



# Active Learning in Online Courses: An Examination of Students' Learning Experience

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This study examines students' perception toward their learning experience in an e-learning environment where active learning through regular and routine graded discussion activities/assignments is expected. Attention was given to the variables of age; gender; increased experience with online courses; and increased proficiency with the course management system. Gender was found to be a significant factor with regard to students' perception toward their learning experience in online courses. Discussion is carried out based on the results of the study. The discussion then shifts to a focus upon strengthening active learning in online courses and common ways in which active learning can be used effectively in online courses. Conclusions and recommendations for future research complete the paper.

**Keywords:** e-learning, learning, active learning, online education, learning experience

## Introduction

The proliferation of technology increases the ability for students to participate in online or distance learning. According to the Allen and Seaman (2011) report for Sloan Consortium titled *Going the distance: Online Education in the United States, 2011* over 6 million students are now taking at least one online course, representing over a 10% growth rate in online enrollment.

Working in an online classroom requires students and teachers to adapt to the environment. The online atmosphere allows greater flexibility in scheduling not only when students learn but also how they learn. Studies have shown that student-centered teaching methods are more effective in the following aspects: 'application of concepts, problem solving, attitude, motivation, group membership and leadership skills' (McKeachie, 1999; Pintrich & De Groot, 1990).

Through a variety of learning management systems and educational software teachers are able to engage online learners. Harper, O'Donoghue, Oliver and Lockyer (2001) suggest that educators must give close attention in using e-learning materials that are connected to pedagogical principals. It is important that the learning environment is designed with learners in mind,

is engaging, and is not 'just glorified PowerPoint presentations' (Feiertag & Berge, 2008, p. 463).

Learning is not achieved by simply listening to teachers, memorizing facts, or regurgitating answers. In order to learn, the students must talk about what they are learning, write about it, and relate the experience to their personal or professional life (Chickering & Gamson, 1987). Student engagement is one of the most important factors that contribute to the student's overall experience in a course (Floyd, Harrington & Santiago, 2009). Students are engaged and active in their learning when they are able to demonstrate extended attention to a mentally thought-provoking task, resulting in genuine learning and the ability to think critically (Corno & Donaldson, 1983).

Active learning means that students are involved in more than passive listening. Students are reading, writing, or discussing a topic. Less emphasis is placed on simple knowledge transfer and greater emphasis on the student developing skills to solve complex problems. Active learning places importance on the exploration of attitudes and values of students which should increase student motivation. Regular immediate feedback from the instructor is a very important aspect of active learning. Receiving immediate feedback enables students to be able to learn skills required to solve problems, thus enabling students to be involved in higher order thinking. Students move beyond simple memorizing of facts to being able to analyze, synthesize, and evaluate complex problems that may have multiple solutions (Bonwell & Eison, 1991).

Johnson (2011) found that good active learning classes: 1) focus on applying content; 2) are active, engaging, and technology friendly; 3) have meaningful learning; 4) use interesting instructional materials; and 5) provide opportunities to collaborate and cooperate. Active learning results in higher-order critical thinking and problem solving skills, and improved communication skills – all necessary skills in today's information age (Johnson, 2011).

Students that are engaged in active learning are able to move along the Active Learning Continuum; beginning with simple tasks and progressing to complex tasks. Simple tasks are usually defined as short and relatively unstructured, while complex tasks are typically longer in duration and involve a higher level of structure. It is important for students to not only complete the tasks involved in learning, but to understand what they are doing, why the task is important, and how the skills can be applied to similar situations or problems (Bonwell & Eison, 1991).

Adler suggests that all genuine learning is active, and the process of discovery works when the student is the main agent, not the teacher (Adler, 1982).

## The Study Setting

This study takes place in an e-learning environment where active learning via regular and routine graded discussion activities/assignments for all online courses is expected. We define active learning as activities/assignments that are central to student engagement and learning. The active learning is encouraged and enforced via the activities/assignments in the online courses. The activities/assignments include individual and/or team activities designed to actively involve students in the learning process. Students are required to interact with each other – individually and in small teams – to express their viewpoints, evaluate various viewpoints, and assess each others' progress via continuous feedback.

## Purpose of the Study

The purpose of this study was to examine students' perception toward their learning experience in an e-learning environment where active learning was expected and encouraged. Four research questions (RQ) streamed from the study's purpose:

- RQ1 *Is there a difference between students' age and their perception with learning experience in online courses?*
- RQ2 *Is there a difference between learners' gender and their perception with learning experience in online courses?*
- RQ3 *Is there a difference between learners' increased experience with online courses and their perception with learning experience in online courses?*
- RQ4 *Is there a difference between learners' increased proficiency with the course management system and their perception with learning experience in online courses?*

Age was selected because some studies have shown age gap in online courses in general (Allen & Seaman, 2007; Allen & Seaman, 2010) while others report no age differences in online learning environments (Shultz, Shultz, & Round, 2010; Yukselturk & Bulut, 2007).

