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Research Article

Students' Evaluation of The Academic Performance Through Interactive Multimedia Integration in A State College

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Abstract:

This study, conducted at a Polytechnic State College in Camarines Sur, evaluates the effectiveness of interactive multimedia integration in enhancing students' academic performance. This study employed a quantitative method using a quasi-experimental design. It evolves pilot testing with pre-tests and post-tests for two sections of BS Nursing students. Section A (control group) consisted of 51 students, while Section B (experimental group) had 47 students. Statistical tools, including independent sample t-tests and analysis of variance (ANOVA), were used to analyze and interpret the data.

The results revealed that the experimental group had a post-test mean score of 68.51, compared to the control group's 55.85. Statistical analysis confirmed a significant improvement in post-test scores for both groups, with the experimental group showing a greater mean difference of -16.29, indicating enhanced learning gains. Correlational analysis showed no significant relationship between pre-and post-test scores in Pair 1 (experimental group, $r = 0.032$, $p = 0.822$). In contrast, Pair 2 (control group) exhibited a statistically significant but weak negative correlation ($r = -0.309$, $p = 0.035$). Despite these differences, both groups demonstrated above-average performance before and after the intervention.

The findings suggest that integrating multimedia technologies fosters an interactive and engaging learning environment, leading to a statistically significant improvement in academic performance. This highlights the potential of multimedia as a valuable tool for enhancing the quality and effectiveness of instruction in classroom settings.

Keywords: Interactive multimedia, academic performance, ICT integration

Introduction

Technologies can help to improve universal access to education and equality in instruction, teaching, and learning. As a result, they are critical for building a more equal society (UNESCO, 2014). ICT is regarded as a crucial factor in the countries` educational reforms for future development. It helps teachers meet the global demand for technology-based instructional resources and facilities (Ghavifekr S., et al. (2015). Teachers must possess practical skills in using technology to integrate ICT into the classroom process (Egemen and Hanmolu, 2018). For decades, ICT integration has increased academic attainment. Technology has made tremendous advances that benefit many people. This includes educational stakeholders, gadgets, applications, and software. These are the most significant technological advances of the twenty-first century. In particular, the presence of technology in the fields of teaching and learning has developed learning activities for teachers and learners to become more accessible and easier in higher education (Bates & Poole, 2003; Garrison & Kanuka, 2004; Jonassen, Mayes, & McAleese, 1993), developing a legitimate and effective method to analyze the influence of technological integration in the field of teaching is becoming increasingly relevant and necessary.

According to international studies, providing access to ICTs in schools is not enough to boost student accomplishment; schools must also provide meaningful opportunities to employ the technology and good quality access (Selwyn, 2004). Opportunities to utilize ICT allow students a chance to interact with the technology. The ease of use of accessible technology and how quickly and smoothly it performs determines access quality. Indicators such as actual Internet connection speeds and the simplicity of beginning operations, data sharing, and backups of personal data are used to assess this. Ensuring fairness in ICT availability is necessary to close the access gap, the first digital divide (Claro and others, 2011). It is critical to acknowledge the vital function of the classroom teacher while striving to expand ICT integration for instructional objectives. Research has discovered and supported that teacher beliefs and attitudes influence ICT integration into educational approaches (Polly & Hannafin, 2010). Students and teachers can access a variety of programs for free. These free online learning tools can help them study more effectively. Teachers and learners have witnessed the advancements, noting how technology has increased the number of learning opportunities (Navarro, 2012).

Previous research has found a link between mobile learning and academic achievement. Mobile technology has been shown in studies to improve performance (Bogdanovi et al. 2014; Dunn et al. 2013). Pechenkina et al. (2017) discovered an improvement in learners' academic performance and rate of retention in their study on correlations between the use of apps by students and their academic performance, contrary to the common belief that learners' retention rate decreases as they progress through the semesters—however, Mobi. M. I., et al. (2015) proved that ICT could waste necessary learning time by turning educational experiences into

games for pupils, improving low academic performance. It also exposes pupils to pornographic websites, which might distract them during class. The report also attempted to make recommendations for potential remedies to this problem. Thus, this study generally aimed to evaluate the students` academic performance through multimedia integration at a Polytechnic State College in Camarines Sur.

