	101.081	(0.001)

A PLS model is described by two models: the measurement model and the structural model. As a previous step to the structural model analysis is necessary to analyze reliability and validity of the measurement model. Factor analysis (using varimax rotation) was applied and every individual item is grouped inside the correspondent construct, achieving an explained total variance of 0.729.

With regard to content validity is based on the theoretical and empirical evidence supported

by the measurement instruments used. Specifically, content validity of TAM scales are based on the rigorous procedure in the development of the scales included in the questionnaire. Thus, in the literature review theoretical, conceptual and empirical aspects were considered. Furthermore, the pretest provide guarantee to support that content validity.

Reliability was evaluated by examining individual loads (λ) or simple correlations of the measures with their respective latent variables (indicators with $\lambda \geq 0.7$ were accepted). Cronbach's α coefficient was used as the reliability index of the latent variables. In addition, composite reliability was calculated. The convergent validity of latent variables was assessed by examining the average variance extracted (AVE), (variables with AVE> 0.5 were accepted), see Table 2.

Table 2: Cronbachs Alpha, AVE and Composite Reliability

All			
Latent Variable	Cronbachs Alpha	AVE	Composite Reliability
BI	0.81	0.72	0.89
ENJ	0.87	0.79	0.92
PCE	0.77	0.69	0.87
PEOU	0.88	0.72	0.91
PU	0.90	0.74	0.92
RES	0.84	0.80	0.92
USE	1.00	1.00	1.00
Males			
Latent Variable	Cronbachs Alpha	AVE	Composite Reliability
BI	0.82	0.73	0.89
ENJ	0.89	0.82	0.93
PCE	0.77	0.68	0.86
PEOU	0.88	0.74	0.92
PU	0.89	0.75	0.92
RES	0.90	0.83	0.94
USE	1.00	1.00	1.00
Females			
Latent Variable	Cronbachs Alpha	AVE	Composite Reliability
BI	0.79	0.70	0.88
ENJ	0.84	0.73	0.89
PCE	0.79	0.70	0.87
PEOU	0.85	0.69	0.90

PU	0.88	0.73	0.91
RES	0.83	0.74	0.90
USE	1.00	1.00	1.00

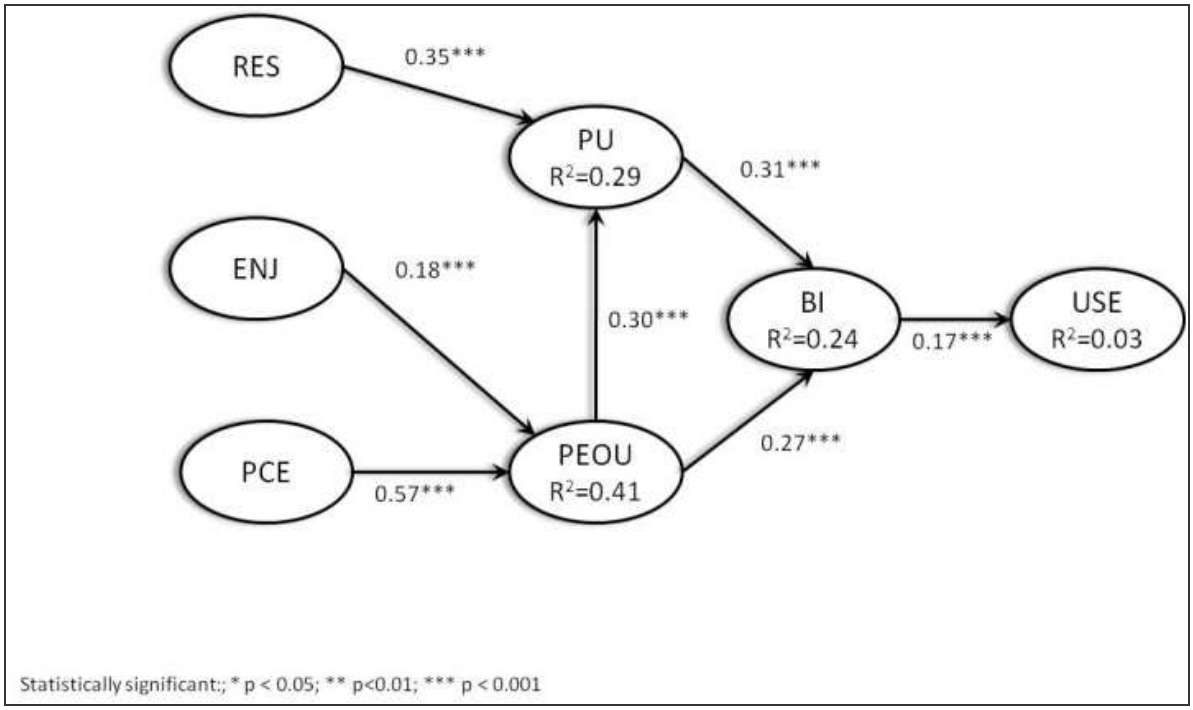
Discriminant validity of latent variables was tested analyzing whether the square root of AVE of each one was greater than the correlations with the rest of latent variables, table 3 shows the results for the whole sample.

