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Facebook e-Learning Kiosk: Its Effect on the Academic Performance of Science Students in one Philippine Comprehensive National High School

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Abstract

The study evaluated the impact of a Facebook e-Learning Kiosk on the academic performance of Grade 11 Science students at Mayor Ricardo De San Jose Comprehensive National High School. Involving 44 students from the HUMSS strand, a Quantitative Experimental Research Design was used, incorporating pre-tests and post-tests. Data analysis included Frequency Count, Standard Deviation, T-Test, and Cohen's D. Results indicated that students utilizing the e-Learning Kiosk significantly outperformed those taught via traditional methods, with post-test scores showing notable improvement and a higher proportion of above-average grades. Significant differences were found between pre-test and post-test scores within both control and experimental groups, confirming the positive effect of the e-Learning Kiosk. Consequently, the study demonstrates the efficacy of the Facebook e-Learning Kiosk in enhancing science academic performance. It is recommended that the e-Learning Kiosk be integrated into the regular curriculum to further improve student outcomes.

Keywords: Facebook e-Learning kiosk, academic performance, Quantitative Experimental Research Design, Science education, HUMSS strand

Introduction

Technological interventions in education provide institutions with a significant advantage, particularly in addressing the technological demands prevalent in impoverished areas. These demands often leave under-resourced schools lagging behind those equipped with advanced technological devices. In the 2019 Trends in International Mathematics and Science Study (TIMSS), the Philippines ranked lowest among 58 participating countries, with Grade 4 students scoring 297 in mathematics and 249 in science.

The survey revealed that only 19% of Filipino students met the low benchmark for basic mathematical knowledge, 6% achieved the intermediate benchmark, and 13% demonstrated limited understanding of scientific concepts.

The education sector is increasingly investing in learning kiosks to enhance access to information and facilitate communication between educational institutions and their stakeholders. Facebook

kiosks, in particular, are becoming integral to the education sector, enabling students, faculty, and parents to perform routine tasks efficiently. Young people, often referred to as "digital natives" or "digital immigrants," are naturally inclined towards utilizing new technology and interactivity (Prensky, 2001). Since its launch in 2004 by Mark Zuckerberg, Facebook has remained a dominant platform for flexible communication and information dissemination.

Alcott, Braghieri, Eichmeyer, and Gentzkow (2019) highlight the profound influence of Facebook on its users' daily lives, emphasizing its role in enhancing communication, engagement, and creativity. The internet and computer-mediated communication have revolutionized knowledge acquisition, necessitating learners to handle vast amounts of data and communicate across diverse languages and cultures.

This study aims to explore the impact of Facebook kiosks on students' academic performance and their social media interactions. According to a Pulse Asia survey, Facebook is the most frequently accessed social media site in the Philippines, with 63% of Filipino adults using the internet daily. Of these, 99% visit social media profiles regularly, with Facebook and YouTube being the most popular.

The integration of information and communication technology in education has significantly influenced modern learning processes (Almaghaslah et al., 2018; Bandalaria, 2018; McIsaac and Gunawardena, 1996; Qayyum and Zawacki-Richter, 2018). Innovations such as wiki pages, blogs, videos, podcasts, and social media platforms are increasingly recognized as valuable educational tools (Moran, Seaman, and Tinti-Kane, 2011). Educational institutions are promoting e-learning technologies to foster engagement and satisfaction among students (Yuan and Kim, 2014; Jung et al., 2009).

The Facebook Learning e-Kiosk aims to provide tech-enabled applications and resources, offering self-paced learning opportunities to students in rural areas through a blended learning model. This study investigates the effectiveness of the Facebook Learning e-Kiosk in enhancing the academic performance of Grade 11 students at Mayor Ricardo De San Jose Comprehensive National High School, leveraging the fact that all students possess cell phones or gadgets for this purpose.