Gender was selected because gender gap with technology has been reported in the literature since the 1980s with inconsistent results. Some studies have reported no significant differences between males and females (Shultz, Shultz, & Round, 2010; Yukselturk & Bulut, 2007). In other studies (Koohang, 1987; Hackett, Mirvis, & Sales, 1991), females exhibited a less positive view of technology than males did.

Literature has documented differences in users' increased prior experience with technology and users' increased prior experience with courseware in general. Users' increased prior experience with technology and users' in-

creased prior experience with courseware in general significantly contributed to their positive views about e-learning (Koohang, 2004a; Koohang 2004b).

## Study Design

### Instrumentation

The instrument (see Appendix A) was designed specifically around active learning associated with weekly activities/assignments in online courses of an IT program. The instrument consisted of 12 items. The instrument used a Likert-type scale that included the following scoring strategy: strongly agree = 5, agree = 4, neither agree nor disagree = 3, disagree = 2, and strongly disagree = 1.

The items of the instrument were specifically related to student active learning within the e-learning environment as described in the setting of this study. The items are as follows:

1. I like the idea that the course includes individual and/or team activities.
2. I like the various individual and/or group assignments/activities.
3. I believe that the assignments/activities in this course enhance my ability to understand and evaluate viewpoints.
4. The assignments/activities in this course encourage me to enhance my skills as a team member.
5. I feel at ease expressing my thoughts.
6. I feel at ease when interacting with other students.
7. I like the various ideas expressed by everyone in the class.
8. I believe that the multiple perspectives expressed by everyone in various assignments/activities contribute to my learning.
9. The timely feedback is very important to my progress.
10. I like interacting with fellow students.
11. I like discussion of different view points on a given subject.
12. I like the idea of being actively involved in the class.

The content validity of the instrument was determined by a panel of experts consisting of three professors. The panel of experts determined that the content of the instrument was appropriate to measure what it intended to measure.

Furthermore, the instrument was tested for reliability using 19 students who were enrolled in an online IT course. This sample was independent of the sample used in the actual study. The calculated Cronbach's alpha ( $\alpha = .93$ ) indicated that the instrument is reliable enough to measure students' perception of their learning experience in online courses.

### Sample Population & Procedure

After receiving permission from the IRB, the survey instrument was administered to 121 students who were enrolled in a four-year Information Technology program in a medium-sized higher education institution located in the southeast United States. Subjects were males and females with their age ranging from 18 to over 41. They were taking online courses in the following topics: introduction to information technology; Web design and development, networking essentials; systems analysis and design; database principles; project management; human computer interaction; information security; and senior capstone. These courses were conducted on a popular commercial e-learning content management system.

The subjects were assured that their participation in completing the survey was voluntary and that they must be 18 years of age or older to complete the survey. Furthermore, they were assured protection of their anonymity.

Of the 121 students, 115 completed the survey. Twelve of the completed surveys were not usable, thus eliminated. The final sample population included 103 usable surveys.

### Data Analysis

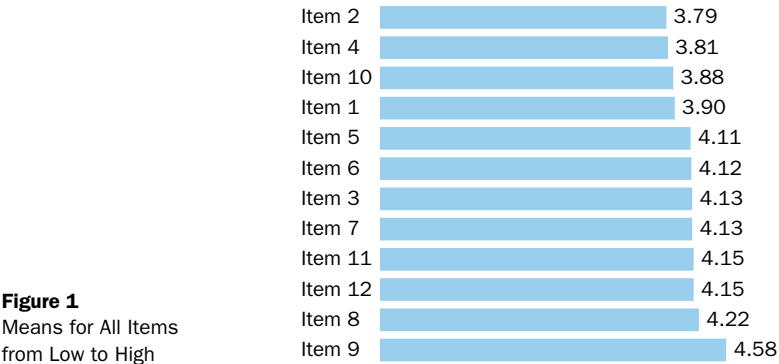
Collected data were analyzed via SPSS, a popular statistical analysis software. In addition to descriptive analyses, four separate one-way analyses of variance (ANOVA) procedures were conducted to answer the research questions. ANOVA procedure tests differences between means of two or more groups and uses the F statistic to test the statistical significance of the differences among the means. The predetermined level of significance was 0.05.