Research Questions

Specifically, this study aims to answer the following questions:

1. What interactive multimedia intervention may be used to improve the student's academic performance?
2. What was the academic performance of the control and experimental groups before and after the intervention?
3. What is the significant difference between the two groups before and after the intervention?

Conceptual Framework

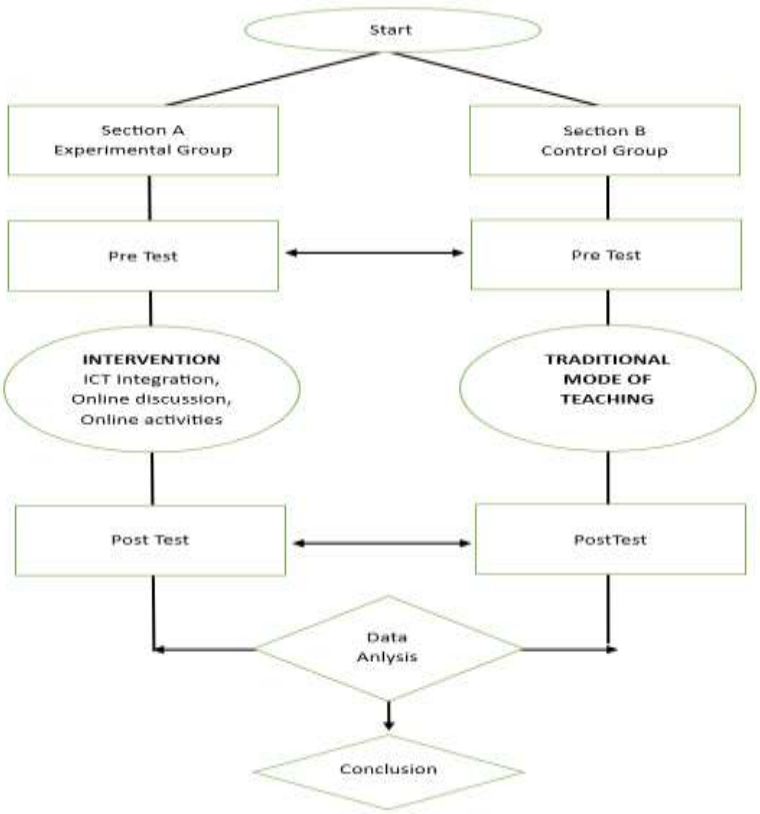

Figure 1. Conceptual Paradigm

Figure 1 presents the Conceptual Paradigm of the current study titled "Students' Evaluation of the Academic Performance Through Interactive Multimedia Integration in a State College". The research paradigm was adapted from a study by Kilicaslan and Vural (2018). The study employs a quasi-experimental design involving the experimental and control groups (Ariel et al., 2021). Both groups underwent a pre-test to assess their prior understanding of the topic and a post-test after the intervention to evaluate their achievement. Moreover, the experimental group utilized multimedia integration in their lessons, while the control group used traditional teaching methods. The pre-test and post-test results were compared to evaluate the effectiveness of the multimedia integration. Data analysis was used to interpret the study's final results, highlighting the most effective teaching technique.

Methodology

Research Design

This study, titled "Students' Evaluation of the Academic Performance Through Interactive Multimedia Integration in a State College," was conducted at Camarines Sur Polytechnic Colleges-Nabua. This study employs a quantitative method using a quasi-experimental design to investigate students' academic performance through multimedia integration.

Participants. The participants in this study were BS Nursing students from Camarines Sur Polytechnic Colleges-Nabua, specifically those enrolled in Microbiology and Parasitology subjects. These students served as the primary sources of data. The data-gathering procedure involved a non-random selection of participants.