Literature Review

Uses of Facebook

Nadkarni and Hofmann (2012) found that this generation's extensive use of Facebook is driven by two fundamental social needs: the desire to belong and the need for self-presentation. These motivations are influenced by demographics, social backgrounds, and personality traits. Similarly, Cheung, Chiu, and Lee (2011) discovered that individuals engage with social networking sites to connect socially with others. Many students reported that instant communication with geographically distant friends is a common desire. Interestingly, Clayton, Osborne, Miller, and Oberle (2013) identified a link between forming emotional attachments on Facebook and increased anxiety, alcohol consumption, and marijuana use, suggesting that Facebook might provide social support for those experiencing emotional difficulties. This study also indicated that lonely and anxious individuals are more likely to engage with Facebook users. Conversely, a more recent study has shown that Facebook usage is associated with fewer cases of depression. Ellison, Steinfield, and

Lampe (2007) found a positive correlation between Facebook use and the development and maintenance of social capital, including bridging, bonding, and online-offline relationships, although this is contingent on managing envy triggered by others' posts on the platform.

Facebook's widespread use has extended to English Language Teaching (ELT) classes, prompting academics and educators to explore its potential as an online learning platform. Ulla and Perales (2020) conducted a study using Facebook as a digital whiteboard in an EFL class, revealing that it significantly enhances language teaching and learning through increased student engagement in classroom activities. However, the study also acknowledges that using Facebook for classroom instruction presents certain challenges that educators must address.

Benefits of Learning Kiosks

In their article "The Benefits of Interactive Kiosks," Parteam (2021) stated that the education sector is increasingly investing in interactive kiosks due to their ability to provide unparalleled access to information and facilitate communication between students, faculty, alumni, and visitors. These kiosks are becoming essential tools in educational settings, seamlessly integrating into daily life by offering practical information, interactive lessons, games, and news.

The growing presence of multimedia kiosks in educational institutions reflects their utility. Students, professors, and parents are already accustomed to using new technology, making it almost second nature to interact with these kiosks. By enhancing the environment with digital signage and interactive kiosks, institutions can create a more relaxed and informative atmosphere. These kiosks also offer functionalities such as purchasing educational materials and issuing security alerts.

As the academic year begins, multimedia kiosks are becoming increasingly popular in many colleges and universities, including Universidade Europeia, University of Minho, University of Porto, University of Trás-os-Montes and Alto Douro, and Camilo Castelo Branco High School in Vila Nova de Famalicão. These institutions utilize the technology to inform students about various events and activities, both within and outside the educational setting, fostering a more inclusive and engaged community.

Interactive kiosks and digital signage are now indispensable in the visual communication strategies of educational institutions. They draw attention and deliver significant information digitally, enhancing the overall learning experience. By incorporating additional features into multimedia kiosks, educational institutions can further improve their digital signage experience, making them even more effective tools for communication and learning (Parteam, 2021).

Facebook as a Learning Platform

Social media's potential to enhance student engagement makes it a viable alternative to traditional classroom instruction, particularly during the COVID-19 pandemic era (Greenhow and Chapman, 2020). While numerous studies highlight the educational benefits of integrating social media into classroom instruction (Barrot, 2016; Camus et al., 2016; Henry et al., 2020; Sánchez et al., 2019; Ulla and Perales, 2020), there is limited research on using Facebook as an online learning support application, especially in the absence of an established Learning Management System (LMS) and when classes must transition to online and remote teaching due to health emergencies.

Niu (2017) assessed Facebook's academic use, noting that despite its recognition as a student-centered learning platform, the impacts of Facebook as a learning management system remain varied and underexplored. This finding aligns with Barrot's (2018) study on Facebook as a language learning environment. Barrot's literature analysis revealed that most research in Asian higher education institutions focused on general language skill development and enhancement rather than Facebook's role as an online learning support tool.

In contrast to Barrot (2018) and Niu (2017), Manca and Ranieri (2016) acknowledged differences in learning designs across various studies, even though Facebook was primarily used as an alternative to traditional LMS. These differences include assignment posting, content delivery, and feedback mechanisms. Despite these variations, Facebook is regarded as an "informal, dynamic, sociable, and flexible setting where structured and unstructured learning processes can occur" (p. 520). Chugh and Ruhi (2018) also support the notion that Facebook can serve as a platform for both informal and formal language learning.

Learning Kiosk Benefits

A kiosk can serve multiple purposes in educational settings, whether in basic schools, high schools, or universities. According to Pangan (2020), a multimedia kiosk can function as a student card loader equipped with a note and coin reader, allowing students to load their balance cards for use in school services such as the cafeteria and reprographics. Additionally, it can act as a hub for multimedia content for both students and teachers, facilitating discussions on exam notes, timetables, and more.

