IDENTIFYING FACTORS IMPACTING ONLINE LEARNING

Dennis Kira, Raafat George Saadé and Xin He
Department of Decision Sciences and MIS,
John Molson School of Business,
Concordia University, Quebec, Canada

Keywords: Dimensions, Affect, Perceptions, Motivation, Learning Attitudes.

Abstract: The study presented in this paper sought to explore several dimensions to online learning. Identifying the dimensions to online learning entails important basic issues which are of great relevance to educators today. The primary question is "what are the factors that contribute to the success/failure of online learning?" In order to answer this question we need to identify the important variables that (1) measure the learning outcome and (2) help us understand the learning experience of students using specific learning tools. In this study, the dimensions we explored are student's attitude, affect, motivation and perception of an Online Learning Tool usage. A survey utilizing validated items from previous relevant research work was conducted to help us determine these variables. An exploratory factor analysis (EFA) was used for a basis of our analysis. Results of the EFA identified the items that are relevant to the study and that can be used to measure the dimension to online learning. Affect and perception were found to have strong measurement capabilities with the adopted items while motivation was measured the weakest.

1 INTRODUCTION

The opportunities for learning and growth of online are virtually limitless. Internet-based education transcends typical time and space barriers, giving students the ability to access learning opportunities day and night from every corner of the globe. Coursework can now provide material in highly interactive audio, video, and textual formats at a pace set by the student.

In one decade since the coding language for the World Wide Web (WWW) was developed, educational institutions, research centers, libraries, government agencies, commercial enterprises, advocacy groups, and a multitude of individuals have rushed to connect to the Internet. One of the consequences of this tremendous surge in online communication has been the rapid growth of technology-mediated distance learning at the higher education level.

Individuals are continuously using the Internet to perform a wide range of tasks such as research, shopping and learning. In particular, during the last decade Information Technology (IT) has been the primary force driving the transformation of roles in the education industry. More specifically, the World Wide Web (WWW) and associated technologies provided a new environment with new rules and tools to conduct instruction and create novel approaches to learning. With the evolution of the WWW we saw education marketed as long distance learning, web based learner centered environments, internet based learning environments, and self instructed learning. With all the different models used on the web, few have studied their acceptance and their effectiveness on learning.

Education has expanded from the traditional in-class environment to the new digital phenomenon where teaching is assisted by computers (Richardson and Swan, 2003). Today, we find a vast amount of courses, seminars, certificates and other offerings on the Internet. This wave of educational material and online learning tools has challenged the effectiveness of the traditional educational approach still in place at universities and other education institutions. Consequently, these institutions are struggling to redefine and restructure their strategies in providing education and delivering knowledge. With today's student demographics, educational institutions are rushing to meet the needs of the new learner by designing and setting up online learning tools as support to the computer assisted classroom.

Online education is often defined as an approach to teaching and learning that utilizes Internet technologies to communicate and collaborate in an

Kira D., George Saadé R. and He X. (2005).
IDENTIFYING FACTORS IMPACTING ONLINE LEARNING.
In *Proceedings of the First International Conference on Web Information Systems and Technologies*, pages 457-465
DOI: 10.5220/0001232904570465

educational context. This includes technology that supplements traditional classroom training with web-based components and learning environments where the educational process is experienced online. Online learning tools are any web sites, software, or computer-assisted activities that intentionally focus on and facilitate learning on the Internet (Poole, Jackson, 2003). Learning tools that have been investigated by researchers include web based dynamic practice system, multimedia application and game based learning modules (Saadé, 2003, Sunal et al., 2003, Poole et al., 2003, Eklund and Eklund, 1996, Irani, 1998). These learning tools focus on specific learning aspects and try to meet the learning needs of a particular group of learners.

With the wide use of technology in today's learning environment, we should not anymore be concerned with finding out which is better, face-to-face or technology-enhanced instruction (Daley et al, 2001). In fact, student's experience with a course does not only entail the final grade but how much of the learning objectives have been attained. Also, holistic experiences with the course should be emphasized. Online learning presents new opportunities to engage more with the students and student-centered learning, thereby enhancing the learning experience. Our primary goal should be whether students really learn with the intervention of online learning tools. If yes, what are the variables that contribute to the success of online learning tools? If no, then what is going wrong and how can we enhance the learning tool in question? To understand the process of learning using online learning tools, we need to identify the important variables that measure the learning outcome of students using a specific learning tool, and also the variables that help us understand students' learning experience with the learning tool.