### Results

*Descriptives* Figure 1 depicts descriptive analysis for all the items of the instrument. The results show that students had positive perception toward their learning experience in the e-learning environment where active learning was expected and encouraged.

*RQ1* Is there a difference between students' age and their perception with learning experience in online courses? Results of one-way ANOVA (See Table 1) indicate no significant difference for age ( $F_{4,98} = .715$ ,  $p = .715$ ). There was no significant difference among the levels of age and students' perception with learning experience in online courses. Overall, all students in this category expressed high perception towards their learning experience in online courses. Descriptive results were as follows:

- Level 1 = 18–23 Years (Mean = 4.0215,  $N = 31$ ,  $SD = .56723$ )



**Figure 1**  
Means for All Items  
from Low to High

- Level 2 = 24–29 Years (Mean = 4.0402,  $N = 29$ ,  $SD = .55707$ )
- Level 3 = 30–35 Years (Mean = 4.2000,  $N = 20$ ,  $SD = .46232$ )
- Level 4 = 36–41 Years (Mean = 4.0093,  $N = 9$ ,  $SD = .43590$ )
- Level 5 = Over 41 Years (Mean = 4.1607,  $N = 14$ ,  $SD = .46394$ )

RQ2 Is there a difference between learners’ gender and their perception with learning experience in online courses? Results of one-way ANOVA (See Table 2) revealed a significant difference for gender ( $F_{1,101} = 6.539$ ,  $p = .012$ ). There was a significant difference between males and females in regard to their perception with learning experience in online courses. Male students significantly scored higher in regard to their perception with learning experience in online courses than female students did. Descriptive results were as follows:

- Level 1 = Male (Mean = 4.1784,  $N = 64$ ,  $SD = .52869$ )
- Level 2 = Female (Mean = 3.9167,  $N = 39$ ,  $SD = .45963$ )

RQ3 Is there a difference between learners’ increased experience with online courses and their perception with learning experience in online courses? Results of one-way ANOVA (See Table 3) indicate no significant difference for increased experience with online courses ( $F_{3,99} = .937$ ,  $p = .426$ ). There was no significant difference among the levels of increased

**Table 1** ANOVA for E-Learning and Age

	SS	df	MS	F	Sig.
Between Groups (Combined)	.576	4	.144	.528	.715
Within Groups	26.721	98	.273		
Total	27.297	102			

**Notes** SS – Sum of Squares, MS – Mean Square.

**Table 2** ANOVA for E-Learning and Gender

	SS	df	MS	F	Sig.
Between Groups (Combined)	1.660	1	1.660	6.539	.012
Within Groups	25.637	101	.254		
Total	27.297	102			

**Notes** SS – Sum of Squares, MS – Mean Square.

**Table 3** ANOVA for E-Learning and Experience with Online Courses

	SS	df	MS	F	Sig.
Between Groups (Combined)	.753	3	.251	.937	.426
Within Groups	26.544	99	.268		
Total	27.297	102			

**Notes** SS – Sum of Squares, MS – Mean Square.

**Table 4** ANOVA for E-Learning and Proficiency with CMS

	SS	df	MS	F	Sig.
Between Groups (Combined)	.588	2	.294	1.101	.336
Within Groups	26.709	100	.267		
Total	27.297	102			

**Notes** SS – Sum of Squares, MS – Mean Square.

experience with online courses and students' perception with learning experience in online courses. Overall, all students in this category expressed roughly equally high perception towards their learning experience in online courses. Descriptive results were as follows:

- Level 1 = 1–2 Online Courses (Mean = 3.9948,  $N = 16$ ,  $SD = .73123$ )
- Level 2 = 3–5 Online Courses (Mean = 3.9417,  $N = 20$ ,  $SD = .49345$ )
- Level 3 = 6–10 Online Courses (Mean = 4.1509,  $N = 37$ ,  $SD = .47825$ )
- Level 4 = More than 10 Online Courses (Mean = 4.1278,  $N = 30$ ,  $SD = .44190$ )

**RQ4** Is there a difference between learners' increased proficiency with the course management system and their perception with learning experience in online courses? Results of one-way ANOVA (See Table 4) indicate no significant difference for increased proficiency with the course management system ( $F_{2,100} = 1.101$ ,  $p = .336$ ). There was no significant difference among the levels of increased proficiency with the course management system and students' perception with learning experience in online courses. Overall, all students in this category expressed roughly equally high perception towards their learning experience in online courses. Descriptive results were as follows:

- Level 1 = Excellent (Mean = 4.1172,  $N = 59$ ,  $SD = .49473$ )
- Level 2 = Good (Mean = 4.0658,  $N = 38$ ,  $SD = .51266$ )
- Level 3 = Average (Mean = 3.7917,  $N = 6$ ,  $SD = .74675$ )
- Level 4 = Weak (no subject reported weak proficiency with the course management system)

