

Combined Effect of Instructional and Learner Variables on Course Outcomes within An Online Learning Environment

Doo Hun Lim, Michael Lane Morris
University of Tennessee

Seung-Won Yoon
Western Illinois University

Abstract

Among many studies focusing on the effect of learner and instructional variables on course outcomes, few studies have investigated the learners' study habits and the mediating mechanisms among the learner and instruction variables in their influence on course outcomes. This study examined differences in learner satisfaction and learning outcomes based on learner characteristics and study habits and the effects of instructional and learner variables on the course outcomes for an online course. Data analyses revealed the quality of online instructor, learning motivation, and learning involvement as significant variables influencing the course outcomes of the online learning program.

Introduction

Online learning has become a major force in higher education as a delivery medium for learning and is expected to continue its rapid growth. A recent national survey from the Sloan consortium reported that the majority of the faculty members in colleges and universities viewed online education as capable of providing equal or superior learning experiences compared to those from classroom instruction (Allen & Seaman, 2003). While the benefits of online learning has been widely acknowledged by online educators at all levels of educational institutions, some quality issues of online learning were pointed out by other researchers including the lack of effective administration of students' learning, online learners' lack of technical skills, and the lack of social interaction during online learning (Muilenburg & Berge, 2001). In an effort to address the mixed results about the effectiveness of online instruction and identify what caused such discrepancies, many past research studies sought to examine which institutional and learner factors influenced the overall quality of online learning program. However, less known in the literature is what the mediating variables or mechanisms at a course level influencing specific outcomes of online learning are.

Purpose of the Study

The history of online education using the Internet as the primary content-delivery and communication media is not long. The researchers' summary of the online education literature reveals that more 'macro' level efforts have been made to create theoretical frameworks to: (a) guide the design of Internet-based learning environments (Hannafin, Land, & Oliver, 1999), (b)

identify instructional strategies and challenges of online teaching and learning (Palloff & Pratt, 1999), (c) examine the types and roles of interactions (Hirumi, 2002; Northrup, 2001), and (d) study the effect of learner characteristics, such as demographic information, learning styles/preferences, technology skills, and learning motivation on online learning. Among these, the greatest attention has been given to teaching and learning issues (i.e., interaction) backed by both empirical and position papers (Flottemesch, 2000; Harasim, 1987; IHEP, 2000). However, the field is not still clear about the construct and influence of interactions on learning outcomes of online learning. Various claims for the importance of interactions were largely based on the learners' perception data (Simpson & Du, 2004) and they lacked specificity in terms of what aspect of learning outcomes they sought for.

The researchers also find that interaction studies tend to disregard the collective influence of learner-related variables and instructional conditions on course outcomes as well as learning outcomes. Here, the course outcomes are a broader term than learning outcomes in that they include learners' satisfaction from a course, learning gains between before and after a course, and opportunities to use the learning content in meaningful ways during learning and through personal careers, jobs, and/or tasks. Despite the inter-connected alignment among learner characteristics, instructional conditions, and other learner variables such as learning motivation and involvement for affecting course outcomes, past studies of learner and instructional variables largely examined simple correlations between learner backgrounds with course participation and/or satisfaction (Patrick & Mohamed, 2005). Few studies have utilized integrated approaches to conduct the empirical assessment of the influence of those diverse instructional and learner variables on course outcomes within online learning environments. The need to identify the mediating mechanisms to link contextual features influencing course outcomes has been pressing research interest among researchers.

Also, the literature of learning application and transfer within education discipline claims that course outcomes are more accountable when not only knowledge gains but also learning applications are demanded simultaneously during learning. In order to make an instructional program to be more transferable some researchers suggested that online instructions should use learning activities that assist learners to apply their learning to near situations within instructional processes through assignments and class projects, but also strongly recommended to use more reflective activities to apply learning to distant situations where the context of application is different from learning situations, which will eventually result in far transfer (Clark & Taylor, 1992). From an extended review of literature of online learning, seldom studies were found to address the issue of learning application within online learning environments. In view of these, current study examining the influence of core input variables (i.e., instructional variables, learner characteristics, study habits) on course outcomes which includes online learners' learning application is an important research endeavor to improve the current online instructional practices.