In essence, learning is a remarkably social process. In truth, it occurs *not* as a response to teaching, but rather as a result of a social framework that fosters learning. To succeed in our struggle to build technology and new media to support learning, we must move far beyond the traditional view of teaching as delivery of information. Although information is a critical part of learning, it's only one among many forces at work. It's profoundly misleading and ineffective to separate information, theories, and principles from the activities and situations within which they are used. Knowledge is inextricably *situated* in the physical and social context of its acquisition and use.

From examining previous literature, we identified six variables that are considered to be important by researchers to the learning outcome and learning experience with online learning tools. These variables are an affect, a learner's perception of the course, a perceived learning outcome, an attitude, an intrinsic motivation and an extrinsic motivation. In this study, a survey methodology was followed. We adopted items (questions) for these variables from different studies and performed an Exploratory Factor Analysis (EFA) to test the validity of the variable sets in the present context. It is the objective of this paper to identify those variables that may play a significant role in learning while using online learning tools.

A recent study performed by (Sunal et al., 2003) analyzed a body of research on best practice in asynchronous or synchronous online instruction in higher education. The study indicated that online learning is viable and resulted in the identification of potential best practices. Most studies on student behavior were found to be anecdotal and are not evidence based. Researchers today are concerned with exploring student behavior and attitudes towards online learning. The evaluation of behavior and attitude factors is not well developed and scarce. Motivated by the need for more concrete and accurate evaluation tools, we identified six important factors that may be used to better understand student behavior and attitude towards online learning. These factors which we shall refer to as the dimensions to online learning are affect, perception of course, perceived learning outcome, attitude, intrinsic motivation and extrinsic motivation.

Affect: Affect refers to an individual's feelings of joy, elation, pleasure, depression, distaste, discontentment, or hatred with respect to particular behavior (Triandis, 1979). Triandis (1979) argued that literature showed a strong relationship between affect and behavior. In a business context, it was observed that positive relation between affect and senior management's use of executive information system exists. Positive affect towards technology leads gaining experience, knowledge and self-efficacy regarding technology, and negative affect causes avoiding technology, thereby not learning about them or developing perceived control (Arkkelin, 2003).

Learner's Perception of the Course: Student's perceptions of using technology as part of the course learning process was found to be mixed (Piacciano, 2002, Kum, 1999). Some students were uncomfortable with the student-centered nature of the course and were put-off by the increased demands of the computer-based instruction, which reduced student engagement in the course and led to a decline in student success (Lowell, 2001). Learners' perception of the course may influence behavior due to the non-familiarity with the learning tool used. Until students fully understood what was

expected of them, they often acted with habitual intent based on an imprecise understanding or perception of the course (Davies, 2003).

Perceived learning Outcome: Perceived learning outcome is defined as the observed results in connection with the use of learning tools. Perceived learning outcome was measured with three items: 1) performance improvement; 2) grades benefit; and 3) meeting learning needs. Previous studies have shown that perceived learning outcomes and satisfaction are related to changes in the traditional instructor's role from leader to that of facilitator and moderator in an online learning environment (Feenberg, 1987; Krendl and Lieberman, 1988; Faigley; 1990). Researchers also reported that students who have positive perceived learning outcome may have more positive attitudes about the course and their learning, which may in turn cause them to make greater use of the online learning tools.

Attitude: Most of the online learning literature concentrates on student and instructor attitudes towards online learning (Sunal et al., 2003). Marzano and Pickering (1997), indicated that students' attitude would impact the learning they achieve. Also research has been conducted to validate this assertion and extends this assertion into an on-line environment (Daley et al, 2001). Moreover, Technology Acceptance Model (TAM) (Davis et al., 1989) also suggests that attitudes towards use directly influence intentions to use the computer and ultimately actual computer use. Davis et al. (1989) demonstrate that an individual's initial attitudes regarding a computer's ease of use and a computer's usefulness influence attitudes towards use.

