"E-Booksan Ang Kaalaman": Development, Validation, and Utilization of Electronic Book in Academic Performance of Grade 9 Students in Social Studies

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ABSTRACT

This study investigated the effectiveness of an interactive electronic book (E-book) for enhancing social studies learning among Grade 9 students in one of the Secondary School of Himamaylan City. The study aimed to address the challenge of low student interest and performance in social studies, particularly in the topic of "Sektor ng Paglilingkod." A quasi-experimental design was employed, with 31 students from Grade 9-Platinum. The study involved a pre-test to assess students' baseline understanding, followed by a four-week intervention period during which the E-book was integrated into classroom instruction. A post-test was then administered to measure the impact of the intervention. The findings revealed a significant improvement in students' academic performance after the introduction of the E-book. The pre-test scores categorized students' performance as "low," while the post-test scores indicated a "very high" level of understanding. This dramatic shift suggests that the E-book intervention had a strong positive impact on students' academic achievement in social studies. The E-book's interactive elements, multimedia content, and personalized learning features were found to be highly acceptable and contributed to increased student engagement and comprehension.

Keywords: Action Research, Electronic Book, Instruction, Mixed Methods, Social Studies

INTRODUCTION

In this 21st century, technology is considered a need in the learning process, especially to motivate and gain students' interest during learning activities (Hidayat, 2020). One material is interactive E-books which have been found to have a significant impact on developing scientific concepts to students and would help them in these modern technological innovations (Shemmy, 2020); Alberto (2019) interactive E-books are gaining increasing momentum because of their comprehensive coverage of many media and sources, whether audible, visual, or readable. These can include combined resources (Kitchen and Gole, 2017) and interactive books beyond merely written text compared to traditional books or text-support electronic books.

According to Klatt Karola (2020), Estonia has embraced E-books as instructional materials, recognizing their potential to create interactive classrooms and enhance student engagement. Estonia's education system is known for its high performance and its embrace of digital technologies, making it a model for other countries seeking to leverage technology for improved learning outcomes.

Research shows that interactive E-books based on certain learning strategies are more effective on learning outcomes (Chen et al., 2019). E-books developed without integration with appropriate learning strategies or methods may be insufficient to meet learning-related expectations (Peng et al., 2009) and to support high-level thinking processes such as analysis, evaluation, and synthesis (Batoon et al., 2018). Welldesigned interactive E-books can support students' higher-order thinking skills (Bozkurt & Bozkaya, 2015).

Recent studies in Indonesia have explored the development and effectiveness of electronic books (E-books) for Social Studies education. Although, textbooks serve a significant role in the daily constructs of students in school as noted by Java (2024) for Junior high schools, e-learning-based social studies media have been developed and validated as practical and effective tools for teaching (Rosmandi et al., 2021). Interactive E-books have shown significant positive impacts on students' learning outcomes in social studies, with experimental groups outperforming control groups (Asrowi et al., 2019). Additionally, Edmodo-based E-books have been developed and validated as practical learning media for high school students (Novitasari et al., 2019). These studies collectively demonstrate the potential of E-books as valuable educational resources across different grade levels, offering benefits such as improved learning outcomes, practicality, and the integration of technology in social studies education.

Unfortunately, in the Philippines, there are many obstacles to learning social studies, one of which is the lack of interest and enthusiasm on the part of the students. Students are unable to understand the value of social studies as a result (Wijanarko, Eskasasnanda, & Kurniawan, 2020). According to data gathered from children's academic performance, Social Studies has consistently been the lowest performing topic in the national context, scoring only 74% on the National Achievement Test (NAT) out of a possible 100% competency norm. There may be a split in how the subject is taught if these numbers continue to have an effect on students' performance. It was rumored that attaining academic objectives in Social Studies was challenging.