Theoretical Background

Learner characteristics were most commonly examined variables to predict success in online environments. In Contreras' study (2004), *self-confidence* in using computers was predicted by demographic variables, such as age, gender, ethnicity, socio-economic status, and geographic region. In another study, the same construct was used to predict the student's course performance (DeTure, 2004). While these studies are considered valuable to find variable relationships influencing certain dependent variables, they seemed narrow in their scope to examine the effect

of key variables in learner and instructional conditions. In order to develop a more viable research framework that will guide our study, we grouped various learner and instructional variables into similar types together as shown in Table 1.

From the review of research studies on demographic learner variables, gender was found to be one of the most frequently examined. In one study, female students reported more belonging-feeling toward the learner and the social community with greater knowledge gains (Rovai & Baker, 2005). More female adult learners of online courses said that their course experiences were positive (Sullivan, 2001). From another study using a medical post-graduate student group, male students tend to use more formal and lengthier messages in online discussions compared to those of their counterparts (Taplin & Jegede, 2001). In some studies, gender was not a significant factor to predict the learners' self-confidence in using computers (Contreras, 2004) and the use of the computers and the Internet for online learning (Atan, Sulaiman, Rahman, & Idrus, 2004). Contreras (2004) reported that previous computer experiences and the number of online courses taken previously better predicted the students' confidence in taking online learning.

Learner support, such as providing online tutors, counselors, and student clubs, was another variable indicated as a significant factor affecting the quality of online education (Huett, Moller, & Young, 2004; LaPadula, 2003). Studies also reported that online learning activities, such as group conferencing, helped adult learners become more self-directed (Lee & Gibson, 2003). Sankaran and Bui (2001) stated that online learners without specific learning strategies performed poorer than those who used 'deep' or 'surface' strategies (e.g., taking notes or self practicing exercises). They also informed that less motivated learners did not perform on knowledge tests as well as motivated students. Study skills, such as study groups and active contacts and communications with the instructor, were reported as positively contributing to student success (King, Harner, & Brown, 2000). From the review of related literature, we classified numerous course-affecting variables into four categories: learner characteristics, study habits, instructional variables, and learning motivation and involvement (Table 1). For course outcomes variables, we included learner satisfaction, learning gains, and perceived learning application made by the students. In view of the tendency that the learners' course experiences are largely shaped by their traits and actions (strategies) guided by the imposed structure and processes (instructional variables), we attempted to group and identify major course-quality affecting variables accordingly.

Table 1 Operational Variables for the Current Study

<p>Learner characteristics</p> <ul style="list-style-type: none"> • Gender/age (DeTure, 2004; Sullivan, 2001; Tapiln & Jegede, 2001) • Distance learning/technology experience (Atan et al., 2004; Contreras, 2004) • Online learning preference over classroom <p>Study habits</p> <ul style="list-style-type: none"> • Browsing pattern • Procrastination tendency • Print of web content 	<p>Instructional variables</p> <ul style="list-style-type: none"> • Learning support (Huett et al., 2004) • Learning activities (Lee & Gibson, 2003) • Learning motivation (Sankaran & Bui, 2001) • Learning involvement • Instructor quality • Study workload <p>Learning motivation and involvement</p> <ul style="list-style-type: none"> • Learning motivation (Sankaran & Bui, 2001) • Learning involvement
<p>Course outcome variables</p> <ul style="list-style-type: none"> • Course satisfaction (Sullivan, 2001) • Learning gains (Rovai & Baker, 2005) • Learning application 	

Methodology

Research Questions: The purpose of this research study was to examine how online learners were different in instructional and course outcome variables based on learner characteristics and study habits. Also this study purported to identify what variables in learner characteristics, study habits, and instructional variables influenced course outcomes made by a group of online learners. Two research questions were developed to investigate the study purpose:

1. Do online learners show significant differences in course outcomes, instructional quality, and learning motivation and involvement based on learner characteristics and study habits?
2. What variables in learner characteristics, study habits, instructional variables, and learning motivation and involvement influence course outcomes in learner satisfaction, learning gains, and perceived learning application for an online course?