Intrinsic Motivation: Researchers also studied motivational perspectives to understand behavior. Davis et al. (1992) have advanced this motivational perspective to understand behavioral intention and to predict the acceptance of technology. They found intrinsic and extrinsic motivation to be key drivers of behavioral intention to use (Venkatesh 1999, Vallerand, 1997). Wlodkowshi (1999) defined intrinsic motivation as an evocation, an energy called forth by circumstances that connect with what is culturally significant to the person. Intrinsic motivation is grounded in learning theories and is now being used as a construct to measure user perceptions of game/multimedia technologies (Venkatesh 1999, Venkatesh and Davis, 2000, Venkatesh et al. 2002).

Extrinsic Motivation: Extrinsic motivation was defined by (Deci and Ryan, 1987) as the performing of a behavior to achieve a specific reward. In students' perspective, extrinsic motivation on learning may include getting a higher grade in the exams, getting awards, getting prizes and so on. A lot of research has already verified that extrinsic motivation is an important factor influencing learning. However, other research also addresses that extrinsic motivation is not as effective as intrinsic motivation in motivating learning or using technology to facilitate learning.

2 METHODOLOGY

An exploratory factor analysis approach was followed to test the validity of the dimensions of online learning. The EFA mathematical criteria were used to create factor models from the data. It simplifies the structure of the data by grouping together observed variables that are inter-correlated under one "common" factor (or in the context of this study, dimension). Prior to the presentation of the EFA approach and results, we describe the tool used, the experimental setup including participants and procedure and the questionnaire used.

2.1 The Online learning tool

The Online Learning Tool was developed so that students could practice and then assess their knowledge of content material and concepts in an introductory management information systems course. The learning tool helps students rehearse as well as learn by prompting them with multiple-choice, and true or false questions. The learning tool is web based and can be accessed using any web browser. Selection of the web to implement the learning tool is appropriate due to the fact that the technology is available from many locations around the campus, friends, internet cafes and homes, thus access would not count as a barrier to the usage of the technology.

The learning tool is programmed using html and scripting languages with active server pages (ASP) support to communicate with the database. The html and ASP files are very simple in design and do not include graphics and images or any other distracting objects. Each page includes one or two buttons that students can click on. This design allows the student to focus on the task at hand and away from exploration.

The learning tool is made up of three components: (1) the front end which interacts with the user, (2) the middle layer which stores and

controls the interaction session and (3) the back end which includes the database with questions. The front end is simple and allows the student to log into the web site and select whether he/she wants to practice or get evaluated. The middle layer keeps track of the student's performance as well as controls the logic behind the selection of the questions from the database and prompting them to the student. The back end (database) contains the multiple choice and true or false pools of questions students' answers to the questions and time that they spent answering each set of questions.

Since the Online Learning Tool was developed for the web, students were able and allowed to use the system anywhere, anytime. The system would monitor students' activities such that usage time, chapters accessed and average scores per chapter were stored and time stamped. Due to the fact that the internet is widely used among students, the selection of the web to implement the Online Learning Tool is justified. Furthermore, the web technology exemplifies the characteristics of contemporary information technology and that the technology is available from many locations around the campus, friends, Internet cafes and homes. Therefore access would not count as a barrier to the usage of the technology.

Students were asked to use the Online Leaning Tool and informed that this portion of the course to count for 10% of their final mark. The remaining part of the course grade was distributed between a midterm exam (25%), a project (20%) and a final exam (45%). The Online Learning Tool interface was simple and contained two major components. The first component included a practice engine where students would practice multiple choice, and true or false questions without being monitored or having any of their activities stored. The second component entails a test site similar to what the students have used in component 1. Both parts have the same interface, engine and pool of questions.