Table 3: Discriminant validity for the whole sample

	BI	**ENJ**	**PCE**	**PEOU**	**PU**	**RES**	**USE**
BI	**0.85**						
ENJ	0.33	**0.89**					
PCE	0.38	0.23	**0.83**				
PEOU	0.40	0.31	0.62	**0.85**			
PU	0.42	0.46	0.39	0.43	**0.86**		
RES	0.41	0.51	0.26	0.37	0.46	**0.89**	
USE	0.17	0.08	0.06	0.12	0.14	0.15	**1.00**

After analyzing validity and reliability of the measurement model, relationships between the constructs were addressed. Hypotheses were tested by examining path coefficients (β) and their significance levels. A bootstrapping with 500 sub-samples was performed to verify the statistical significance of each of the path coefficients. The variance explained (R-squared) in the endogenous latent variables and p-values of regression coefficients (F-test) serve as indicators of the explanatory power of the model. Figure 2 shows the result for the model considering the whole sample.

Figure 2: PLS results for the whole sample



Results of PLS analysis for the model with the groups of males and females are shown in Table 4. Based on these results hypotheses H1, H2, H3, H4, H5, H6 and H7 are accepted because all the relationships hypothesized are statistically significant.

Table 4: Path coefficients

Path	Males	(Sig.)	Females	(Sig.)	t-spooled	(Sig.)
BI -> USE	0.19	***	0.15	***	0.13796	n.s.
ENJ -> PEOU	0.22	***	0.11	***	0.33217	n.s.
PCE -> PEOU	0.54	***	0.64	***	-0.32310	n.s.
PEOU -> BI	0.31	***	0.23	***	0.19891	n.s.
PEOU -> PU	0.39	***	0.15	**	0.70046	n.s.
PU -> BI	0.26	***	0.36	***	-0.25773	n.s.
RES -> PU	0.34	***	0.38	***	-0.12910	n.s.

From this table we can refute hypothesis H0b, because statistically significant differences between men and women do not exist in the relationships between variables of the adoption of e-learning in our model.

5. Conclusions

In conclusion, we highlight four main contributions of this study. Firstly, a version of TAM model that includes elements of TAM2 and TAM3, to explain the process of adoption of e-learning in higher education in two universities from two different countries, has been used successfully. This means you can use a tested tool in other areas of technology in the field of virtual education platforms, helping to test and to improve these educational techniques that will undoubtedly gaining weight in college learning.

Secondly, the finding of a strong and significant relationship between Perception of External Control and Perception of Ease of Use of e-learning platform is remarkable. This has implications for the design of these platforms in relation to control and resources given to users. This can be interpreted as an indication that users of these platforms like having control over the system. Probably, students like to customize the platform environment.

Thirdly, according to previous literature, a significant relationship between Perceived Enjoy and Perceived Ease of Use and between Results Demonstrability and Perceived Utility is found. If students conceive the use of the platform as fun and enjoyable they show a higher perception of ease of use of it. Another consequence is that students who communicate to others the possibilities of the platform give more value to it.

Last but not least, the study indicates no statistically significant differences between males and females when adopting e-learning platform according to the tested model (Hypothesis H0b). However, multi-group analysis holds some information differentiating between both genders. It is a bit stronger among the males of the sample the relationship between (1) the perception of ease of use and behavioral intention and (2) the perception of ease of use and perceived usefulness. Furthermore, the same occurs in the relationship between perceived enjoyment and perceived ease of use. By contrast, among female students is stronger the relationship between perception of external control and perception of ease of use. This seems to indicate that this group of students value more perception of greater control of the virtual learning platform. It is also lightly stronger among the women of the study the relationship between perceived usefulness and behavioral intention. With regard to hypothesis H0a, significant differences between males and females exist in the scores of four variables of the study: perception of ease of use, perception of external control, behavioral intention and use. In all the cases females scored higher than males. This result indicates that women of the sample use the learning platform more time than men, and indeed their intention to use it is