Participants: A group of undergraduate students were asked to participate in this study. The subjects for the study included 125 students (39 male and 86 female) who took a program evaluation course conducted online at a southeastern university. The students took the online course that required completion of thirteen learning modules for a semester period except the course orientation and project presentation meetings. The workload of one learning module was equivalent to that of one week's classroom instruction. Four sub-learning sections comprised one learning module. The online learning modules provided subject content in learner and program evaluation. Various types of media such as texts, graphics, audio, and video clips were used to deliver related subject content to the students. The course used the Blackboard system to deliver the learning content and manage administrative tasks for students' learning including grade posting, announcements posting, group formation, and communications. The students were required to complete various learning activities and assignments including group discussions, virtual case studies, pre/post tests, review quizzes, weekly assignments, and group and individual projects. The purpose of these learning activities was not only to aid learning but also for the online learners to apply learned knowledge and skills while learning. During the course

orientation, all learners were divided into peer groups composed of three to five students who were involved in group projects and various online activities for group engagement and learning.

Data Collection and Analysis: This study utilized an online questionnaire for data collection. Research about the use of online questionnaire compared to traditional paper-based questionnaire indicated that there are no significant differences between assessment techniques and results while the former method is more cost-efficient, reduces data entry errors, and increases survey accessibility (Miller et al. 2002; MacElroy, 1999). Other study also supported the use of online questionnaire due to its shorter data collection period compared to paper-based method (Raziano, Jayadevappa, & Valenzula, 2001). In this study, the online questionnaire was used to obtain the data about course outcomes (i.e., learners' perceived degree of learning and learning application), perceived instructional quality (i.e., instructor quality, learning activities, and learning support), perceived study workload, and learning involvement during their study. The questionnaire included question items using a five point Likert-type scale to measure the perceived degree of learning (1=do not understand to 5=completely understand) and perceived application of learning (1=none to 5=frequently use) of the eighteen learning objectives developed by the course instructor. Other sections of the online questionnaire included question items to measure learners' perception about the instructional variables and learning involvement during their study. This study also administered a knowledge test set to assess the learners' learning gain before and after each semester. Prior to conducting the data analysis, factor analysis was performed to screen variables within the course outcomes, instructional variables, and learning motivation and involvement factors that may have causal relationships in predicting course outcomes. Results from the factor analysis indicated that all scales within each variable fell into one single factor. Regarding the instruments to assess learning motivation sustained during the study by the students, we utilized the Learning Motivation Questionnaire (LMQ) composed of 24 question items representing the six sub categories (course relevancy, course interest, affect/emotion, reinforcement, self-efficacy, and learner control) (Lim & Kim, 2003). From an extended review of several instruments used for assessing learning motivation, we selected the LMQ for our study since it assesses various motivation types that may be utilized during an online learning. The LMQ used a five point Likert-type scale (1=strongly disagree to 5=strongly agree) to measure online learners' perceived level of learning motivation. From the data analysis, the reliability alphas were: .95 for the perceived learning, .93 for the learning application, and .70 for the knowledge test in course outcomes; .92 for the instructor quality, .73 for the quality of learning activity, and .91 for the learning support in instructional factors; and .65 for the study workload, .81 for the learning involvement, and .90 for the learning motivation in learner factors, respectively. To collect the pre and post survey data, the learners were asked to participate in the surveys conducted online at the beginning and at the end of each semester. The learning motivation data was collected through an online questionnaire at the end of each semester. Data collection was performed for five semesters including one summer semester between 2003 and 2005.

Basic descriptive statistics were used to analyze the population mean scores in the perceived degree of learning, knowledge test, perceived application of learning, instructional quality, learning involvement, and learning motivation responded by all learners. Pearson's correlations were calculated to test inter relationships between course outcomes and other learner and instructional variables. ANOVA was run to detect the difference in course outcomes based on learner characteristics and study habits. Regression analysis was conducted to assess the influence of learner and instructional variables on the course outcomes.