The Online Learning Tool is integrated in the instructional design of the course with some pedagogical elements in mind. First, the questions in the practice (Component 1) and assessment (Component 2) components of the Online Learning Tool are retrieved from the same pool in the database. This implies that some questions will repeat and therefore encourage students to use their cognitive skills such as short-term memory, working memory, recognition and recollection. This is especially true because the students are notified that the pool of questions is fixed and that questions will reappear. That is, students need to be very attentive during the exercise/practice process. Questions included multiple choice, and true or false and students were given immediate feedback to their responses. Second, the assessment (component 2) of the students' level of acquired knowledge found in a specific chapter of the course is not limited by the number of questions that the students are asked to answer but only by their willingness to practice. Students have the flexibility to answer as many questions as they wish. In other words, students have the choice to practice again and be re-assessed (tested) as many times as they wish. The final assessment mark, however, is calculated as the average of all the assessments taken. For example, the student is required to do a minimum of 20 questions. If the student after answering 20 questions receives an average of 75% and the students wishes to increase this average, then the student may practice some more (using component 1) and then return to the assessment part (component 2) and re-attempt 10 more questions. If the student score 80% on the second set of questions, then the running average of the student is (80+75)/2 = 77.5%. Third, the answer to a few questions in every chapter was intentionally specified wrong. That is, if the student selects the correct answer, the Online Learning Tool will tell the student that the answer is wrong. Students are notified about this fact and are encouraged to find those errors and report them. Students are given bonus points for finding those wrong questions/answers.

2.2 Participants and Procedure

A total of 105 undergraduate students participated in using the Online Learning Tool. The students' sample represents a group:

- 37% between the ages of 18 and 22, 21% aged between 22 and 24 years and 32% above 26 years old;
- with a majority (57%) claiming to have 2 to 5 years of experience using the internet and 33% claiming to have more than 5 years of internet experience ;
- with the majority (90%) indicating that they use the internet more than 1 hour a day.

A flowchart describing the suggested students' learning process with the Online Learning Tool integrated is shown in figure 1 below. Steps 1 to 5 are a cycle that needs to be followed for every chapter. First, the student should study chapter C(i) prior to the use of the Online Learning Tool (step 1). Once the student has studied chapter C(i), he/she can login (via the internet) and select to practice

answering questions 'P(i,j,k)' associated with the chapter 'i' studied, where 'j' and 'k' represent multiple choice and true or false questions respectively (step 2). The practicing component prompts the student with a set of five questions at a time. The student answers the questions and requests to be evaluated. The Online Learning Tool then identifies the correct from the incorrect answers. The student can verify the results and when ready click on the 'Next' button to be prompted with another randomly selected set of questions (step 2). The student can practice as much as he/she feels is necessary (step 3), after which he/she can do the test for the specific chapter T(i,j,k) (step 4). The student can then continue with another cycle identified by a new chapter to study and practice (step 5). At any time, a student can request an activity report which includes a detailed view of what and how much they practices and a summary report which provides them with running average performance data.

2.3 Questionnaire

Validated constructs were adopted from different relevant prior research work (Venkatesh et al., 2003, Agarwal and Karahanna, 2000, Davis, 1989). The wording of items was changed to account for the context of the study. All items shown in the appendix were measured using a 5-point scale with anchors all of the questions from "Strongly disagree" to "Strongly agree" with the exception of 'learners' perception of course' which had anchors between 0% and 100%. The questionnaire included items worded with proper negation and a shuffle of the items to reduce monotony of questions measuring the same construct.

3 RESULTS AND DISCUSSION

3.1 Student Feedback on Affect (AFF)

The Affect reported by the sample students is not positive. More than 50% of the students reported that they feel the "learning tool" to be a nuisance. 40% of them also reported frustration in using the "learning tool". The same number of the students reported anxiety and tension in using the "learning tool". The negative affect in using the "learning tool" was not due to technical problems since very little technology related problems were reported. Student most probably had negative affect due to the fact that the course (which is also reflected in the number of chapters to practice for) contained a large amount of information. This was previously observed where negative affect has caused the student to avoid the use of the "learning tool" (Arkkelin, 2003). In the present study, students continued using the learning tool because their scores were part of their final mark (5%).

3.2 Student Feedback on Learners' Perception on Course (PC)

The perception on the course was positive. More than 50% of the students indicated that the learning tool is important for the course. Closer to 95% of the students felt that they will score above 50% in the course with half of them expecting a mark above 75%. Approximately 75% of the students seemed to invest more than 50% of their efforts on this course. In relation to the course material, nearly 60% of the students felt that compared to other courses, this course on the average has 75% more valuable content, at the same time 75% more difficult and that they were 75% more enthusiastic in taking the course.