also higher for females. According with results of multi-group PLS analysis, women of the sample have a stronger perception of external control than men using the online learning platform. Although the results of Ong and Lai (2006) report different reactions to gender in the adoption of e-learning platforms, the results of this study are in line with Kim and Forsythe (2000) and Morris et al. (2005). Consistently with Morris et al. (2005), we believe that analyzing a sample of university students (not employees) is a key point to explain this result. Students both men and women have equal educational technology in the classroom. Often, they have similar previous training, especially in the higher courses with a very similar experience as learners, in spite of this some differences appear between both groups. This may be one reason why gender inequalities regarding the perception of new technologies that often occur in other areas do not appear so intensely among higher education students. Further research is necessary to continue the work on this topic.

This study has some limitations that guide future work. First, the validation of results requires a larger sample of individuals. Second, the use of a non random sampling method within a single organization limits the generalization of findings. Third, the study is cross sectional, a longitudinal study would be advisable to compare the different stages of the adoption of e-learning. Finally, it would be useful to incorporate more students from other areas of knowledge different of marketing, business and engineering, such as other social sciences and humanities. Also, including students in early degree courses with less experience as learners and users of these e-learning platforms may yield more complete and detailed studies.

References

- Alonso Díaz, L., & Blázquez Entonado, F. (2009). Are the Functions of Teachers in e-Learning and Face-to-Face Learning Environments Really Different?. *Educational Technology & Society*, 12 (4), 331–343.
- Aroyo, L., & Dicheva, D. (2004). The New Challenges for E-learning: The Educational Semantic Web. *Educational Technology & Society*, 7 (4), 59-69.
- Bates, A. W. (2005). *Technology, E-learning and Distance Education,* (2nd ed.), Routledge.
- Bender, D. M., & Vredevoogd, J. D. (2006). Using Online Education Technologies to Support Studio Instruction. *Educational Technology & Society*, 9 (4), 114-122.

- Chang, S. & Tung, F. (2008). An empirical investigation of students' behavioural intentions to use the online learning course websites. *British Journal of Educational Technology*, 39 (1),71-83.
- Chin, W. W. (1998). The partial least squares approach for structural equation modeling, in George A. Marcoulides (Ed.), *Modern Methods for Business Research*, Lawrence Erlbaum Associates.
- Chin, W. W. (2000). *Frequently Asked Questions – Partial Least Squares & PLS-Graph*, Home Page Retrieved from: http://disc-nt.cba.uh.edu/chin/plsfaq.htm
- Davis, F.D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technologies. *MIS Quarterly*, 13 (3), 319-340.
- Gunasekaran, A., Mcneil, R. D. and Shaul, D. (2002). E-learning: research and applications. *Industrial and Comercial Training*, 34 (2), 44-53.
- Hadjerrouit, S. (2006). Creating Web-based learning systems: an evolutionary development methodology. In Proceedings of the 2006 *Informing Science and IT Education Joint Conference*, Saldford, UK, 119-144.
- Halawi, L. and Mccarthy, R. (2008). Measuring students perceptions of blackboard using the technology acceptance model: a PLS approach. *Issues in Information Systems*, 9 (2), 95-102.
- Harris, M., Yanosky, R. and Zastrocky, M. (2003). Supplemental Beats Remote in Higher-Education E-Learning. *Gartner Research Document*, ID Number: COM-20-0839.
- He, J. and Freeman, L. (2009). Are Men More Technology-Oriented Than Women? The Role of Gender on the Development of General Computer Self-Efficacy of College Students. *AMCIS 2009 Proceedings*. Paper 672. http://aisel.aisnet.org/amcis2009/672.
- Keil, M., Tan, B. C. Y., Wei, K. K., Saarinen, T., Tuunainen, V. and Wassenaar, A. (2000). A Cross-Cultural Study on Escalation of Commitment Behavior in Software Projects. *MIS Quarterly*, 24 (2), 299-325.
- Kim, J. and Forsythe, S. (2008). Adoption of Virtual Try-on technology for online apparel shopping. *Journal of Interactive Marketing*, 22 (2), 45-59.
- Lee, J.-S., Cho, H., Gay, G., Davidson, B. and Ingraffea, A. (2003). Technology Acceptance and Social Networking in Distance Learning. *Educational Technology & Society*, 6 (2), 50-61.