Findings

Differences in Learner Variables and Course Outcomes Based on Learner Characteristics and Study Habits

For the purpose of this study, the researchers categorized learner characteristics into gender, age, distance learning experience, online learning preference, and work status. In addition, their study habits were broken down into learners' browsing pattern during online learning, procrastination in learning, printing of web content, and learning interruption during learning. From the data analysis, the learners with different learner characteristics and study habits indicated different levels of mean scores for the course outcomes, perceptions about the instructional quality, and learning involvement and motivation. First, gender was insignificant in regards to the students' course satisfaction and learning outcomes. The mean scores of all course outcomes, instructional, and learner variables were not significantly different between male and female learners (Table 2). For age, learners between 20-29 years old appeared to have significantly higher mean scores in learning gain, posttest, learning activity, and learning support than other age group learners as shown in Table 4. For learners with previous distance learning experience, they seemed to have a significantly lower learning motivation mean score and less satisfied with the learning support than those who didn't have the same experience. Regarding online learning preference, those learners who preferred online learning method showed significantly higher mean scores for course satisfaction, posttest, learning gain, learning application, instructor quality, learning activity, learning motivation, and learning involvement than those who did not. For study habits, learners with browsing the online learning content from the very beginning page indicated a significantly higher mean score for the perceived study workload of the course than other learner groups who browsed the learning content from the whole to interested part and from the whole to the first part respectively. Interestingly, those learners who printed the online learning materials indicated significantly higher mean scores in course satisfaction, general workload, and learning involvement than their counterparts. In our study, learners with procrastination tendency showed significantly lower mean scores for course satisfaction, posttest, learning gain, learning motivation, and learning involvement than those learners without procrastination. Tables 2 and 3 present the online learners' respective mean and standard error scores based on learner characteristics and study habits.

Table 2 Mean and Standard Error Scores by Learner Characteristics

Category	Sub category	N	Course Outcomes			Instructional Quality			Learner Factors		
			Course Satisfaction	Learning Gain	Learning Application	Instructor Quality	Learning Activity	Learning Support	Study Load	Learning Motivation	Learning Involvement
Gender	Male	39	3.57 (.83)	3.05 (3.77)	3.73 (.71)	3.59 (1.05)	4.89 (3.30)	3.73 (.93)	3.59 (.85)	3.92 (.59)	3.62 (.89)
	Female	86	3.62 (.76)	2.52 (3.74)	3.61 (.57)	3.70 (1.00)	6.11 (3.41)	3.60 (.89)	3.62 (.80)	3.75 (.71)	3.69 (.85)
Age	18-19	87	3.53 (.85)	2.17 (3.31)	3.65 (.64)	3.62 (1.11)	3.43 (.95)	3.51 (.95)	3.62 (.85)	3.78 (.67)	3.60 (.97)
	20-29	27	3.88 (.41)	4.59 (3.92)	3.64 (.57)	3.83 (.66)	4.00 (.49)	4.02 (.70)	3.48 (.70)	4.00 (.66)	3.85 (.44)
	30 or older	11	3.55 (.73)	2.09 (5.15)	3.64 (.61)	3.61 (.95)	3.68 (.90)	3.76 (.62)	3.91 (.77)	3.39 (.60)	3.70 (.72)
Distance Learning Experience	Yes	99	3.61 (.75)	2.47 (3.76)	3.66 (.62)	3.66 (1.03)	3.55 (.92)	3.55 (.93)	3.67 (.78)	3.73 (.71)	3.68 (.81)
	No	26	3.59 (.89)	3.50 (3.60)	3.60 (.63)	3.71 (.99)	3.65 (.80)	3.98 (.71)	3.38 (.91)	4.05 (.46)	3.60 (1.03)
Online Learning Preference	Classroom	39	3.23 (.97)	1.41 (3.38)	3.41 (.57)	3.28 (1.14)	3.32 (.98)	3.52 (.94)	3.67 (.93)	3.43 (.69)	3.25 (1.06)
	Online	85	3.78 (.61)	3.31 (3.77)	3.78 (.58)	3.84 (.91)	3.68 (.84)	3.70 (.88)	3.58 (.77)	3.96 (.61)	3.85 (.68)