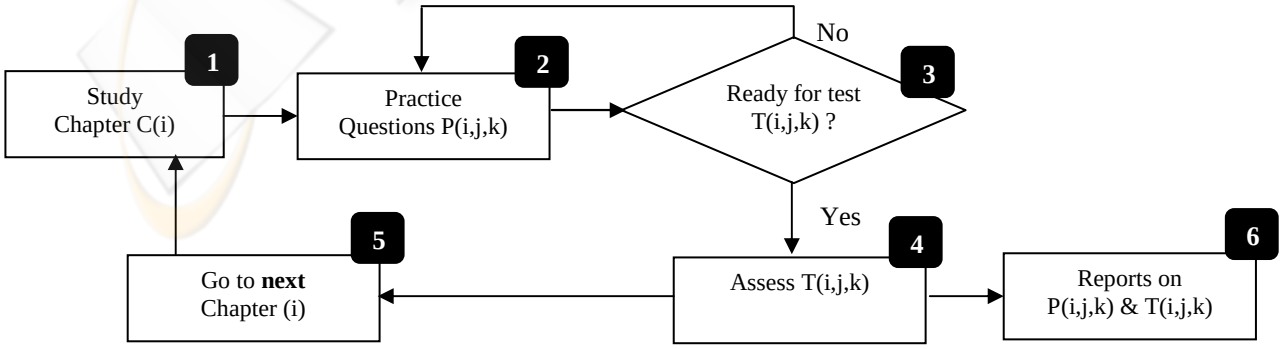

Figure 1: The Online Learning Tool process

3.3 Student Feedback on Attitude (ATT)

Close to 60% of the students found that "learning tools" are helpful in better understand course content. Also 60% of the students reported the advantages of "learning tools" overweigh the disadvantages. Most students felt that the "learning tool" had little influence in improving their interaction with other fellow students, in helping their performance in other courses, and in feeling more productive by using it. These results were expected due to the fact that the
"learning tool" targeted student's learning of specific topics in relation to the present course and not other courses. Also, the "learning tool" was not designed to enhance collaboration among students. What is interesting is that 10% of the students actually did feel that the "learning tool" will help them in other courses, claimed that it improved the quality of interaction with other students and felt that they were more productive using it.

3.4 Student Feedback on Perceived Learning Outcome (PLO)

As shown, perceived learning outcome is very positive. More than 60% of the students indicated that the "learning tool" meets their learning needs and does not waste their time. Their understanding of the topic was improved by using the tool. Close to 50% of the students reported that they understand the strategy of the "learning tool" and were able to adjust their learning in order to maximize the advantage in using the learning tool.

3.5 Student Feedback on Intrinsic and Extrinsic Motivation (IM and EM)

More than 80% of the students reported that the "learning tool" being a support throughout the semester motivated them to use it more regularly. This indicated that students use the "learning tool" because they believe it is a support for the learning in the course throughout the semester. At the same time, 80% of the students reported that they used the "learning tool" more seriously because it is part of the grading scheme. Both the intrinsic and extrinsic motivation played an important role in learning.

First, we performed an initial factor analysis to observe the relationship among the factors and their indicators. Some variables were well defined with a factor (AFF1, AFF2 and AFF3 with Factor 4; PLO1 and PLO2 and PLO5 with Factor 5). However, other items such as ATT1 loaded on Factor 1 (0.580) and factor 2 (0.578). During subsequent factor analysis we rotated the matrix to improve our ability to interpret the loadings (to maximize the high loading of each observed variable on one factor and minimize the loading on the other factors. Scree plot and eigenvalue were used to identify the number of factors that can be extracted from the items pool (Field, 2000)

Factor analysis was performed on the original set of items, six factors were retained initially. After factor extraction often it is difficult to interpret and name the factors on the basis of their factor loadings. A solution to this difficulty is factor rotation. Factor rotation alters the pattern of the factor loadings, and hence can improve interpretation. Thus, to obtain better understanding of the factors, we used orthogonal rotation which tends to maximize the loadings on one factor and minimize the loading on the other factor or factors. The most commonly used rotation scheme for orthogonal factors is Varimax, which attempts to minimize the number of variables that have high loadings on one factor.

