

A Comparative Study On Learning Outcomes Of Web Based Vs. Classroom Based Instruction

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ABSTRACT

This study investigates and compares the learning outcomes and student satisfaction of classroom versus web based instruction of the EDE4341 - Technology and Learning in Elementary and Middle Schools offered to preservice teachers in the Elementary Education program at Florida State University during Spring & Summer 2004 semesters. While 20 students enrolled spring 2004 section which was taught face to face, 22 students enrolled Summer 2004 section which was taught online by the same instructor.

INTRODUCTION

Countless evaluative literature has pointed to the conclusion that there is “no significant difference” between the face-to-face and the various models of distance learning, especially Internet based distance education (Russell 2000, Wegner et al., 1999). Examination of test scores and satisfaction survey results from the participants are used as evidence for most of these studies. Nevertheless, there exists the other face of the fact that some authorities still maintain that traditional classroom instruction is never equal to online education (Phipps & Merisotis, 1999). One critic even branded virtual schools as “digital diploma mills” (Noble 1997). There is thus a perceptible need to confirm or disconfirm the claims of both camps regarding comparable effectiveness between traditional teaching and online teaching.

This study investigates and compares the learning outcomes and student satisfaction of classroom versus web based instruction of the EDE4341 - Technology and Learning in Elementary and Middle Schools offered to preservice teachers in the Elementary Education program at Florida State University during Spring & Summer 2004 semesters. While 20 students enrolled spring 2004 section which was taught face to face, 22 students enrolled summer 2004 section which was taught online by the same instructor.

HYPOTHESIS

Web-based (distance education) instruction of EDE4341 (Technology and Learning in Elementary and Middle Schools) provided to Elementary Education pre-service teachers at FSU- Panama City Campus during Spring 2004 and Summer 2004 semesters will bring about the educational learning outcomes and course satisfaction comparable to that of face-to-face instruction.

RESEARCH QUESTIONS

- What effect does being instructed in a web-based learning environment have on pre-service elementary teachers' learning outcomes in comparison with that of being instructed in a face-to-face learning environment?

- What effect does being instructed in a web-based learning environment have on pre-service elementary teachers' course satisfaction in comparison with that of being instructed in a face-to-face learning environment?

METHODOLOGY

A quasi-experimental pretest- posttest design with a control group employed to the study.

$N_1 \rightarrow O_1 \rightarrow O_2 \rightarrow X_1 \rightarrow O_3 \rightarrow O_4 \rightarrow O_5 \rightarrow O_6$

$N_2 \rightarrow O_1 \rightarrow O_2 \rightarrow X_2 \rightarrow O_3 \rightarrow O_4 \rightarrow O_5 \rightarrow O_6$

N_1 -Pre-service elementary education teachers at FSU who will be instructed EDE4341 in a face-to-face classroom environment. (Control Group)

N_2 -Pre-service elementary education teachers at FSU who will be instructed EDE4341 in a web-based environment. (Experiment Group)

O_1 – Online Readiness & Learning Style Survey

O_2 – Pretest: A computer literacy test

X_1 – Face-to-face instruction of EDE4341

X_2 – Web based instruction of EDE4341

O_3 – Final exam that is a cumulative assessment of students learning in EDE4341

O_4 – FSU Teaching Evaluation Form (SPOT)

O_5 – A Focus group with randomly selected groups of students from both experimental and control groups.

O_6 – Student portfolios.

DATA COLLECTION

Both quantitative and qualitative methods used to collect data for the study.

Quantitative data collected using the following instruments:

- Online Readiness & Learning Style Survey
- Computer Literacy Test (Pre-test),
- Final exam (Post-test),
- FSU Teaching Evaluation Form (SPOT) (course satisfaction),
- Student Portfolios and
- Student Grades

Qualitative data collected using a

- Focus group with randomly selected students from both experiment and control groups. See below for more information and appendix for samples of instruments.

DATA ANALYSIS

At the beginning of each class sessions, a 96 item survey was given the students to collect demographic information and to investigate students' learning style and online readiness. The findings from the survey as follows:

Demographic Information

Method	Enrolled	Gender	Age	GPA	Learning Style
Classroom	20	20F	26.75	3.71	Participant-Collaborative-Dependent
Online	22	22F	28.77	3.58	Participant-Collaborative-Dependent-Independent

Online Readiness

All of the students (100%) enrolled to this study had at least one computer with Internet connection at home. Also online readiness survey showed that both groups had the required computer knowledge and skills to take an online course.

Comparing Pretest Scores

The pre-test exam was given to students from both classroom and online sections to determine students' previous knowledge on the course content.