Students' test results occasionally may deteriorate (Tomines, Tipolo, & Pantao, 2021) The researchers observed that today's students seemed too often find traditional social studies classes to be boring and unengaging because they heavily rely on lectures and textbooks. Specifically, this would result in a lack of engagement and lower-class participation. This provided an opportunity for the researchers to explore the development and validation of an electronic book for social studies classrooms. This study may be of use for the students to ensure that the E-book is effective in enhancing student engagement and improving the level of performance.

Thus, the integration of interactive E-books into the educational landscape represents a promising approach to enhance student engagement and improve learning outcomes, particularly in subjects like Social Studies. Research indicates that these digital resources, when developed with appropriate learning strategies, can significantly foster higher-order thinking skills and motivate students who may otherwise find traditional teaching methods unengaging. The positive experiences from countries like Estonia and recent studies in Indonesia highlight the potential of Ebooks to transform classrooms into interactive learning environments. However, challenges remain, particularly in regions like the Philippines, where students exhibit low interest and performance in Social Studies. Addressing these issues through the effective implementation of interactive E-books may not only foster greater enthusiasm for the subject but also facilitate improved academic achievement. Overall, the adoption of technology in education, particularly through interactive E-books, can pave the way for a more engaging and effective learning experience for students across various educational contexts.

Theoretical Framework

The creation, calibration and utilization of the E-books for the Grade 9 Social Studies students of one of the Secondary Schools in Himamaylan City is based on several learning and educational theories focusing on the use of technology towards the improvement of the learning process. These theories describe how E-books may affect the performance and learning achievements of students. The constructivist learning theory by Piaget (1964) and Vygotsky (1978) notes that knowledge is constructed during learning through active participation and interactivity. E-books, which contain information and media presentations within social studies lessons, can provide more opportunities for revisiting the topic. It was found that constructivism has been adopted as the framework for developing the E-book that that seeks to give learners an engaging environment that empowers them to build knowledge.

E-books support individual learning and participation, which can be considered as constructivism when the students interact with content based on prior knowledge. Multimedia learning theory (1990s) Richard Mayer, a psychologist from Canada, introduced his theory of multimedia learning in 1990 and made further improvements to the theory in 2001. Information presented in the form of text, image, video, and maps make a

learning easier as different channels are used to pass information. Among the guidelines are best practices that can be adopted in the process of multimedia design in E-books to foster learning. Working memory is another aspect of the learning theory of cognitive load introduced in the 1980s by John Sweller. Informed by this framework, good E-books can help to decrease extraneous cognitive load by organizing information in a coherent and easy-to-navigate manner. Multimedia and interactivity can assist in controlling the level of intrinsic cognitive load by chunking large amounts of information.

The Theoretical framework of this study is grounded on the principles of integrating multimedia-supported e-learning platforms such as E-books into the learning process so as to increase learner activity and enhance their performance. Based on the ideas of constructivist learning theory, multimedia learning theory, cognitive load theory, the E-book designed for this investigation serves the purpose of self-learning, improved understanding, and avoidance of excessive cognitive load. These theories are explained below with regard to the development of the E-book and the extent to which its use would enhance the teaching pedagogy in the Grade 9 Social Studies classroom.

Purpose of the Study

This study aims to determine the effects of the developed, validated and utilized electronic books for social studies classrooms of Grade 9 students at one of the Secondary Schools in Himamaylan City. Specifically, it sought to answer the following questions:

What is the least mastered competency of the students?

What is the pre- and post-intervention academic performance of the students in Social Studies?

Is there a significant difference in the pre- and post-intervention performance of the students in Social Studies?

What is the acceptability level of the E-book developed in terms of Content and Relevance, Technical Aspects, and Ethical Considerations?

What are the insights of the students after using the E-book?

Hypothesis

There is a significant difference in the academic performance of Grade 9 students in Social Studies after the utilization of the developed E-book.