Research Instrument. Test questions, including Pre-test and Post-test, were utilized in this study. Pilot testing measures students'

knowledge, skills, or abilities in specific subject areas. This also assesses academic performance before and after an intervention or compares the performance of different groups.

Research Instruments Validation. The validation of the research instruments was a crucial part of this study. Four experts evaluated the instruments based on their content, contextualization, and the up-to-dateness of the information. These criteria were essential for both the pre-test and post-test to ensure the validity and reliability of the study's results. The experts provided valuable insights and knowledge, making the study valid and reliable. Their responses and comments were also considered in organizing, analyzing, and interpreting the study's significant findings.

Data Collection and Analysis. This study employed pilot testing, administering pre-tests and post-tests to two sections of BS Nursing students. The first section was the control group, while the second was the experimental group. Numerical data were collected from both groups before and after the intervention, and performance metrics were compared quantitatively. Statistical tools were used to analyze and interpret the data, providing insights into the effectiveness of the intervention.

Statistical Treatment. The data of this study calculates the mean performance of the two groups in both the pre-test and post-test, with the significance level set at 0.05 (95% confidence interval). An independent sample t-test was used to evaluate the difference in mean scores between the pre-test and post-test. The study assessed the significant difference in academic performance between the control and experimental groups before and after the intervention using t-tests and analysis of variance (ANOVA) to examine if the observed differences were statistically significant.

Results and Discussions

1. Integration of Interactive Multimedia Improves the Student's Academic Performance.

The integration of interactive multimedia has been shown to positively improve learners' academic skills. The integration of interactive multimedia in classroom discussion was used in this study to enhance the students' academic performance. The impact of Multimedia integration in the lesson demonstrates active learning and encourages dynamic and engaging classes for the optimal learning experience for students.

Students are more active and engaged in the lesson when ICT is used. Both teachers and learners felt that using technology encourages learners to be more involved in the learning experience (Ghavifekr, S., & Rosdy, W. A. W. (2015). Moreover, the current study is similar to the previous research. Both ICT integrations were used as an intervention in the class. The teacher used interactive multimedia to teach the subjects. This platform enables teachers and students to be more engaged and active and develop positive interactions. The ICT platform features engaging exercises, videos, and graphics that engage learners' attention in learning and understanding the topics. Using ICT in this study to deliver the lesson becomes more effective and efficient. Therefore, this study revealed that multimedia integration as a tool in teaching enhances students` understanding and learning. Interactive multimedia technology enhances the learning process and increases positive interaction between teachers and students. Technology as a material in lesson delivery plays a crucial role in enhancing the quality of teaching and learning results for students (Made Rajendra et al., 2018). Thus, the statistical test suggests evidence to support the claim that the post-test score improved significantly for both Group A and Group B. The experimental group performed better than the control group in this study.

2. Academic Performance of Control and Experimental Group Before and After the Intervention

Table 1. Correlations between the pre-intervention and post-intervention

Paired Samples Correlations

	N	Correlation	Sig.
Pair 1 PreA - PostA	51	.032	.822
Pair 2 PreB - PostB	47	-.309	.035

Table 1 shows the correlations between the two pairs before and after the intervention assessments. It can be seen in Table 1 for Pair 1, the sample size is 51, the correlation coefficient is 0.032, and the significance level is 0.822. This indicates that the correlation between the pre-intervention and post-intervention scores is not statistically significant at the 0.05 level.

For Pair 2, the sample size is 47, the correlation coefficient is -0.309, and the significance level is 0.035, indicating a statistically significant correlation. Moreover, in Pair 1 (PreA-PostA), the correlation coefficient 0.032 suggests a very weak positive correlation, indicating little to no linear relationship between the pre-intervention and post-intervention scores. Additionally, the high significance level of 0.822 suggests that any observed correlation is likely due to chance rather than a meaningful relationship. In Pair 2 (PreB-PostB), the correlation coefficient of -0.309 indicates a moderate negative correlation, suggesting a weak inverse relationship between the pre-intervention and post-intervention scores. The significant p-value of 0.035 indicates that this correlation is statistically significant, meaning that the observed association is unlikely due to chance. Thus, the results suggest a statistically significant negative correlation between the pre-intervention and post-intervention scores in Pair 2 (PreB-PostB). In contrast, no significant correlation is observed in Pair 1 (PreA-PostA).