Method		Pre-test Scores			
Classroom Based		25, 31, 32, 33, 34, 36, 37, 37, 38, 43, 44, 44, 44, 46, 47, 48, 49, 49, 51, 55			
Online Based		31, 34, 35, 35, 36, 37, 37, 38, 38, 38, 39, 39, 39, 39, 40, 42, 43, 44, 44, 47, 52, 52			
Student's t test for independent samples / two-tailed test					
Sample	Sample size	Mean	Variance	SD	Standard-error
Classroom	20	41.150	62.134	7.883	1.763
Online	22	39.955	28.522	5.341	1.139

Using XSLAT, the following comparison results achieved. Decision: At the level of significance Alpha=0.050 the decision is to not reject the null hypothesis that (Mean1 - Mean2) is equal to 0.005. In other words, the difference between (Mean1 - Mean2) and 0.005 is not significant.

Comparing Post-Test Scores

The pre-test exam was given to students from both classroom and online sections to determine students' previous knowledge on the course content.

Method		Post-test Scores			
Classroom Based		60, 55, 57, 58, 64, 66, 68, 60, 58, 64, 70, 68, 68, 70, 61, 70, 71, 69, 72, 70			
Online Based		58, 50, 54, 56, 61, 59, 55, 60, 59, 60, 59, 67, 68, 66, 68, 65, 68, 70, 65, 70, 71, 72			
Student's t test for independent samples / two-tailed test.					
Sample	Sample size	Mean	Variance	SD	Standard-error
Classroom	20	64.950	29.481	5.424	1.231
Online	22	62.773	38.470	6.202	1.332

Using XSLAT, the following comparison results achieved. Decision: At the level of significance Alpha=0.050 the decision is to not reject the null hypothesis that (Mean1 - Mean2) is equal to 0.005. In other words, the difference between (Mean1 - Mean2) and 0.005 is not significant.

Comparing Pre-test & Post-test Scores

The pre and post-test data also indicates that the classroom based class showed %56.09 percent improvement while online based class showed %58.97 percent of improvement between pre and posttest scores at the end of each sessions.

Comparing Course Satisfaction (SPOT)

The Student Perception of Teaching survey given students to measure preservice teachers' course satisfaction from both sessions. The survey includes 26 questions collecting students' feedback on Course & Instructor Details, Overall Course & Instructor Assessment, and SUSSAI (State University System Student Assessment of Instruction).

The answers to SPOT survey coded as follows,

1.00 to 1.49 Strong disagreement	(Highly Negative)
1.50 to 2.49 Disagreement	(Negative)
2.50 to 3.49 Neutral	(Neutral)
3.50 to 4.49 Agreement	(Positive)
4.50 to 5.00 Strong agreement	(Highly Positive)

Method	Course & Instructor Details	Overall Course & Instructor Assessment	SUSSAI (State University System Student Assessment of Instruction)	Overall (Mean)
Classroom	4.83	4.85	4.86	Mean1 = 4.847
Online	4.65	4.94	4.91	Mean2 = 4.833

Using XSLAT, the following comparison results achieved. Decision: At the level of significance Alpha=0.050 the decision is to not reject the null hypothesis that (Mean1 - Mean2) is equal to 0.005. In other words, the difference between (Mean1 - Mean2) and 0.005 **is not significant**.

Student Portfolio Evaluation

Student portfolio was the main assignment of the course required for both classroom and online sessions. Each student had a portfolio which includes thirteen assignment completed at the end of the semester. The portfolio was graded using a rubric by both course instructor and a colleague to maintain objective results.

Method	Portfolio Completed	Portfolio Grade (Mean)	Overall Grade (Mean)
Classroom	100%	97%	98%
Online	100%	94%	96%

Focus Group Interview

At the end of both sessions, a focus group interview conducted by a colleague to collect data about the course and student satisfaction from the course with 6 randomly selected students from each session.

CONCLUSION

The study findings shows that online instruction of EDE4341 (Technology and Learning in Elementary and Middle Schools) provided to Elementary Education pre-service teachers at FSU- Panama City Campus during Spring 2004 and Summer 2004 semesters brought about the educational learning outcomes and course satisfaction comparable to that of face-to-face instruction. In other words, the findings of the study indicates that there is no significant difference between the learning outcomes (pre-test, post-test, student grades, portfolio) and student satisfaction (SPOT Survey) of the classroom and online version of the course.

The most common statements form the focus group interviews as follows,

Classroom Based	Online
<ul style="list-style-type: none">• The course was a success• Very satisfied from the course and instructor• Course content was appropriate to their major and level• The course improved their computer knowledge and skills• Posting materials online helps them to review• Instructor help is a main factor to success• Step by step instruction helps them learn effectively• They enjoyed online projects especially WebQuest and Weblesson• If this course offered online, the students should be informed before enrolling the course to make right decision• Most of them would not take this course, if offered online	<ul style="list-style-type: none">• The course was a success• Very satisfied from the course, instructor and course website• They did not have any technical problem reaching the course website• Discussion board was the main tool for them to learn• The layout of the course on the course website was very useful and help them easily navigate• Instructor answered questions promptly• The course handbook was a big help and a must for the future online course• Course content was appropriate to their major and level

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