METHODS

Research design

The researchers employed an explanatory sequential mixed-methods research design, integrating quantitative and qualitative approaches, to develop, validate and use an electronic book ("E-book") for Social Studies classrooms. This design aimed to investigate the impact of the E-book on student learning and engagement. It was highlighted by the framework of Creswell & Plano Clark (2018) for mixed methods research, which it combines the strengths of both quantitative and qualitative data collection and analysis to provide a comprehensive understanding of the E-book's effectiveness.

The quantitative component utilized a one group pre- and post-test design to measure changes in students' Social Studies knowledge and comprehension scores following the use of the E-book. The qualitative component employed a researcher made questionnaire with students to explore their perceptions and experiences with the E-book. This qualitative data served to complement the qualitative results by providing rich, contextual insights into the "why" behind any observed quantitative differences. Data analysis involved statistical comparisons of pre- and post-test scores between the groups, followed by thematic analysis of interview transcripts to identify recurring patterns and themes related to E-book usage.

Participants of the Study

The respondents of the study identified were the 31 students of Grade 9- STE Platinum, officially enrolled for the school year 2024-2025. Eleven (11) were males and twenty (20) were females of one of the Secondary Schools in Himamaylan City.

These students were selected using convenience sampling because of the following reasons:

1. The researchers were conducting their internship with Grade 9 students,

2. The lesson was all about Economics.

3. Grade 9 Platinum had a television in their classroom, which will be used in presenting E-books.

In addition, ten (10) students were selected randomly to respond in qualitative question. These 10 students were given codenames to hide their identity. The following are the participants codename with corresponding descriptions:

Participant 1. Mateo - "The MATEOrial Witness" to countless classroom breakthroughs.

Participant 2. Sofia - "The SOFIAsticated learner", always ahead of the curve.

Participant 3. Migue l- "The MIGUEL-ious problem solver", always finding the answer.

Participant 4. Isabella - "The ISABELLA-bly bright", illuminating the classroom with knowledge.

Participant 5. David - "The DAVID-edly dedicated" a true champion of learning.

Participant 6. Maria - "The MARIA-velous storyteller", captivating everyone with her tales.

Participant 7. Jose - "The JOSE-ful contributor", enriching the classroom with his insights.

Participant 8. Elena - "The ELENA-gant" in her approach, always graceful and precise.

Participant 9. Ana - "The ANA-lytical thinker", approaching problems with logic and precision.

Participant 10. Samantha - "The SAMANTHA-sized impact", leaving a lasting impression on everyone.

Data Gathering Instrument

This research has two phases: Phase 1 is the Quantitative Phase Part while Phase 2 is the Qualitative Part.

Quantitative Phase (Phase 1). The instrument used to collect the data was the adapted 40-item standardized questionnaire from the Grade 9 Social Studies module at one of the Secondary Schools in Himamaylan City. This questionnaire was used to determine the least mastered competency of Grade 9 students. After identifying the least mastered competency, the researchers made the Table of Specifications (TOS) to ensure and equitable distribution of items. The researchers then created a 50-item questionnaire based from the TOS to assess students' performance levels before and after the E-book intervention. The scale below was employed to determine the student's performance levels before and after the E-book intervention.

Table 1

Scale	Descriptive Rating	Interpretation
40.01-50.00	Very High	Identifies with very high level performance of the students

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30.01-40.00	High	Identifies with high level performance of the students
20.01-30.00	Average	Identifies with average level of performance of the students
10.01-20.00	Low	Identifies with low level of performance of the students
0.00-10.00	Very Low	Identifies with very low level of performance of the students

The scale below was employed to determine the acceptability level of the E-book in terms of Content and Relevance, Technical Aspects, and Ethical Considerations.

Table 2

Scale	Descriptive Rating	Interpretation
4.51 - 5.00	Highly Acceptable	Indicates that the E-book is of excellent quality in the given aspect.
3.51 - 4.50	Acceptable	Indicates that the E-book meets expectations with minor improvements needed.
2.51 - 3.50	Neutral	Indicates that the E-book is fair but requires significant improvement.
1.51 - 2.50	Unacceptable	Indicates that the E-book is of poor quality and not suitable for use.
1.00 - 1.50	Highly Unacceptable	Indicates that the E-book is extremely poor and should not be used.

