

Student Perceptions of Using a SCORM-Compliant Learning Object (SCLO) for Learning in an ODL Environment

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Abstract

The sharable content object reference model (SCORM) has become one of the important specifications for content packaging and platform development in open and distance learning (ODL). SCORM-compliant learning objects (SCLO) are knowledge repositories that have been meta-tagged for SCORM compliance. SCLO can be easily interoperated among different learning management systems (LMS) without being tied to a single content provider or authoring tool. The content can last longer because it is easier to justify ongoing compatibility with standard content. The purpose of this research is to examine student acceptance of SCLO. The involvement of students was important for a successful content delivery process. Therefore, students' acceptance behavior should be assessed as this reflects whether they will eventually adopt SCLO in their learning. Data were collected through Davis's extended technology acceptance survey instrument. The data collected were further analysed and evaluated. The results of this study are useful for instructors and course designers with respect to the use of SCLO in their respective courses or any content delivery process.

Keywords: SCORM, technology acceptance model, perceived ease of use, perceived usefulness, attitude to using, intention to use

Introduction

SCORM is created primarily for vendors and designers who build LMS and learning content authoring tools so that they conform to SCORM technically and the courseware contents are designed to run on any SCORM-compliant LMSs. Instructional designers and instructors may adopt relevant SCORM-compliant courses to deliver their university courses. There have been numerous studies on the benefit of SCORM-compliant learning objects (SCLOs) over the last decade. The use of SCLO is increasingly prevalent in many e-learning systems and higher educational



institutions. However, there has been limited study on students' perceptions and acceptance of SCLO. The purpose of this research is to determine the extent of usage of SCLO by studying user technology acceptance using a technology acceptance model (TAM). The successful implementation of a system is dependent on the extent to which such a system is used and eventually adopted by potential users (Fagan, Neill & Wooldridge, 2004).

TAM has been widely applied to studies of technology acceptance and usage behavior (Bruner & Kumar, 2005). The TAM, which was introduced by Davis in 1989, modified TRA to predict computer adoption by replacing the belief determinants of TRA with two key beliefs: perceived ease of use and perceived usefulness. Davis (1989) defined perceived ease of use as 'the degree to which a person believes that use of a particular system would be free of effort'; and, in contrast, perceived usefulness is 'the degree to which a person believes that use of a particular system would enhance his or her job performance'.

Literature Review

There are theoretical models that attempt to explain the relationship between user attitudes, perceptions, beliefs, and eventual system use. These include the theory of reasoned action (TRA), the theory of planned behavior (TPB), and the technology acceptance model (TAM). Among these, TAM, proposed by Davis (1986), seems to be the most widely used by researchers. It is a model which explains the adoption behavior of computer systems by users and calculates the level of acceptance. Saadé, Nebebe and Tan (2007) suggested that TAM is a solid theoretical model whose validity can extend to the e-learning context.

The theory of reasoned action

TRA is based on the assumption that individuals are rational decision-makers who constantly calculate and evaluate the relevant behavior beliefs in the process of forming their attitude toward the behavior. Figure 1 shows the TRA model. The actual behavior is determined by an individual's behavior intentions. Individual's attitude in turn determines behavior intention.

Fishbein and Ajzen (1975) define attitude as 'an individual's positive or negative feelings (evaluative affect) about performing the target behavior'. Individuals form attitudes towards a behavior by evaluating their beliefs through an expectancy-value model. For each attitude towards a behavior, individuals multiply the belief strength by the outcome evaluation, and then sum the entire set of resulting weights to form the attitude.

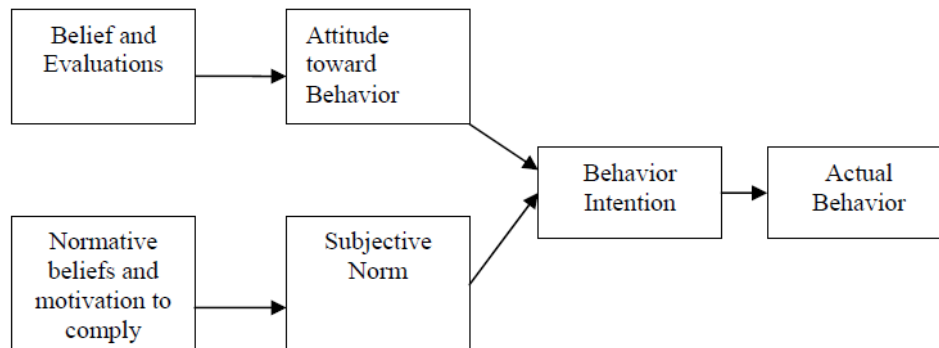


Figure 1 The theory of reasoned action (Fishbein & Ajzen, 1975)

