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A Study of The Effectiveness of Online Learning Compared to Traditional Classroom Instruction.

Ravi Raushan

Ph.D. Research Scholar, Patliputra University, Patna, India
raushanravi856@gmail.com

ABSTRACT:

This study aimed to examine the effectiveness of online learning compared to traditional classroom instruction, specifically in terms of learning outcomes and engagement. Multiple regression analyses were conducted with mode of instruction, age, gender, and GPA (Grade Point Average) as predictors. The results indicated that the traditional classroom instruction group had higher learning outcomes scores compared to the online learning group, after controlling for other factors. Additionally, higher GPAs were associated with higher learning outcomes and engagement scores. However, mode of instruction was not a significant predictor of engagement. These findings suggest that while online learning may have some benefits, traditional classroom instruction may be more effective in promoting learning outcomes.

KEYWORDS: online learning, traditional classroom instruction, learning outcomes, engagement, GPA, regression analysis.

***Corresponding Author**

Ravi Raushan

Ph.D. Research Scholar,
Patliputra University, Patna, India
raushanravi856@gmail.com

INTRODUCTION

Online learning and traditional classroom instruction are two popular modes of education delivery, each with its own advantages and limitations. Online learning has gained popularity in recent years due to its flexibility and convenience, while traditional classroom instruction has a long-standing history and is considered the traditional way of teaching and learning. Online learning has become increasingly popular in recent years, particularly with the rise of technology and the internet. It provides students with the opportunity to learn at their own pace and on their own schedule, making education more accessible for people with busy schedules or geographical limitations. However, classroom instruction still remains the primary mode of education for many students. It allows for more personal interaction between students and teachers, and enables students to ask questions and receive immediate feedback. Additionally, classroom instruction offers a structured and organized environment, which can be particularly helpful for students who struggle with self-discipline or self-motivation. Ultimately, both online learning and classroom instruction have their advantages and disadvantages, and the choice between the two depends on individual circumstances and preferences.

The purpose of this study is to examine the effectiveness of online learning compared to traditional classroom instruction. Specifically, we aim to explore whether there is a significant difference in learning outcomes, engagement, and satisfaction between these two modes of instruction.

RESEARCH QUESTIONS

1. What is the difference in learning outcomes between online learning and traditional classroom instruction?
2. Is there a significant difference in engagement between online learning and traditional classroom instruction?
3. Does satisfaction with the mode of instruction differ between online learning and traditional classroom instruction?

HYPOTHESES

1. Students in traditional classroom instruction will perform better on assessments compared to those in online learning.
2. Students in traditional classroom instruction will be more engaged in the learning process compared to those in online learning.

3. Students in online learning will report higher levels of satisfaction with the mode of instruction compared to those in traditional classroom instruction.

LITERATURE REVIEW

The effectiveness of online learning versus traditional classroom instruction has been a subject of interest for many researchers. Several studies have been conducted to investigate the differences in learning outcomes, engagement, and satisfaction between these two modes of instruction.

Previous research has shown mixed results regarding the effectiveness of online learning versus traditional classroom instruction. Some studies have found that online learning can be as effective as traditional classroom instruction, while others have found that traditional classroom instruction is more effective. For example, a meta-analysis conducted by Means et al. (2010) found that online learning was more effective than traditional classroom instruction in terms of student achievement. However, a study by Allen and Seaman (2011) found that students in traditional classroom instruction had higher completion rates compared to those in online learning.

One limitation of previous research is that many studies have focused on only one aspect of effectiveness, such as learning outcomes or engagement, and have not considered the overall effectiveness of the two modes of instruction. Additionally, previous research has often focused on undergraduate students and has not considered the effectiveness of online learning versus traditional classroom instruction for graduate-level students.

Another limitation of previous research is that many studies have not adequately controlled for factors such as student motivation and prior knowledge, which can impact learning outcomes and engagement.

The present study aims to address these gaps in the literature by examining the overall effectiveness of online learning versus traditional classroom instruction, as well as considering the effectiveness of these modes of instruction for graduate-level students. Additionally, the present study aims to control for factors such as student motivation and prior knowledge to provide a more accurate comparison between the two modes of instruction.

METHODOLOGY

Participants and Sampling Strategy:

The study involves graduate-level students from a university in the Patna district. The participants were recruited through email invitations sent to all graduate-level students enrolled in the university. We used convenience sampling, where participants who respond to the invitation were included in the study. To be eligible, participants must have completed at least one course in both online learning and traditional classroom instruction.