Qualitative Phase (Phase 2)

Another researcher-made questionnaire was used to gather student insights on using E-books in the Grade 9 classroom. This study employed a written questionnaire administered to the respondents at the same time as a post-test. The questionnaire focused on gathering insights regarding their experiences using E-books in Araling

Panlipunan. Students were informed beforehand that the essay's purpose was to reflect on their experiences and insights with E-books in the subject. The researcher managed the collection and storage of completed questionnaires for subsequent analysis. This approach provided data to complement and verify the quantitative results from the assessments.

Validity of the Instrument

The researchers used Standardized Test Questionnaire to determine the least mastered competency. It has been confirmed that this particular instrument was "Quality Assured", therefore, it was considered standardized and does not necessarily need to undergo the process of validity and reliability testing. Then, the researchers came up with another researcher-made questionnaire to determine the development and validation of electronic book for social studies classroom in terms of level of performance of Grade 9 pupils in learning Social Studies (Social Studies). The questionnaire was a 50-item multiple choice and was validated by three expert faculty, especially in this kind of topic.

Also, the researchers developed an E-book. The E-book's content, technical aspects, ethical considerations, and overall quality were assessed by eight evaluators: three social studies teachers, two IT experts, and three students. Each evaluator independently rated the E-book across these four criteria on a scale of 1.00-5.00, with higher scores indicating greater acceptability. The scale was defined as follows: 4.51-5.00 is "Highly Acceptable," 3.51-4.50 is "Acceptable," 2.51-3.50 is "Neutral," 1.51-2.50 is "Unacceptable," and 1.00-1.50 is "Highly Unacceptable."

For each evaluator, the table showed the mean score and a corresponding description of the rating (Highly Acceptable, Acceptable, etc.) for each criterion: Content and Relevance, Technical Aspects, Ethical Considerations, and an overall assessment ("As a Whole"). The "Grand Mean" row provided the average score across all eight evaluators for each criterion, offering a summary of the overall evaluation.

Reliability of the Instrument

According to Twycross (2015), the term reliability in quantitative study or the accuracy of an instrument is the extent to which a research instrument consistently has the same results, if it is used in the same situation on repeated occasions. In this study, after the validation of the research instrument and with the cue of the validators, the instrument had been pilot tested and was subjected to reliability test using Cronbach Alpha set at 0.05 level of significance. The reliability test resulted to Cronbach Alpha value 0.943 was interpreted as "Excellent" and made the instrument reliable.

Data Collection Procedure

First, the researchers secured the necessary permissions by sending a formal letter to the principal of Himamaylan National High School. Additionally, approval was obtained from the parents of the respondents to conduct the study. Second, upon receiving the required approvals, the researchers secured the consent of the student respondents. The objectives and potential benefits of the study were carefully explained to them to ensure informed participation. Third, the researchers personally administered the standardized questionnaire to gather data on the least mastered topics and the students' level of performance. The respondents were given thirty (30) minutes to complete the questionnaire. After the allotted time, all completed questionnaires and answer sheets were collected and prepared for statistical analysis. Fourth, an intervention involving the use of electronic books (E-books) in teaching Social Studies was introduced. This intervention was carried out over a period of four (4) weeks. Fifth, on the first day of the first week, immediately after securing consent and approval, the researchers conducted a class with the Grade 9 STE-Platinum students focusing on economics competencies from the fourth quarter. This session also served to support the development and validation of the electronic book for the Social Studies class. Sixth, the researchers implemented the E-book intervention over four (4) weeks, with one session per week conducted every Thursday. To ensure the validity of the findings, only one of the researchers was assigned to deliver the lessons, thereby minimizing the influence of teacher variability and focusing on the effectiveness of the Ebook intervention. Seventh, during the fourth week, the respondents were given a post-test questionnaire to assess the impact of the E-book intervention on their learning outcomes. Lastly, the students' post-test data were collected, organized, and prepared for statistical treatment and analysis.