Many educational institutions install interactive kiosks to create an internal information network accessible to staff, students, professors, and guardians. These kiosks can replace traditional access and attendance systems for both students and teachers. Specialized software for teachers can enable quick consultations regarding students' circumstances, attendance, and direct communication between parents, teachers, and school administration.

Multimedia kiosks offer logistical and practical benefits to the entire school community and provide educational and extracurricular advantages. Effective use of these kiosks can enhance institutional productivity. They also promote social interaction by advertising events, deadlines, lectures, and seminars, fostering friendships among students from different classes, universities, and institutions.

The University of Antique (UA)-Hamtic Campus exemplifies the multifunctional use of kiosks with its e-Learning Hub and Farmers Information and Technology Services (FITS) Kiosk, as reported by Tubera (2022). This initiative aims to enhance the knowledge and skills of students, faculty, and clients in farming and agriculture. The e-Learning platform offers over sixty courses/programs beneficial to both students and faculty. During the FITS Kiosk launch, ATI Region 6 provided information, education, and communication (IEC) materials, along with ICT equipment like desktop computers and printers. Campus Director Noel M. Montao highlighted that these resources allow users to broaden their knowledge through various e-Learning courses.

Synthesis of the Reviewed Literature and Studies

ChatGPT

The research, theories, and associated literature referenced in this study emphasize the significance of students' use of Facebook Learning Kiosks for academic and school-related tasks. These platforms are frequently employed by students for academic assistance and social capitalization. This study aims to reflect on the use of Facebook Learning Kiosks, which can have both positive and negative impacts on students' academic performance. The data collected has facilitated the development of several theories and assumptions regarding the various effects of using Facebook Learning Kiosks.

The reviewed literature and studies provided the researchers with essential guidelines and instructions to achieve their objectives. Technology has permeated nearly all aspects of modern life, significantly impacting education in various ways. The findings from other studies reviewed by the researcher offer relevant insights that enhance the credibility and reliability of this study. The results of these related investigations are also similar or identical to this study, further validating its significance and findings.

Research Methodology

The study utilized a Quantitative Experimental Research Design, wherein participants underwent a pre-test and post-test administered before and after the intervention. These tests were used to identify any differences attributable to the treatment or condition.

Data Collection

The researcher obtained permission from the Principal of the School to administer the study to student respondents. A copy of the permission was submitted to the Dean of the Graduate School at Cagayan State University - Sanchez Mira Campus. The researcher personally conducted the pre-test and post-test with the participants, ensuring confidentiality to encourage honesty in their responses.

Data Analysis

The findings from the evaluation were systematically recorded in tables. Utilizing statistical treatment, the researcher thoroughly analyzed and interpreted the data. A proficiency scale was employed to assess the performance levels in both the conventional teaching approach and the utilization of Facebook e-Learning Kiosk during both the pre-test and post-test phases.

SCORE RANGE	DESCRIPTIVE VALUE
25 - 30	Excellent
19 - 24	Above Average
13 - 18	Average
7 - 12	Below Average
0 - 6	Poor

ChatGPT

Frequency counts were employed to analyze the pre-test and post-test scores administered before and after the intervention was introduced. Standard deviation was utilized to evaluate the variability of the pre-test and post-test scores. T-tests were

conducted to ascertain any significant differences between the mean pre-test and post-test scores of the students. Additionally, Cohen's D was utilized to assess the effect size of the intervention in improving students' academic performance in Science.

Discussion of Findings

Pretest and post test result of the group exposed with Facebook e-Learning Kiosk and the group not exposed with Facebook e-Learning Kiosk.

Table 1 shows the frequency and percentage distribution of the pre-test scores for both the control and experimental group of students. The results indicate that the majority of students in both groups got

a scores ranging from 13 to 18, which reflects an average level of performance in the pre-test assessment. Additionally, it shows that both groups have the same highest scores of 22 and lowest scores of 10. With the same average score of 15, this reflects that the students from both groups have an average prior knowledge about the competencies tested or had similar knowledge levels before the study. By having similar average scores, it suggests that the groups started with a comparable baseline level of understanding or skills. This is important because it helps ensure that any differences observed in the outcomes or performance between the groups after the study can be attributed to the intervention or treatment being tested, rather than pre-existing differences in knowledge or skills.