Table 2. Academic Performance of Control and Experimental Group Before and After the Intervention

Paired Sample Statistics

Group		N	Mean
Experimental	Pre-test	51	52.2157
Control		47	49.2553
Experimental	Posttest	51	68.5098
Control		47	55.8511

Table. 2 presents the academic performance of the experimental and control groups before and after the intervention. The results of the pre-test and post-test revealed that the mean scores of the two groups (Experimental and control group) of each of the two samples (pre-test and post-test) performed above average. The average score is 85%; the pre-test of the experimental group has a mean score of 52.2157, and the post-test has a mean score of 68.5098. The pre-test of the Control group has a mean score of 49.2553, and the post-test has a mean score of 55.8511. Thus, the results indicate that both groups performed above average before and after the intervention.

3. A Significant Difference Before and After the Intervention

Table 3. Significant difference between the two samples before and after the intervention

Paired Samples Test

	Mean	Std. Deviation	df	Sig. (2-tailed)
Pair 1 PreA – PostA	-16.29412	11.50182	50	.000
Pair 2 PreB – PostB	-6.59574	9.99709	46	.000

Table 3 presents the significant difference between the two samples before and after the intervention. Based on the test result, there is a significant difference between the mean score of the pre-test and the post-test of two (2) groups. The data in Table 3 indicates a significant difference between the two samples (PreA-PostA and PreB-PostB) before and after the intervention. The table presents each pair's mean, standard deviation, degrees of freedom (df), and significance level (Sig.). For Pair 1 (PreA-PostA): The mean difference is -16.29412, indicating a decrease in scores from the pre-intervention (PreA) to post-intervention (PostA) assessment. The standard deviation is 11.50182, representing the variability or spread of scores within the sample. The degree of freedom (df) for this pair is 50. The significance level (Sig.) is reported as .000, which means that the difference observed is statistically significant at the 0.05 significance level. For Pair 2 (PreB-PostB): The mean difference is -6.59574, suggesting a decrease in scores from the pre-intervention (PreB) to post-intervention (PostB) assessment. The standard deviation is 9.99709, reflecting the variability or spread of scores within the sample. The degree of freedom (df) for this pair is 46. The significance level (Sig.) is provided as .000. The observed difference is statistically significant at the 0.05 significance level.

On the other hand, the negative mean differences in both pairs indicate decreased scores from the pre-intervention to post-intervention assessments. Therefore, there is strong evidence that the intervention had a significant effect on academic performance, as there was a substantial decrease in the scores from the pre-intervention to the post-intervention phase in both pairs. The result suggests that there is evidence that the score of the post-test improves.

Conclusions and Recommendations

This study concludes that multimedia integration positively impacts the academic performance of the experimental group, as evidenced by their post-test scores compared to their pre-test scores. Also, the study concluded that there is a statistically significant difference between the mean score of the pre-test and the post-test for both groups, indicating that the post-test score improved. There was a significant difference between the mean scores of the pre-test and post-test. Thus, the statistical test suggests evidence to support the claim that the post-test score improved significantly for both the experimental and control groups. The study recommended that using interactive multimedia for teaching effectively enhances the learners' academic performance in their learning process. Integrating interactive multimedia can be an effective approach to enhancing students' academic performance. This method utilizes various digital media elements, such as videos, animations, simulations, quizzes, and games, to engage students in learning. Students can benefit from increased engagement, visual learning, and active participation by incorporating interactive multimedia into educational settings. It offers personalized learning experiences, fosters collaboration, and provides practical assessment and feedback. These factors collectively contribute to improved academic performance and skill development.

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