Table 3 Mean and Standard Error Scores by Study Habits

Category	Sub category	N	Course Outcomes			Instructional Quality			Learner Factors		
			Course Satisfaction	Learning Gain	Learning Application	Instructor Quality	Learning Activity	Learning Support	Study Load	Learning Motivation	Learning Involvement
Browsing Pattern*	WI	17	3.31 (.93)	2.18 (2.51)	3.65 (.72)	3.32 (1.17)	3.31 (.79)	3.63 (.95)	3.09 (.94)	3.54 (.78)	3.37 (1.06)
	WF	43	3.80 (.65)	2.72 (3.31)	3.73 (.50)	3.88 (.93)	3.77 (.82)	3.69 (.77)	3.71 (.64)	3.93 (.60)	3.38 (.66)
	FF	61	3.55 (.80)	2.84 (4.29)	3.62 (.63)	3.61 (1.02)	3.50 (.96)	3.59 (.98)	3.68 (.85)	3.78 (.68)	3.61 (.92)
Procrastination	Yes	66	3.46 (.89)	2.02 (3.48)	3.58(.63)	3.51 (1.12)	3.45 (.96)	3.54 (1.00)	3.63 (.87)	3.64 (.73)	3.47 (.98)
	No	58	3.78 (.59)	3.50 (3.91)	3.76 (.56)	3.85 (.85)	3.71 (.81)	3.76 (.76)	3.59 (.76)	3.96 (.57)	3.88 (.66)
Material Printing	Yes	82	3.74 (.67)	2.84 (4.16)	3.72 (.58)	3.75 (1.00)	3.57 (.90)	3.54 (.93)	3.78 (.66)	3.82 (.68)	3.80 (.73)
	No	42	3.35 (.91)	2.45 (2.80)	3.55 (.64)	3.50 (1.04)	3.56 (.91)	3.84 (.82)	3.29 (1.00)	3.77 (.68)	3.40 (1.03)

* Learners' study habits in reading online learning content (WI-Whole content then interested ones, WF-Whole content then the 1st page, FF-From the 1st page).

Table 4
ANOVA Results According to Learner Characteristics and Study Habits

Category	Study variables	Subcategory	N	Mean (SD)	<i>p</i> -value
Age	Learning gain	18-19	87	2.17 (3.31)	.010
		20-29	27	4.59 (3.92)	
		30 or older	11	2.09 (5.15)	
	Posttest	18-19	87	10.67 (3.37)	.048
		20-29	27	12.56 (3.53)	
		30 or older	11	11.60 (4.12)	
	Learning activity	18-19	87	3.43 (.95)	.015
		20-29	26	4.00 (.49)	
		30 or older	11	3.68 (.90)	
	Learning support	18-19	87	3.51 (.95)	.029
		20-29	27	4.02 (.70)	
		30 or older	11	3.76 (.62)	
Distance learning experience	Learning support	Yes	99	3.55 (.93)	.032
		No	26	3.98 (.71)	
	Learning motivation	Yes	79	3.73 (.71)	
		No	23	4.05 (.46)	
Online learning preference	Course satisfaction	Online	85	3.78 (.61)	<.001
		Classroom	39	3.23 (.97)	
	Posttest	Online	84	11.69 (3.47)	.013
		Classroom	37	9.97 (3.41)	
	Learning gain	Online	85	3.31 (3.77)	.008
		Classroom	39	1.41 (3.37)	
	Application	Online	85	3.78 (.58)	.001
		Classroom	39	3.41 (.57)	
	Instructor quality	Online	85	3.84 (.91)	.004
		Classroom	39	3.28 (1.14)	
	Learning activity	Online	84	3.68 (.84)	.036
		Classroom	39	3.32 (.98)	
Learning motivation	Online	72	3.96 (.61)	<.001	
	Classroom	30	3.43 (.69)		
Learning involvement	Online	85	3.85 (.68)	<.001	
	Classroom	39	3.25 (1.06)		
Browsing pattern	Study workload	WI	17	3.09 (.93)	.017
		WF	43	3.71 (.64)	
		FF	63	3.68 (.85)	
Material printing	Course satisfaction	Yes	82	3.74 (.67)	.007
		No	42	3.35 (.91)	
	Study workload	Yes	82	3.78 (.66)	.001
		No	42	3.29 (1.00)	
	Learning involvement	Yes	82	3.80 (.73)	.014
		No	42	3.40 (1.03)	
Procrastination	Course satisfaction	Yes	66	3.46 (.89)	.023
		No	58	3.78 (.59)	
	Posttest	Yes	64	10.45 (3.24)	.004
		No	57	11.96 (3.70)	
	Learning gain	Yes	66	2.02 (3.48)	.027
		No	58	3.50 (3.91)	
	Learning motivation	Yes	50	3.64 (.73)	.013
		No	52	3.96 (.57)	
	Learning involvement	Yes	66	3.47 (.98)	.008
		No	58	3.88 (.66)	