The theory of planned behavior

TRA was extended by Ajzen (1991) to TPB to consider mandatory situations. TRA is used to predict an individual's behavior only in a real voluntary situation, but not in a mandatory context. A new construct, perceived behavior control, was added in TPB. The definition of perceived behavior control is 'the perceived ease or difficulty of performing the behavior'.

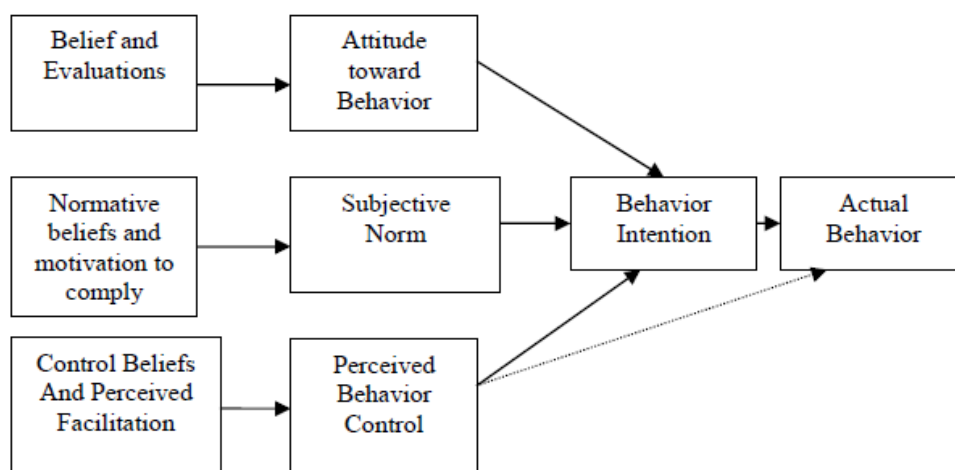


Figure 2 The theory of planned behavior (Ajzen 1991)

Figure 2 shows the TPB model. TPB is similar to TRA in that TPB also assumes that individuals are rational decision-makers. Individuals assess perceived behavior control using a method similar to the expectancy-value model. For each in a set of control beliefs, individuals multiply the belief's strength by the perceived power of the control factor.

Technology acceptance model

TAM adapts Fishbein and Ajzen's (1975) TRA as a basis for specifying the linkages flow in a sequence from beliefs, attitudes and intentions to behaviors. In TAM, technology acceptance and use is determined by intention to use (ITU). ITU, in turn, is affected by attitude towards using (ATT), as well as the direct and indirect effects of perceived ease of use (PEOU) and perceived usefulness (PU). Figure 3 illustrates the TAM model.

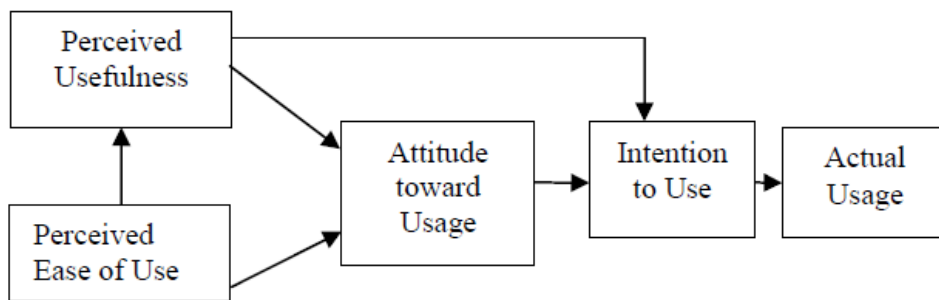


Figure 3 The technology acceptance model (Davis, 1989)

Research Model and Hypotheses

Figure 4 illustrates the research model used in this study and the hypotheses which were proposed.