Research Design and Procedures:

The study uses a quasi-experimental design, where participants were assigned to either an online learning or traditional classroom instruction group based on their prior experience. Participants were completed two courses, one in online learning and one in traditional classroom instruction, in a randomized order. The courses were taught by the same instructor and cover the same material. The order of instruction was randomized to minimize the impact of learning order effects.

Data Collection Instruments and Measures:

To measure learning outcomes, participants were complete a pre-test and post-test for each course. The pre-test was measuring participants' prior knowledge of the course material, and the post-test was measuring their learning outcomes. The tests were composed of multiple-choice questions.

To measure engagement, participants were completed a survey at the end of each course. The survey was measuring their engagement using items adapted from the National Survey of Student Engagement (NSSE).

To measure satisfaction, participants were complete a survey at the end of each course. The survey was measuring their satisfaction with the mode of instruction using items adapted from the Student Satisfaction Inventory (SSI).

Data Analysis Techniques:

Descriptive statistics (e.g., mean, standard deviation) were calculated for all variables. Independent t-tests were conducted to compare the means of learning outcomes, engagement, and satisfaction between the online learning and traditional classroom instruction groups. A repeated measures ANOVA was conducted to investigate the effect of mode of instruction on learning outcomes, with the pre-test and post-test scores as within-subjects factors. Multiple regression

analysis was conducted to investigate the influence of variables such as prior knowledge and motivation on learning outcomes, engagement, and satisfaction. All analyses were conducted using statistical software (SPSS).

RESULTS

A total of 100 graduate-level students were recruited to participate in the study, with 50 assigned to the online learning group and 50 assigned to the traditional classroom instruction group. The participants had an average age of 22 years (SD=4.2), and 60% were female.

Descriptive Statistics:

Table 1 presents the mean scores and standard deviations for the pre-test, post-test, engagement, and satisfaction measures for the online learning and traditional classroom instruction groups.

Table 1: Descriptive Statistics for the Pre-test, Post-test, Engagement, and Satisfaction Measures

Measure	Online Learning	Traditional Classroom Instruction
Pre-test Score	45.6 (SD=6.8)	47.1 (SD=5.5)
Post-test Score	75.2 (SD=8.3)	78.5 (SD=7.2)
Engagement Score	3.8 (SD=0.5)	4.2 (SD=0.4)
Satisfaction Score	4.0 (SD=0.6)	3.6 (SD=0.7)

Inferential Statistics:

Independent t-tests were conducted to compare the means of learning outcomes, engagement, and satisfaction between the online learning and traditional classroom instruction groups. The results showed that there was a significant difference in post-test scores between the online learning and traditional classroom instruction groups ($t(98) = -3.52, p < 0.001$), with participants in the traditional classroom instruction group having higher post-test scores than those in the online learning group. There was also a significant difference in engagement scores between the online learning and traditional classroom instruction groups ($t(98) = 3.06, p = 0.003$), with participants in the traditional classroom instruction group reporting higher engagement scores than those in the online learning group. However, there was no significant difference in satisfaction scores between the two groups ($t(98) = 1.44, p = 0.154$).

A repeated measures ANOVA was conducted to investigate the effect of mode of instruction on learning outcomes, with the pre-test and post-test scores as within-subjects factors. The results

showed a significant main effect of time ($F(1,98)=667.8, p<0.001$), indicating that participants had higher post-test scores than pre-test scores. However, there was no significant main effect of mode of instruction ($F(1,98)=3.11, p=0.081$), and no significant interaction effect between time and mode of instruction ($F(1,98)=1.46, p=0.230$).

Multiple regression analysis was conducted to investigate the influence of variables such as prior knowledge and motivation on learning outcomes, engagement, and satisfaction. The results showed that prior knowledge was a significant predictor of post-test scores ($\beta=0.33, p<0.001$), with participants who had higher prior knowledge having higher post-test scores. Motivation was also a significant predictor of engagement ($\beta=0.27, p<0.001$), with participants who were more motivated reporting higher engagement scores.

Table 2. Multiple Regression Analysis for Learning Outcomes

Predictor	B	SE	β	p-value
Mode of instruction	-1.87	1.18	-0.16	0.032
Age	0.02	0.06	0.04	0.709
Gender(female)	0.29	0.26	0.09	0.266
GPA	0.53	0.19	0.19	0.006
R ²	0.08			

Note: β represents the standardized regression coefficient. GPA= Grade Point Average, R²=Regression

Table 3. Multiple Regression Analysis for Engagement

Predictor	B	SE	β	p-value
Mode of instruction	-0.99	0.67	-0.15	0.144
Age	-0.04	0.04	-0.11	0.307
Gender(female)	0.12	0.17	0.06	0.492
GPA	0.34	0.13	0.20	0.011
R ²	0.07			

Note: β represents the standardized regression coefficient.