- Liu, S., Liao, H. and Pratt, J.A. (2009). Impact of media richness and flow on e-learning technology acceptance. *Computers & Education*, 52 (3), 599-607.
- Morris, M.G., Venkatesh, V., and Ackerman, P.L. (2005). Gender and age differences in employee decisions about new technology: An extension to the theory of planned behavior. *IEEE Transactions on Engineering Management*, 52 (1), 69-84.
- Muñoz, M. (2005). Feasibility of e-learning at Bio-Bio University. *Theoria*, 14 (2), 83-91.
- Ngai, E. W. T., Poon, J. K. L. and Chan, Y. H. C. (2007). Empirical examination of the adoption on WebCT using TAM. *Computers & Education*, 48, 250-267.
- O'neill, K., Singh, G. and O'donoghue, J. (2004). Implementing eLearning Programmes for Higher Education: A Review of the Literature. *Journal of Information Technology Education*, 3, 313-323.
- OECD (2005). *E-learning in Tertiary Education: Where Do we Stand?*, OECD, Paris.
- Ong, C.S. and Lai, J.Y. (2006). Gender differences in perceptions and relationships among dominants of e-learning acceptance. *Computers in Human Behaviour*, 22 (5), 816-829.
- Park, N., Lee, K. M. and Cheong, P. H. (2007). University instructors' acceptance of electronic courseware: An application of the technology acceptance model. *Journal of Computer-Mediated Communication*, 13 (1), 9.
- Park, S. Y. (2009). An Analysis of the Technology Acceptance Model in Understanding University Students' Behavioral Intention to Use e-Learning. *Educational Technology & Society*, 12 (3), 150-162.
- Raza, A. and Murad, H. S. (2008). Knowledge democracy and the implications to information access. *Multicultural Education & Technology Journal*, 2 (1), 37-46.
- Ringle, C. M., Wende, S. and Will, A. (2005). *SmartPLS 2.0 (M3) beta*, Retreived from Hamburg: http://www.smartpls.de.
- Roca, J.C. and Gagné, M. (2008). Understanding e-learning continuance intention in the workplace: A self-determination theory perspective. *Computers in Human Behavior*, 24 (4), 1585-1604.
- Saadé, R. G., Nebebe, F. and Tan, W. (2007). Viability of the technology acceptance model in multimedia learning environments: Comparative study. *Interdisciplinary Journal of Knowledge and Learning Objects*, 37, 175-184.
- Saade, R. and Bahli, B. (2005). The impact of cognitive absorption on perceived

usefulness and perceived ease of use in on-line learning: an extension of the technology acceptance model. *Information Management*, 42, 317-327.

- Sanchez-Franco, M. J., Villarejo-Ramos, A. F. and Rondan-Cataluña, F. J. (2006). Male and female professors. A theoretical analysis regarding the Web acceptance and use. In Proceedings of the *Fifth European Marketing Trends Congress*, Venice, 1-10.
- Taylor, W.A. (2004). Computer-mediated knowledge sharing and individual user differences: an exploratory study. *European Journal of Information Systems*, 13, 52–64.
- Tenenhaus, M., Vinzi, V.E., Chatelin, Y.-M. and Lauro, C. (2005). PLS path modeling. *Computational Statistics and Data Analysis*, 48, 159–205.
- Van Raaij, E.M. and Schepers, J.J.L. (2008). The Acceptance and Use of a Virtual Learning Environment in China. *Computers and Education*, 50 (3), 838-852.
- Venkatesh, V. and Bala, H. (2008). Technology Acceptance Model 3 and a Research Agenda on Interventions. *Decision Sciences*, 39 (2), 273-315.
- Venkatesh, V., & Davis, F. D. (2000). A theoretical extension of the technology acceptance model: Four longitudinal field studies. *Management Science*, 46 (2), 186-204.
- Venkatesh, V., Morris, M.G., Davis, G.B. and Davis, F.D. (2003). User acceptance of information technology: Toward a unified view. *MIS Quarterly*, 27 (3), 425-478.
- Walby, S. (1990). *Theorizing Patriarchy*. Blackwell Publishers Ltd, Oxford.
- Zhang, D. and Nunamaker, J.F. (2003). Powering e-learning in the new millennium: an overview of e-learning and enabling technology. *Information Systems Frontiers*, 5 (2), 207-218.