Influence of Instructional and Learner Variables on Course Outcomes: In analyzing the relationships between instructional and learner factors and the course outcomes, several noteworthy findings were obtained. First, the learners' mean score of satisfaction with the online course was significantly related with their mean scores in instructor quality, learning activity, learning support, learning motivation, and learning involvement except the study workload. Second, the learners' perceived learning mean score was significantly related with the mean scores in learners' learning motivation and involvement. Similarly, the learners' mean score of perceived learning application was significantly related with the mean scores of learning motivation and involvement, respectively. The mean scores of posttest and learning gain, however, did not show any significant relationships with the instructional and learner variables. Table 5 reports the analysis results.

Table 5
Correlations Between Learning Outcomes and Instructional and Learner Factors

	Instructor quality	Learning Activity	Learning Support	Study Workload	Learning Motivation	Learning Involvement
Course satisfaction	.614**	.606**	.371**	.096	.305**	.919**
Perceived learning	.170	.061	.121	.112	.556**	.263**
Posttest	-.041	-.059	-.084	-.132	.144	-.061
Learning gain	-.034	-.021	.019	-.171	.130	.021
Perceived application	.174	.069	.099	.137	.436**	.230**

* $p < .05$, ** $p < .01$ (Two-tailed tests)

While the method of correlation analysis has been widely used to detect specific relationships between study variables, researchers have recommended using multiple regression analyses to establish the relative predictive importance of the independent variables (Allison, 1999). In our study, we performed stepwise regression because this method is used in the exploratory phase of research (Kahane, 2001). When we conducted the stepwise regression, the findings about the influence of instructional and learner variables on course outcomes were consolidated around three variables. For course satisfaction, two variables in instructor quality and learning involvement explained 84% of the total variation to explain the effect of two variables on course outcomes. Regarding the learners' perceived learning, learning motivation explained about 37% of the total variation. Likewise, learning motivation also explained about 28% of the total variation for the learners' perceived learning application. From this analysis, it was inferred that instructor quality, learning motivation, and learning involvement were those influential variables predicting some dependent variables in course outcomes (see Table 6).

Table 6: *Stepwise Regression for Course Outcomes*

Course Outcomes	R^2	δR^2	Predictors	β
Course satisfaction	.840	.827	Learning involvement	.683 ^{***}
			Instructor quality	.125 [*]
Perceived learning	.373	.314	Learning motivation	.382 ^{***}
Perceived learning application	.284	.217	Learning motivation	.313 ^{***}