Table 1. Frequency and percentage distribution of the Pre-Test Scores of the Students Before Using Facebook e-Learning Kiosk in Improving their Academic Performance In Science

Test Scores	Descriptive Value	Pretest Control		Pretest Experimental	
		Frequency(N=22)	Percentage	Frequency(N=22)	Percentage
25-30	Excellent				
19-24	Above Average	4	18.18	3	13.64
13-18	Average	14	63.63	15	68.18
7--12	Below Average	4	18.18	4	18.18
0-6	Poor				
		Highest Score= 22		Highest Score= 22	
		Lowest Score =10		Lowest Score =10	
		Average Score=14.78 = 15		Average Score=15.27 = 15	
		(AVERAGE)		(AVERAGE)	

According to Table 2, the post-test scores of students who used the Facebook e-Learning Kiosk were higher compared to those who underwent traditional teaching methods. Specifically, 9 or 40.91% of students who utilized the Kiosk achieved an above average performance, 7 or 31.82% received an average performance, and an impressive 6 or 27.27% received an excellent performance.

In contrast, 12 or 54.55% received an average performance, 8 or 36.36% achieved an above average performance, and 2 or 9.09% got a poor performance in the group of students who underwent the traditional teaching method.

This clearly shows that students who utilized the Kiosk achieved better results in the post-test. It is also worth noting that the average scores of students who utilized the Kiosk were higher than those of the control group with average scores of 21 and 17 respectively.

Therefore, this indicates that the Facebook e-Learning Kiosk is an effective teaching tool in improving students' performance in science.

Table 2. Frequency and percentage distribution of the Post-Test Scores of The Students After Using Facebook e-Learning Kiosk in Improving their Academic Performance

Test Scores	Descriptive Value	Post test (Control)		Post test (Experimental)	
		Frequency(N=22)	Percentage	Frequency(N=22)	Percentage
25-30	Excellent			6	27.27
19-24	Above Average	8	36.36	9	40.91
13-18	Average	12	54.55	7	31.82
7--12	Below Average	2	9.09		
0-6	Poor				
		Highest Score= 24		Highest score= 28	
		Lowest Score =11		Lowest Score =12	

		Average Score=17.35 = 17	Average Score=21.18 = 21
		(AVERAGE)	(ABOVE AVERAGE)

Comparison between the pre-test and post-test results of the control and experimental group

Table 3 presents the comparison of pretest scores between the control and experimental groups. It reveals that the mean score of the control group was 14.78, whereas the mean score of the experimental group was 15.27. This indicates that, on average, the experimental group outperformed the control group slightly in the pretest.

Table 3. Analysis on the Comparison Between the Pre-Test scores of the control and experimental group

Groups	Mean	t- value	p- value	t- Critical	Remarks
CONTROL	14.78	-0.55559	0.58137	2.01669	NS
EXPERIMENTAL	15.27				

Table 4 illustrates the comparison between the pretest scores of the control and experimental groups. The post-test mean score for the control group was 17.35, whereas the experimental group achieved a mean score of 21.18. This suggests that, on average, the experimental group significantly outperformed the control group following the intervention.

The p-value of 0.00502** falls below the 0.01 level of significance, indicating a statistically significant difference between the two groups. This signifies strong evidence supporting the notion that the experimental intervention positively influenced the post-test scores. Consequently, it implies that the utilization of the Facebook e-Learning Kiosk effectively enhances students' performance in science.

This finding aligns with the research conducted by Kalelioğlu (2017), which suggests that Facebook can be utilized for learning areas requiring the sharing of lecture notes and video lessons, as well as cloud-based applications that support improved academic performance. Additionally, Akbari et al. (2016) further emphasize that employing Facebook for educational purposes fosters student-acting learning, yielding positive benefits for student performance.

Table 4. Analysis on the Comparison Between the Post-Test between the control and experimental group

Groups	Mean	t- value	p- value	t- Critical	Remarks
CONTROL	17.35	-2.95764	0.00502**	2.01669	Highly Significant
EXPERIMENTAL	21.18				

**** Significant at .01 level**

Table 5 presents an analysis of the pre-test and post-test scores of the control group. The mean pre-test score is 14.78, while the mean post-test score is 17.35. With a p-value of 0.00196*, the difference between the pre-test and post-test scores is statistically significant at the 0.01 level, indicating that the observed difference is unlikely to have occurred by chance. Furthermore, the t-value of 3.51397 exceeds the t-critical value of 2.07387, supporting the conclusion of statistical significance. This suggests that some intervention or treatment may have been implemented within the control group, leading to a significant improvement in post-test scores.