There are two methods: orthogonal and oblique rotation. In orthogonal rotation there is no correlation between the extracted factors, while in oblique rotation there is. It is not always easy to decide which type of rotation to take; as Field states, "the choice of rotation depends on whether there is a good theoretical reason to suppose that the factors should be related or independent, and also how the variables cluster on the factors before rotation". A fairly straightforward way to decide which rotation to take is to carry out the analysis using both types of rotation; "if the oblique rotation demonstrates a negligible correlation between the extracted factors then it is reasonable to use the orthogonally rotated solution" (Field, 2000).

The EFA was performed in three steps: (1) Unrotated on all items, (2) Rotated on all items and (3) Rotated and refined. In step 3, refined implies that we dropped all the items that did not meet the inclusion criteria. Also, in each step we analyzed the factor matrix, eigenvalues and the scree plot. Here we present the final solution.

3.6 Retained Solution

Due to the low correlation and low factor loading, the following items are rejected: AFF1, PC2, PC4, PC5, PC6, ATT6, PLO1, PLO2, PLO4, IM1, and EM1. After dropping these items, the final analysis is presented. Table 1 summarizes the relationship among the factors and their observed indicators.

Table 1: Factor loadings on respective items

Variable	Factor1	Factor2	Factor3	Factor4	Factor5	Factor6
AFF2	0.155	0.140	**-0.877**	-0.050	0.122	-0.208
AFF3	0.200	0.006	**-0.650**	-0.200	0.035	0.147
PC1	0.282	-0.151	-0.073	**0.679**	0.326	0.079
PC3	0.236	-0.170	-0.095	**0.927**	-0.005	-0.193
ATT1	**0.666**	0.240	-0.182	-0.338	0.236	-0.250
ATT2	**0.672**	0.116	-0.083	-0.044	0.253	-0.206
ATT3	**0.740**	0.202	-0.185	-0.212	0.101	0.043
ATT4	**0.674**	0.142	-0.115	-0.100	-0.008	0.036
ATT5	**0.588**	0.189	-0.327	-0.214	0.431	-0.060
PLO3	0.144	**-0.555**	-0.086	0.098	0.297	-0.076
PLO5	0.424	**-0.732**	-0.143	0.123	0.367	-0.016
IM2	0.176	0.188	-0.034	-0.276	0.335	**-0.574**
EM2	0.119	0.250	-0.235	0.210	**-0.556**	-0.123

Items with high values are bold to contrast the loading on their respective factor. Items that belong together should have relatively higher loading on the same factor. For example PC1 and PC2 load 0.679 and 0.927 on factor 4, which are high compared to the other variables which load 0.338 or less on the same factor.

We can immediately see that the variables are well defined with a factor (PC1 and PC3 with Factor 4; ATT1, ATT2, ATT3, ATT4 and ATT5 with Factor 1; AFF2 and AFF3 with Factor 3; PLO3 and PLO5 with factor 2).

4 LIMITATIONS

Dimensions that influence online learning have been investigated by researcher under different experimental traits. In this study, we gathered items from different literature and tested the validity of these items under the use of an online learning tool context. We acknowledge that implications of our findings are only confined to the limits at which we interpret the results, and that these limitations must be acknowledged.

From the participants' perspective, bias with the sample of learners may be due to the sample size, and demographic controls. Moreover, the nature of the course is such that it is an introductory MIS course containing many chapters and additional topics that we ask the students to learn. This is especially difficult for the students who have never been exposed to the field of information technology. Therefore generalizing the findings in terms of behavior and intentions to other courses and schools may be limited. As a result, we need to identify the boundary conditions of the dimensions as they relate to demographic variables such as age, gender, Internet competencies and other course properties. In fact, the nature of the course is an important variable that contributes to the success or failure of online learning. In effect, some courses lend themselves to be appropriate for online while other do not. Similarly, some students have the skill to follow online learning tools while others do not.

