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The Role of Presence, Flow and Education Components in the Continuing Intention to e-Learn

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***Abstract*— This paper investigates learners' experiences in virtual education environments and the impact on their continued intention to e-learn. We study how presence and flow affect behavioral intention to continue e-learning, and analyze the role of TAM perceptions on core components of the virtual education environment. We develop an integrated conceptual model, and we test it by means of a questionnaire-based survey and registered data collected from a broad sample of learners within a virtual education environment. The results strongly support the conceptual model, suggesting that the virtual education environment's components (categorized by professor attitude and perceived didactic resource quality) play a key role in prompting learners' perceptions, attitudes and behavioral intentions.**

Keywords*— *e-learning; professor attitude; didactic resources; presence; flow; TAM

I. Introduction

Digital didactic resources and teaching processes have been identified as central components of e-learning programs. Yet scholars and education institutions alike still have much to study about the connections between these two important components of online programs and the e-learners' tendency to continue using virtual education environments.

To analyze continuing intention to e-learn, TAM [1] [2] is a valid theoretical framework. However, the TAM constructs of perceived ease of use and perceived usefulness do not fully capture the range of psychological phenomena elicited by e-learning. On the basis of literature in consumer behavior, reference [3] suggests that users of virtual environments interpret incoming information from affective and cognitive mechanisms. While affective processing facilitates perceptions related to utilitarian facets of the virtual environment, like TAM perceptions, cognitive processing intervenes in the emergence of senses of presence and flow states, which occur when users entirely immerse themselves in the virtual environment [3].

We further understand presence and flow as related, yet distinct facets of individual's cognitive immersion [4] in a virtual education environment. While presence will cover the spatial aspects when feeling placed in the virtual education environment, flow will refer to the state occurring when being focused on the learning activity developed in this alternative realm.

The role of presence in e-learning experiences has been pointed out by e-learning literature, which has identified it as critical in immersing individuals in teaching-learning processes [5]. By its part, flow has found to make the virtual environments' usage easier, and to lead to favorable attitudes [6] and learning performance [7].

II. Conceptual Model and Hypotheses

Our integrated model of the continuing intention to e-learn includes four types of causal pathways: pathways that stem from presence research (H1-H4), pathways from Flow Theory (H5-H8), extended TAM pathways rooted in e-learning literature (H9-H13), and original TAM paths (H14-H17) – see Table I.

TABLE I.

	Hypothesized paths of the model and contexts of prior testing	
	Hypothesized pathways [a]	***Contexts of prior testing***
H1 (+)	PA→P	E-learning satisfaction [8]
H2 (+)	PDRQ→P	No prior testing
H3 (+)	P→F	E-learning attitude [9]
H4 (+)	P→CINT	E-learning adoption [10]
H5 (+)	PDRQ→F	E-learning adoption [11]
H6 (+)	PEOU→F	Continuing intention to e-learn [12]
H7 (+)	F→AP	Self-reported performance [7]
H8 (+)	F→AU	Continuing intention to e-learn [13] [14]
H9 (+)	PA→PDRQ	Perceived quality of e-learning [15]
H10 (+)	PA→PEOU	No prior testing
H11 (+)	PA→PU	E-learning adoption [11] [16]
H12 (+)	PDRQ→PEOU	E-learning adoption [11] [16] [17]
H13 (+)	PDRQ→PU	E-learning adoption [11] [16] [17]
H14 (+)	PEOU→PU	Continuing intention to e-learn [13] [18] [19]
H15 (+)	PEOU →AU	Continuing intention to e-learn [13]
H16 (+)	PU→AU	Continuing intention to e-learn [13] [18]
H17 (+)	AU→CINT	Continuing intention to e-learn [13] [18]

[a] PA: professor attitude; P: presence; PDRQ: perceived didactic resources quality; F: flow; CINT: continued intention to e-learn; PEOU: perceived ease of use of the e-learning environment; AP: Academic performance; AU: attitude towards using the e-learning environment; PU: perceived usefulness of the e-learning environment.

III. Method

A. Data collection

The data employed was obtained from the Universitat Oberta de Catalunya (Open University of Catalonia) in Barcelona, Spain. Data collection was carried out through a web-based survey (conducted in Spring term 2010), and registrar's office data of students' course grades (also for the Spring term 2010).

The sample frame consisted of current undergraduate and graduate students of online programs, who had already taken and passed a term at the University. A total of 2,530 usable questionnaires were obtained.

B. Measurement

Measurement items for the constructs in the survey were selected from prior research [1] [15] [19] [20] [14] [21] [2]. Items were adapted to the concrete virtual education environment of the University, and made available in the two languages used by e-learners (Spanish and Catalan). All items were answered on a 7-point Lykert-type scale, anchored between 'strongly disagree' and 'strongly agree'.

AP was captured by adding the final marks achieved in all courses taken by the e-learner in the term of reference. Course grades ranged from zero (unsatisfactory) to five (excellent work).

IV. Results

Tests of the model were carried out through structural equation modeling. Model estimation was done with the maximum likelihood approach.

A. Measurement model

To assess internal reliability, the Cronbach's α and item-to-total correlation were computed for each construct. All values improved the minimum required bounds. To analyze the convergent validity, it was checked first that all factor loadings (associated to each construct) were above the value of 0.60; second that the composite reliability values were grater than 0.70; and third that the variance extracted was lower than the composite reliability values. With respect the discriminant validity of each construct, it was obtained the required condition that the average of the variance extracted was greater than the maximum shared variance and the average shared variance

B. Structural model

The absolute fit measures of the model (goodness of fit index, standardized root mean square residual, root mean square error) satisfied the required standard conditions. The incremental fit mesures (the adjusted goodness of fit index, Tucker-Lewis index and the comparative fit index) were greater than the required lower bounds. All parsimonious fit measures (parsimonious goodness of fit index, parsimonious normed fit index, and parsimonious comparative fit index) were closer to 1. These results showed a good fit of the model.

Since all path weights were positive and significantly different from zero at 99%, all the hypothesized pathways were supported.

V. Concluding Discussion

Our investigation fills a gap in the literature in e-learning, by connecting two critical components of online education programs (PDRQ, PA) with e-learners' behavioral intentions. Our research suggests that these two education components are relevant antecedents of P, PEOU and PU; and that PDRQ triggers F. Furthermore, it notes that PDRQ and PA indirectly elicit CINT. Another interesting result is that PA influences PEOU and, indirectly, F. These findings further shows the crucial role played by professors (along with didactic resources) in continuing intention to e-learn.

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