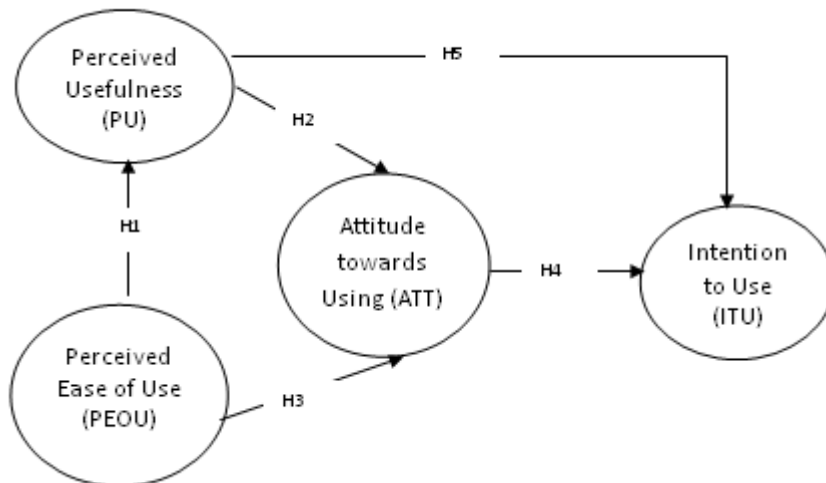


Figure 4 Conceptual research model

It was hypothesized that

Hypothesis 1: *Perceived ease of use* has a significant influence on *perceived usefulness*.

Hypothesis 2: *Perceived usefulness* has a significant influence on *attitude towards using*.

Hypothesis 3: *Perceived ease of use* has a significant influence on *attitude towards using*.

Hypothesis 4: *Attitude towards using* has a significant influence on *intention to use*.

Hypothesis 5: *Perceived usefulness* has a significant influence on *intention to use*.

A survey instrument was administered electronically to the students enrolled in the *Structured Programming* course in the January 2013 semester. The data were gathered from 125 respondents using an online survey, which was held open for approximately one month. Respondents were asked to provide basic demographic information, and the survey instrument elicited responses on a series of Likert-type questions. Statistical tests were conducted using SPSS to evaluate reliability and validity. Reliability addresses the degree to which instruments measure consistently on different occasions and, as Fiske (1971) describes, are free of variable error, and where measurement technique are accurate and dependable (Cronbach, 1951). Validity addresses the degree of truthfulness and the extent to which generalizations can be made.

Table 1 Reliability statistics for individual variables

Factor	Items	Alpha
<i>Perceived ease of use (PEOU)</i>	4	.950
PEOU1: I would find SCLO easy to use.		
PEOU2: Learning to use SCLO would be easy for me.		
PEOU3: My interaction with SCLO was clear and understandable.		
PEOU4: It would be easy for me to become skillful at using SCLO.		
<i>Perceived usefulness (PU)</i>	4	.964
PU1: Using SCLO would enhance my effectiveness in learning.		
PU2: Using SCLO would improve my learning performance.		
PU3: Using SCLO would increase my productivity in my course work.		
PU4: Using SCLO would make it easier to learn course content.		
<i>Attitude towards using (ATT)</i>	3	.897
ATT1: I have a generally favorable attitude towards using SCLO.		
ATT2: I believe it is (would be) a good idea to use SCLO for my course work.		
ATT3: I like the idea of using SCLO.		
<i>Intention to use (ITU)</i>	3	.866
ITU1: I intend to use SCLO whenever possible.		
ITU2: I will return to SCLO often.		
ITU3: I would adopt SCLO in the future.		
Overall	4	.933

Cronbach's alpha internal reliability coefficients were calculated to measure the reliability of the instrument. As shown in Table 1, the Cronbach's alpha for the overall scale is equal to .920. All the measures employed in this study demonstrated good internal consistency, ranging from 0.866 to 0.964, thereby exceeding the reliability estimates ($\alpha = 0.70$) recommended by Nunnally (1967).

Data Analysis and Results

Data processing was performed using the SPSS program, version 21. Analyses of the regression equations revealed that the variables for PEOU, PU, ATT and ITU could be used in a predictive model with moderate accuracy.

To determine the percentage of variation in usage of SCLO accounted for by the independent variables, the coefficient of determination (R Square) was calculated. By employing a series regression analysis, the researcher explored the relationship between the variables as they relate to the true usage of SCLO.

Demographic variables (gender and age group) were dropped as there was no significant correlation between demographic variables and the dependent variables.

The classification analysis for each category is shown in Table 2. Among these four variables, PU (M=3.50, SD=.98) was the most important category.