* $p < .05$, *** $p < .001$

Conclusion and Discussions

Among the several findings of this study, age was identified as an important mediating variable resulting in differences in course outcomes and the online learners' instructional perceptions about the quality of online course. The learners between 20-29 years old who might have more immediate needs to use the learning content to their current or future studies and jobs seemed to perform significantly better in their knowledge test and feel more satisfied with instructional quality of the online course. On the other hand, gender seemed not to be a differentiating variable in our study as similar findings were replicated from other studies (i.e., no difference in the use and self-confidence in using computers during online learning) (Atan, Sulaiman, Rahman, & Idrus, 2004; Contreras, 2004). Rather, in our study, the online learners' prior experience with distance learning was identified as more influential variable explaining meaningful differences in learning support and learning motivation. Parallel findings were noted from other studies, too (Huett, Moller, & Young, 2004; LaPadula, 2004). Some significant findings of this study, however, are related with the online learners' preference in delivery format and study habits. First, the online learners' preference of online learning method compared to classroom instruction was appeared to be an important learner variable making significant differences in their perceived learning outcomes, perceived instructional quality, and learning motivation and involvement from this study. Regarding study habits, this study found that the online learners' study habits or strategies affected the perceived quality of online learning experience and learning outcomes. Especially, the online learners' procrastination tendency was identified as an important variable making differences in course satisfaction, posttest mean scores, learning increase, and learning motivation and involvement. Regarding the online learners' learning strategy to study online learning material, this study revealed an interesting finding. In the browsing pattern of the online learners, those learners without any strategy (who just start reading from the very beginning) seemed to experience more study workload than those who had certain browsing strategies, such as moving from the whole to the interested section or to the beginning. To address this kind of various learning issues occurred in online learning environment, instructors and instructional designers are strongly recommended to use some valid instructional strategies to facilitate meaningful learning engagement during online learning. For example, the Institute of Higher Education Policy (2000) suggests several guidelines to address these issues in online learning design: (a) a reliable and fail-safe technology delivery system, (b) clear guidelines for class assignments and faculty feedback, (c) appropriate technology standards to deliver instruction, (d) meaningful learning experiences to demonstrate students' ability of analysis, synthesis, and evaluation of learning content, (e) facilitated interaction among students and between students and faculty, (f) facilitation of student self-

motivation and commitment, and (g) access to adequate technical assistance and orientation prior to the course.

In analyzing the effect of instructional and learner variables on course outcomes, findings indicated that those learners who were satisfied with instructional factors such as instructor quality, learning activity, and learning support were also satisfied with the online course as a whole while those who experienced more study workload were less satisfied with the course. For course outcomes, those online learners with high learning motivation and involvement seemed to have better results in their perceived learning and learning application. The online learners' learning motivation and involvement were also significantly correlated with their satisfaction with the online course. From these findings, the researchers could conclude that the course outcomes of the studied online learning program seemed to be mostly affected by the online learners' learning motivation and involvement more than any instructional variables. This conclusion is also supported by the result of the regression analysis indicating that the course outcomes were significantly influenced by the online learners' learning motivation and involvement. In order to provide greater learning engagement and promote learning motivation for online learners, Lim (2004) suggests several instructional strategies including: (a) providing timely and frequent feedback to engage students in the learning process, (b) facilitating direct communication experience among students and with instructors through alternative communication channels such as chat, threaded discussion, and audio/video conferencing, and (c) embedding some rewarding mechanisms other than grades during online instruction (e.g., checking students' learning progresses, sending frequent emails for feedback and encouragement, and sharing good examples of assignments accomplishments among peer learners).

The contribution of this study to the online education is three-fold. First, researchers and practitioners of online education can utilize the study findings about when and how online learners are satisfied with online courses in designing more learner oriented online courses. For example, it is an important task identifying learners' immediate needs for learning, prior online learning experience, and preference of online learning method to customize online learning courses meeting online learners' needs. Second, current study identified two important variables (learning motivation and learning involvement) and their mediating mechanism to influence course outcomes for an online learning course. This finding calls for special attention among instructional designers and instructors to utilize motivational strategies to result in a more outcome oriented online instruction. Third, the researchers provided several viable instructional strategies to address those study variables in online learning influential to learner satisfaction and learning outcomes.

Future Study and Limitations

This study has identified several meaningful findings about the influence of instructional and learner variables on an online course. While many research studies were considered scattered in nature by focusing only one or two learner or instructional variables in the study scope, this study utilized integrated approach to identify the effect of multiple learner and instructional variables on online learning. Some limitations of this research study were, however, that this study utilized a group of online learners' perception data to assess the course outcomes as part of data collection. The selection and size of the study subjects may also limit the generalization of the study findings. We collected the data from a group of undergraduate students who took an

online course within a university learning environment. For generalization, future studies to investigate similar construct with a more broad population in different learning environment are warranted.

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