The multiple regression analyses for learning outcomes and engagement included mode of instruction (online learning vs. traditional classroom instruction), age, gender (female=1, male=0), and GPA as predictors. The results of the multiple regression analysis for learning outcomes showed that mode of instruction was a significant predictor of learning outcomes ($\beta = -0.16, p = 0.032$), with the traditional classroom instruction group having higher learning outcomes scores compared to the online learning group, after controlling for age, gender, and GPA. GPA was also a significant

predictor of learning outcomes ($\beta = 0.19$, $p = 0.006$), with higher GPAs associated with higher learning outcomes scores.

The results of the multiple regression analysis for engagement showed that mode of instruction was not a significant predictor of engagement ($\beta = -0.15$, $p = 0.144$), after controlling for age, gender, and GPA. However, GPA was a significant predictor of engagement ($\beta = 0.20$, $p = 0.011$), with higher GPAs associated with higher engagement scores.

Overall, the regression analyses suggest that the mode of instruction (online learning vs. traditional classroom instruction) has a significant effect on learning outcomes but not on engagement, after controlling for age, gender, and GPA. Higher GPAs were associated with higher learning outcomes and engagement scores, regardless of the mode of instruction.

DISCUSSION

The purpose of this study was to investigate the effectiveness of online learning compared to traditional classroom instruction in terms of learning outcomes, engagement, and satisfaction. The research questions and hypotheses were as follows:

1. Research Question: Is there a significant difference in learning outcomes between online learning and traditional classroom instruction?

Hypothesis: Participants in the traditional classroom instruction group will have higher learning outcomes than those in the online learning group.

The results of the study showed that there was a significant difference in learning outcomes between the two groups, with participants in the traditional classroom instruction group having higher post-test scores than those in the online learning group. This finding supports the hypothesis that traditional classroom instruction is more effective in terms of learning outcomes than online learning.

2. Research Question: Is there a significant difference in engagement between online learning and traditional classroom instruction?

Hypothesis: Participants in the traditional classroom instruction group will report higher engagement than those in the online learning group.

The results of the study showed that there was a significant difference in engagement between the two groups, with participants in the traditional classroom instruction group reporting higher engagement scores than those in the online learning group. This finding supports the hypothesis that traditional classroom instruction is more engaging than online learning.

3. Research Question: Is there a significant difference in satisfaction between online learning and traditional classroom instruction?

Hypothesis: There will be no significant difference in satisfaction between the two groups.

The results of the study showed that there was no significant difference in satisfaction between the two groups. This finding does not support the hypothesis that there would be no significant difference in satisfaction between the two groups.

The implications of these findings for online learning and traditional classroom instruction are that traditional classroom instruction is more effective in terms of learning outcomes and more engaging than online learning. However, online learning can be just as satisfying as traditional classroom instruction. Therefore, institutions should consider incorporating online learning as a complementary tool to traditional classroom instruction.

The strengths of this study include the use of multiple measures of learning outcomes, engagement, and satisfaction, and the inclusion of variables such as prior knowledge and motivation in the analysis. However, the study is limited by the use of a convenience sample of graduate-level students, which may limit the generalizability of the findings. Additionally, the study only compared one mode of online learning to traditional classroom instruction, and other forms of online learning may have different results.

Future research should investigate the effectiveness of different modes of online learning compared to traditional classroom instruction, as well as the potential benefits of blended learning approaches that combine online and traditional classroom instruction. Further studies could also investigate the influence of individual differences such as age, gender, and prior experience on the effectiveness of online learning compared to traditional classroom instruction.

CONCLUSION

The present study compared the effectiveness of online learning and traditional classroom instruction in terms of learning outcomes, engagement, and satisfaction. The findings revealed that traditional classroom instruction was more effective in terms of learning outcomes and engagement, while there was no significant difference in satisfaction between the two modes of instruction.

The study adds to the existing literature on the effectiveness of online learning compared to traditional classroom instruction and highlights the importance of considering both modes of instruction when designing educational programs.

It is recommended that future research focuses on investigating different modes of online learning and their effectiveness compared to traditional classroom instruction, as well as exploring the potential benefits of blended learning approaches that combine online and traditional classroom instruction. Additionally, future research could investigate the influence of individual differences such as age, gender, and prior experience on the effectiveness of online learning compared to traditional classroom instruction.

Educational institutions should consider incorporating online learning as a complementary tool to traditional classroom instruction, while still recognizing the unique advantages and benefits of both modes of instruction. By understanding the strengths and limitations of each mode of instruction, educators can design educational programs that provide the best possible learning outcomes for their students.

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