Table 2 Mean and standard deviation of each variable

Variable	Mean	SD
PEOU	3.43	.91
PU	3.50	.98
ATT	3.46	.92
ITU	3.48	.89

Note: PEOU = perceived ease of use; PU = perceived usefulness; ATT = attitude towards using; ITU = intention to use

A regression analysis was also conducted to observe the relationship between PEOU and PU. Table 3 displays the results from the regression analysis. PEOU explains 68% of the variance (R^2) in PU, which is highly significant as indicated by the F-value of 38.054.

Table 3 Regression PEOU on PU

	R²	β	Standard error of β	t	p
PEOU	.679	.824	.119	6.169	.000

As shown in Table 3, hypothesis 1 was observed for statistical significance at the level $p=.000$. Therefore, hypothesis 1 was supported.

Table 4 shows the results of regression analysis of H2 and H3. H2 and H3 were tested by regressing both PEOU and PU on ATT.

Table 4 Regression PEOU and PU on ATT

	R²	β	Standard error of β	t	p
PEOU	.783	.601	.075	8.063	.000
PU	.630	.605	.109	5.531	.000

Both PEOU and PU have a significant influence on ATT as indicated by the F-values of 65.017 and 30.594 respectively. H2 and H3 have a significant value of .000. Hence, hypotheses 2 and 3 were both supported.

Table 5 Regression PU and ATT on ITU

	R²	β	Standard error of β	t	p
PU	.559	.748	.098	4.781	.000
ATT	.439	.545	.145	3.749	.001

H4 and H5 were tested by regressing both PU and ATT on ITU. The results are shown in Table 5. PU and ATT had a significant influence on ITU, with p values = .000 and .001 respectively. The effect of PU and ATT explains 55.9% and 43.9% of the variance of ITU. Thus, hypotheses 4 and 5 were both supported.

The resulting path diagram is presented in Figure 5. The results show that all the proposed hypotheses were supported.

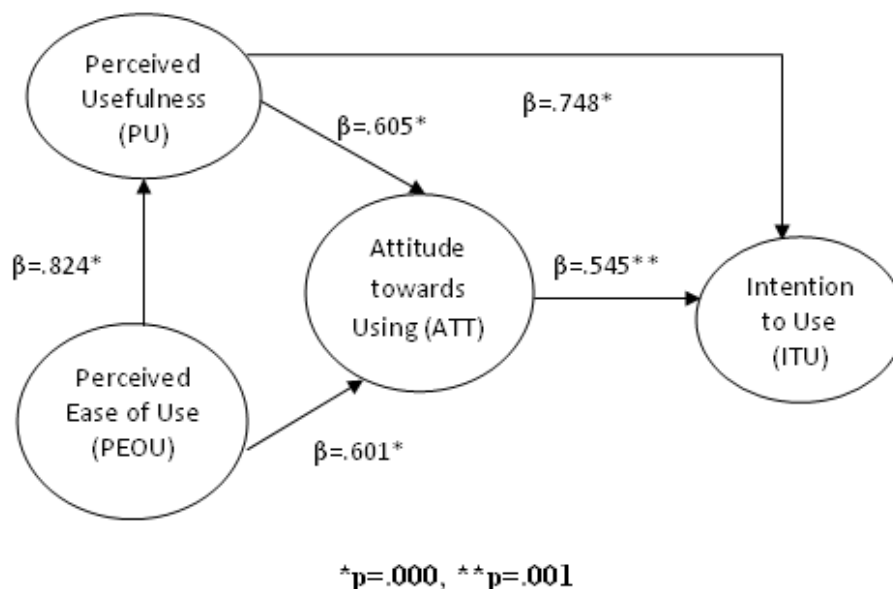


Figure 5 Final conceptual research model

Conclusion

The purpose of this research project was to examine student acceptance of SCLO to increase the effectiveness of content delivery. A modified survey instrument based on the principle of Davis's (1989) TAM was distributed to all ODL undergraduate students enrolled in the *Structured Programming* course during the January 2013 semester at the University. The true usage an individual makes of a system is driven by the ITU, which in turn is determined by the PU and PEOU. The results of the regression analyses show that variable PEOU, PU, ATT and ITU did serve as predictors of one another. The statistical results also show that PU is important in determining the acceptance by students of SCLO. An explanation might be that students are willing to explore to improve their learning performance and enhance their effectiveness in learning — and this may suggest that students are willing to adopt any new course delivery approach as long as they find it useful in their learning.

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