Considering the questionnaire, it is not free of subjectivity. The respondents' self-report measures used are not necessarily direct indicators of improved learning outcomes. Furthermore, although a proper validation process of the instrument was followed, the fact that the questions were collected from other research may not necessarily be precise and appropriate in the context of this study. Conclusions drawn are based on a specific online learning tool usage but not for all online learning tools. Other learning tools can be designed for different tasks and for different platforms (in this case it was web-based) and this study was based on a single distinct technology. This however, may not generalize across a wide set of learning technologies.

The effectiveness of online learning tool in facilitating students' learning and the learners learning outcome are measured in many dimensions. In this study, we chose five important dimensions that have been investigated in different research and tested the validities of these dimension under the current context. These five dimensions are Affect, Learner's Perceived on the Course, Attitude, Perceived Learning outcome, Intrinsic Motivation

and Extrinsic Motivation. In this validating process, all the five dimensions show content and construct validities to some extent. The last two constructs related to motivation should be deleted as factors if Stevens' (2002) guideline is followed since there is only one loaded item for these two factors. We have decided to retain these two factors since other literatures indicate the importance of motivational factors in learning (Venkatesh 1999, Venkatesh and Davis, 2000, Venkatesh et al. 2002). The unreliable items in constructs are eliminated and not considered in the final solution of the factor analysis. Student feedback on questions items and the factor analysis provide

- validity of the dimensions that influence the effectiveness of online learning
- controls to revalidate under different experimental setups
- researchers with the valid questionnaire items to test models or hypotheses under
- different contexts hence facilitating the analysis of mediating effects on student experiences and
- quantitative results that may help the researcher/instructor understand the dynamics of the online learning tool and identify critical element to enhance the tool in helping students perform better in their learning process

REFERENCES

Agarwal, R., and Karahanna, E., 2000. Time Flies When You're Having Fun: Cognitive Absorption and Beliefs, About Information Technology Usage. *MIS Quarterly*, Vol. 24 No. 4, pp. 665-694.

Arkkelin, D., 2003. Putting Prometheus' Feet to the Fire: Student Evaluations of Prometheus in Relation to Their Attitudes Towards and Experience With Computers, Computer Self-Efficacy and Preferred LearningStyle. http://faculty.valpo.edu/darkkeli/papers/syllabus03.htm (Last accessed on April 17, 2004).

Bergeron, F., Raymond, L. Rivard, S. and Gara, S., 1995. Determinants of EIS Use: Testing a Behavioral Model. *Decision Support System*, Vol. 14, pp. 131– 146.

Daley, B. J., Watkins, K., Williams, W., Courtenay, B. and Davis, M., 2001. Exploring Llearning in a Technology-Enhanced Environment. *Educational Technology & Society*, Vol. 4, No. 3.

Davies, R. S., 2003. Learner Intent and Online Courses. *The Journal of Interactive Online Learning*, Vol. 2, No. 1.

Davis, F.D., 1989. Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology. *MIS Quarterly*, Vol. 13, pp. 319-340.

Davis, D. F., Bagozzi, R.P. Warshaw,P.R. 1989.User Acceptance of Computer Technology: a Comparison of Two Theoretical Models. *Management science*, Vol. 35, No. 8, pp.982-1003.

Davis, F.D., Davis, G.B. and Warshaw, P.R., 1992. User Acceptance of Computer Technology: A Comparison of Two Theoretical Models. *Management Science*, Vol. 35, No. 12, pp. 982-1003.

Deci, E L., and Ryan, R.M., 1985. Intrinsic Motivation and Self-determination in Human Behavior. *Plenum*, New York.

Eklund, J. and Eklund, P. (1996), "Integrating the Web and The Teaching of Technology: Cases Across Two Universities," *Proceedings of the AusWeb96*, The Second Australian WorldWideWeb Conference, Gold Coast, Australia. Available online at: http://wwwdev.scu.edu.au/sponsored/ausweb/ausweb96/educn/eklund2 (last accessed Feb, 2004).

Feenberg, A., 1987. Computer Conferencing and the Humanities. *Instructional Science*, Vol. 16, pp. 169-186.

Faigley, L. 1990. Subverting the electronic workbook: Teaching writing using networked computers. In D. Baker & M. Monenberg (Eds.*), The writing teacher as researcher: Essays in the theory and practice of class-based research*. Portsmouth, NH: Heinemann.