Samani and Noordin (2020) discuss the utilization of Facebook and social networks in relation to students' academic performance. Utilizing Facebook as a platform for delivering lessons has been shown to enhance students' achievement and engagement. Its popularity and familiarity among students can foster greater engagement in the learning process, potentially increasing motivation and connection to the content.

Table5. Analysis on the Comparison Between the Pre-Test and Post -Test Scores of The Control Group

Groups	Mean	t- value	p- value	t- Critical	Remarks
PRETEST	14.78	3.51397	0.00196**	2.07387	Highly Significant
POST TEST	17.35				

**** Significant at .01 level**

Table 6 displays the analysis of pre-test and post-test scores for both the control and experimental groups. The mean score for the experimental group (21.18) exceeded that of the control group (15.27). With a p-value of 0.00000**, the difference between the mean scores of both groups is statistically significant at the 0.01 level, indicating that the observed difference is unlikely to have occurred by chance alone. This signifies that the intervention or treatment implemented in the experimental group significantly influenced the post-test scores, rendering the experimental group results highly significant.

This finding aligns with Ainin et al. (2015), who found a positive relationship between Facebook usage and student academic performance. Similarly, Gonzales et al. (2016) observed a positive outcome regarding Facebook's impact on academic performance, despite varying results.

Table 6. Analysis on the Comparison Between the Pre-Test and Post -Test Scores of experimental group

Groups	Groups	t- value	p- value	t- Critical	Remarks
<i>PRETEST</i>	15.27	-7.03646	0.00000**	2.07961	Highly Significant
<i>POST TEST</i>	21.18				
** Significant at .01 level					

Table 7 illustrates the effect size on student performance before and after the intervention. The pre-test mean score for the experimental group was 15.27, increasing to 21.18 in the post-test, indicating a significant impact of the intervention on post-test scores. A larger standard deviation in post-test scores (4.87) suggests increased variability post-intervention. The Cohen's d effect size of 1.46 represents a large/strong effect, emphasizing the substantial impact of the intervention on post-test scores. These results corroborate Dankel et al.'s (2017) findings, suggesting a significant effect on academic performance. Additionally, Anggoro & Rueangrong's (2020) study supports the effectiveness of using Facebook and Messenger groups for delivering educational interventions in distance learning.

Table 7. Effect Size on the Performance of the Subjects Before and After the Intervention

Test	Mean Score	Standard Deviation	Sample size	Cohen's d Effect Size	Remarks
Pre-test	15.27	2.98	22	1.46	Large/Strong Effect Size
Post-test	21.18	4.87	22		

Conclusion

Based on the research findings, it is evident that both the control and experimental groups entered the study with a similar level of prior knowledge. However, students utilizing the Facebook e-Learning Kiosk demonstrated significantly higher average scores compared to those under traditional teaching methods. This suggests the efficacy of the e-Learning Kiosk in enhancing students' performance in Science. Moreover, a notable improvement in post-test scores was observed, with more students achieving above-average grades. This improvement was particularly significant among students exposed to the e-Learning Kiosk, indicating a positive impact on overall test performance. While no significant difference was found in pre-test scores between control and experimental groups, significant differences emerged in post-test scores, underscoring the effectiveness of the e-Learning Kiosk. The implications of these findings are significant for educational institutions and policymakers. The demonstrated effectiveness of the Facebook e-Learning Kiosk highlights the potential for technology-enhanced learning tools to positively impact student performance in Science. Integrating such tools into educational practices can lead to improved academic outcomes and engagement among students.

Recommendations

The implementation of the Facebook e-Learning Kiosk as a science education tool is recommended based on the study's findings, which show improved student performance compared to traditional teaching methods. It is advised to combine the e-learning Kiosk with traditional teaching approaches to accommodate diverse learning styles effectively. DepEd administrators should integrate online learning tools like the e-learning Kiosk into the curriculum and provide teacher training for optimal utilization. Continuous research and evaluation are essential to monitor effectiveness and inform policy decisions. Future studies should explore the long-term impact of the e-learning Kiosk on academic performance and strategies for further enhancement.

Declaration of no conflict of interest

The author hereby declares no conflict of interest and this article is her original work.

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