## Discussion

This study examined students' perception toward their learning experience in online courses where active learning is central to the learning process. Descriptive analyses revealed that students in general have a very high perception toward active learning and that the design of active learning in online courses contributes positively to their learning experience. This study, therefore, recommends that active learning elements be included in the design of online courses. The design of active learning elements in online courses should focus on continuously engaging students in the process of learning by providing activities/assignments that allow students to actively explore and create knowledge together. These activities/assignments should promote discussion that includes exchange of viewpoints, collaborative discourse that will lead students beyond what they already know. In addition, routine feedback and assessment should be designed in the activities/assignments to make sure students are progressing in their learning.

Four research questions were formed to see whether there were significant differences among the levels of independent variables (age; gender; increased experience with online courses; and increased proficiency with the course management system) and the dependent variable of students' learning experience in online courses where active learning is central to the learning process.

Age, increased experience with online courses and increased proficiency with the course management system did not yield significant differences in students' learning experience in online courses. The means were equally high among the levels of all these independent variables and the dependent variable. These findings are consistent with prior studies and reaffirm that age, increased experience with online courses, and increased proficiency with the course management system do not play significant roles in students' experience in online learning.

Gender made a significant difference in regard to students' learning experience in online courses where active learning is central to the learning process. Male students had a significantly higher perception towards their learning experience in online courses than female students did. This finding suggests that the design of active learning in activities/assignments for online courses could be modified to better target the differences in learning



styles of both males and females. Further research is needed to delineate the reason or reasons for this finding.

This study provides insight into the perceptions of students in online classes where educators embrace and create an active learning environment. The findings about age, increased experience with online courses, and increased proficiency with the course management system may be due to increased and growing participation of students in online courses in general. Further studies on gender may help understand the improved design of active learning elements in activities/assignments for both males and females, giving special attention to females and their style of learning in online environments. By offering a learning environment that is attractive to both genders, perceptions of the learning experience may improve. Continued studies of online students can help us better understand what types of learning activities work well and avoid using the ones that do not work well.

This study is not without limitations. It must be noted that this population must be considered a purposeful sample and its members comprise a subset of the online student population. Participants were enrolled in online information technology courses in a medium-sized higher education institution in the southeast United States. The results may not be regarded as generalizable from the sample to the general online student population.

### **Appendix A: E-Learning Experience Survey**

The purpose of this survey is to assess IT students' opinion about their learning experience in online courses.

Notes: Your participation in completing this survey is absolutely voluntary. You must be 18 years or older to complete this survey. All your responses are kept confidential. Do not put your name on this survey.

#### **Section 1: Demographics**

Please answer the following questions by circling the appropriate number:

1. Your age:
  - 1 = 18–23 Years
  - 2 = 24–29 Years
  - 3 = 30–35 Years
  - 4 = 36–41 Years
  - 5 = Over 41 Years
2. Your Gender:
  - 1 = Male
  - 2 = Female
3. How many online courses have you taken:
  - 1 = 1–2
  - 2 = 3–5
  - 3 = 6–10

4 = More than 10

4. College Status:

1 = Freshman

2 = Sophomore

3 = Junior

4 = Senior

5. Rate Your Proficiency with using the MSC Vista:

1 = Excellent

2 = Good

3 = Average

4 = Weak

**Section 2: Your opinion about the learning experience in online courses**

Using the scale below, please indicate your response to each of the items that follow by circling the number that best describes your opinion about your experience with the online course you are taking (5 = strongly agree, 4 = agree, 3 = neither agree nor disagree, 2 = disagree, 1 = strongly disagree).

1. I like the idea that the course includes individual and/or team activities

5 4 3 2 1

2. I like the various individual and/or group assignments/activities

5 4 3 2 1

3. I believe that the assignments/activities in this course enhance my ability to understand and evaluate view-points

5 4 3 2 1

4. The assignments/activities in this course encourage me to enhance my skills as a team member

5 4 3 2 1

5. I feel at ease expressing my thoughts

5 4 3 2 1

6. I feel at ease when interacting with other students

5 4 3 2 1

7. I like the various ideas expressed by everyone in the class

5 4 3 2 1

8. I believe that the multiple perspectives expressed by everyone in various assignments/activities contribute to my learning

5 4 3 2 1

9. The timely feedback is very important to my progress

5 4 3 2 1

10. I like interacting with fellow students

5 4 3 2 1

11. I like discussion of different view points on a given subject

5 4 3 2 1

12. I like the idea of being actively involved in the class

5 4 3 2 1

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