Field, A. (2000). *Discovering Statistics using SPSS for Windows*. London – Thousand Oaks –New Delhi: Sage publications.

Hair, J.F. Jr. , Anderson, R.E., Tatham, R.L., & Black, W.C. (1998). *Multivariate Data Analysis, (5thEdition)*. Upper Saddle River, NJ: Prentice Hall.

Irani, T., 1998. Communication Potential, Information Richness and Attitude: A Study of Computer Mediated Communication in the ALN Classroom. *ALM Magazine*, Vol. 2, No. 1.

Krendl, K. A., and Lieberman, D. A., 1988. Computers and Learning: A Review of Recent Research. *Journal of Educational Computing Research*, Vol. 4, No. 4, pp. 367-389.

Kum, L. C., 1999. A Study Into Students' Perceptions of Web-Based Learning Environment. *HERDSA ANNUAL International Conference, Melbourne*, pp. 12-15.

Lowell, R., 2001. The Pew Learning and Technology Program Newsletter. http://www.math.hawaii.edu/~dale/pew.html (last accessed Feb, 2004).

Marzano, R. J. & Pickering, D. J., 1997. *Dimensions of learning* (2nd ed.), Alexandria, VA: Association for Supervision and Curriculum Development.

Picciano, G. A., 2002. Beyond Student Perceptions: Issues of Interaction, Presence and Performance in an Online Course. *JALN*, Vol. 6, No. 1, pp. 21-40.

Poole, B. J. and Lorrie J., 2003. *Education Online: Tools for Online Learning. Education for an information age, teaching in the computerized classroom,* 4th edition.

Richardson, C. J. and K. Swan, K., 2003. Examining Social Presence in Online Courses in Relation to Students' Perceived Learning and Satisfaction. *JALN*, Vol. 7, No. 1, pp. 68-88.

Saadé, G. R., 2003. Web-based Educational Information System for Enhanced Learning, (EISEL): Student Assessment. *Journal of Information Technology Education*, (2), pp. 267-277. Available online: http://jite.org/documents/Vol2/v2p267-277-26.pdf (last accessed Feb, 2004).

Stevens, J., 2002. *Applied Multivariate Statistics for the Social Sciences (4th Edition)*. Mahwah, NJ: Lawrence Erlbaum Associates.

Sunal, W. D., Sunal, S.C., Odell, R.M. and Sundberg, A.C., 2003. Research-Supported Best Practices for Developing Online Learning. *The Journal of Interactive Online Learning*, Vol. 2, No. 1, pp. 1-40.

Triandis, C. H. (1979), "Values, Attitudes, and Interpersonal Behavior," *Nebraska Symposium on Motivation, 1979: Beliefs, Attitudes and Values, Lincoln, NE: University of Nebraska Press*, pp. 159 – 295.

Vallerand, R. J.,1997. Toward a Hierarchical Model of Intrinsic and Extrinsic Motivation. *Advances in Experimental Social Psychology*, Vol. 29, pp. 271-374.

Venkatesh, V., 1999. Creation of Favorable User Perceptions: Exploring the Role of Intrinsic Motivation. *MIS Quarterly*, Vol. 23, No. 2, pp. 239-260.

Venkatesh, V. and Davis, F. D., 2000., A Theoretical Extension of the Technology Acceptance Model: Four Longitudinal Field Studies., *Management Science*, Vol. 46, No. 2, pp. 186-204.

Venkatesh, V., Speier, C. and Morris, M.G. 2002. User Acceptance Enablers in Individual Decision-Making About Technology: Toward an Integrated Model. *Decision Sciences*, Vol. 33, pp. 297-316.

Venkatesh, V., Morris, M.G. Davis,F.D. and Davis, G.B., 2003. User Acceptance of Information Technology: Toward a Unified View. *MIS Quarterly*, Vol. 27, pp. 425-478.

Wlodkowski, R. J ,1999. Enhancing Adult Motivation to Learn, Revised Edition, a Comprehensive Guide for Teaching All Adults. San *Francisco, CA: Jossey-Bass*.