Data Analysis Procedure

The following statistical tool was used to interpret the data collected:

Quantitative Data Analysis For problem number 1, which states that, "What are the least mastered lessons of the student?" Frequency and percentage were used. For problem number 2, which states that, "What is the pre-and post-intervention academic performance of the students in Social Studies?" Mean and Standard deviation was used. For problem number 3, which states that, "Is there a significant difference in the pre- and post-intervention performance of the students in Social Studies?" Wilcoxon Signed-Ranks Test was used. For problem number 4, which states that" What is the acceptability level of the E-book developed in terms of Content and Relevance, Technical Aspects, and Ethical Considerations?" Mean was used.

Qualitative Data Analysis

For problem number 5, which states that "What are the insights of the students after using the E-book?" Thematic Analysis was used. To acquire insights into the development, validation and utilization of the electronic book for Grade 9 Social Studies, the researchers collected data from participants, both teachers and students using written responses (Essays). This feedback gave vital insights on the E-book's usability, effectiveness, and engagement. Following data gathering, Thematic Analysis was used to systematically arrange and analyze the information. Thematic Analysis is a popular qualitative technique that enables researchers to locate, evaluate, and understand trends or common themes in the collected information (Braun & Clarke, 2006). It is a successful and adaptable way to assessing several sorts of qualitative data, including participant feedback, making it exquisite for our study (Nowell et al., 2017). The steps of Thematic analysis used in this study includes:

Step 1: Familiarizing. The researchers thoroughly read all written essays responses.

Step 2: Generating Initial Codes. After closely examining the data, the researchers developed preliminary codes based on repeating themes and noticeable assertions.

Step 3: Generating Themes. Upon sorting the initial codes, the researchers recognized highly probable themes emerging from the coded data.

Step 4: Reviewing Themes. The researchers examined and adjusted the themes, selecting those that most accurately captured the participants' experiences.

Step 5: Defining and Naming themes. Each finalized theme was properly defined and given a descriptive name that reflected its main concept.

Step 6: Creating the Report. The researchers synthesized the final themes using the selected themes as the basis for their analysis.

Ethical Considerations

This research requires that all participants, including both Teachers and students must give their informed consent after being fully informed about the purpose, methodology, and anticipated outcomes of the research. Participants were guaranteed that participation is entirely voluntary and that they can leave at any time without facing any repercussions.

By not revealing any identifying information in the research outputs, confidentiality and anonymity were preserved. All information gathered were safely saved and utilized only for academic and research reasons. The E-book was designed to be age-appropriate, culturally sensitive, and educationally relevant to ensure that users find it useful and not offensive. To guarantee the accuracy, relevance, and appropriateness of the content, validation processes Social Studies experts were involved.

Furthermore, approval from the research adviser, institutional review board or ethics committee, and school administrators was obtained prior to implementation. The researchers ensured that no harm psychological, emotional, or educational resulted from participation in the study.

Prior to implementation, the research adviser, the university's review board or ethical committee, and school administration provided their permission. The researchers ensured that participation in the study did not cause any psychological, emotional, or educational harm.

RESULTS AND DISCUSSIONS

Descriptive Data Analysis

This study was conducted to determine the level of the students' level of pre-intervention and post-intervention academic performance of Grade 9 – STE Platinum students of Himamaylan National High School using quasi-experimental design. The mean scores and standard deviation showed the level of student's academic performance below.

Table 2

The Least Mastered Competency of Grade-9 Platinum in Social Studies

Competency	Number of Items based on TOS	% of Wrong Answers	% of Correct Answers
Pambansang Kaunlaran	9	40.50%	59.49%
Sektor ng Agrikultura	9	45.87%	57.34%
Sektor ng Industriya	5	57.41%	42.58%
*Sektor ng Paglilingkod	12	*67.74%	*32. 35%
Impormal na Sektor	3	59.13%	40.86%
Kalakalang Panlabas	2	62.90%	37.09%

*Note: The competency with the lowest percentage of correct answers was made as the basis in developing, validating, and utilizing the E-book.

Table 4 shows the six competencies and indicates that the competency "Sektor ng Paglilingkod" has the lowest percentage of correct answers at 32.35% and the highest error rate at 67.74%. This significant gap suggests several reasons for students' difficulties in mastering this competency. These are the complexity of the concepts, which includes the different Sub-topics namely; (1) Sub-Sektor ng Paglilingkod; (2) Mga Ahensyang Bumubuo sa Sektor ng Paglilingkod; (3) Hamon at Oportuninad sa Sektor ng Paglilingkod and (4) Mga Batas na Nangangalaga sa mga Karapatan ng Manggagawa — can present significant difficulties, particularly for students who may lack the necessary foundational knowledge. According to Tindowen (2019), the complexity of certain academic concepts—especially those involving multiple sub-sectors, government agencies, and labor laws—can overwhelm students who lack foundational knowledge, leading to poor performance and disengagement. Similarly, Cajayon et al. (2021) highlighted that teaching methods that are not responsive to diverse learners often result in low student motivation and limited comprehension. Given these complexities and results, this suggests that "Sektor ng Paglilingkod" is the least mastered competency among Grade 9 students, making it the best choice as a foundation for the validation and creation of an Electronic Book specifically designed for Grade 9 Social Studies.

Table 5

Means and Standard Deviations of the Academic Performance of Students in Social Studies

Before and After the Intervention

	N	Mean	SD	Verbal Description
Pre-intervention Academic Performance in Social Studies	31	16.13	5.31	Low

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Post-intervention Academic Performance in Social Studies	31	41.61	3.40	Very High

Note: 40.01-50.00 Very High; 30.01-40.00 High; 20.01-30.00 Average; 10.01-20.00 Low; 0.00-10.00 Very Low

Table 5 indicates that the students' pre-intervention mean score of 16.13 (SD = 5.31) categorized their performance as "low." However, after the introduction of the Ebook intervention, there is a significant improvement in performance, with the postintervention mean score rising to 41.61 (SD = 3.40), classified as "very high." This dramatic shift suggests that the E-book intervention has a strong positive impact on students' academic achievement in social studies. Before the intervention, students performed at a "low" level, with a mean score of 16.13. The relatively high standard deviation of 5.31 indicates that there is variability in student performance, meaning that while most students are struggling, there are a few students who might have performed somewhat better. However, the overall low mean suggests that many students has difficulty understanding or engaging with the content before the intervention.

After the introduction of the E-book as intervention, there is a dramatic increase in performance, with the mean score rising to 41.61, which is categorized as "very high." The reduced standard deviation of 3.40 indicates that there is less variability in performance post-intervention, meaning that most students are able to benefit from the E-book tool and their performance becomes more consistent. This suggests that the Ebook intervention helps bring students up to a higher level of understanding and achievement in social studies, with fewer students left behind. This dramatic shift indicates that the E-book provided students with a more engaging, interactive, and effective way of learning social studies content, helping them grasp concepts more easily and achieve higher academic results.

According to Turner (2020), the use of E-books, especially in subjects like Social Studies, offers several benefits over traditional textbooks. E-books can provide interactive elements such as multimedia (videos, audio, animations) that enhance learning by making abstract or complex concepts more tangible. This aligns with Mayer's (2005) Cognitive Theory of Multimedia Learning, which emphasizes that students learn better when information is presented through both visual and auditory channels. Additionally, E-books allow students to learn at their own pace, revisiting content as needed, and can offer personalized learning experiences that cater to individual needs (Larson, 2010). Hence, these features likely contributed to the significant improvement observed in the study.

The E-book format may have increased student engagement and motivation, which are key factors in academic achievement. Research by Mayer (2005) and Guthrie & Wigfield (2000) shows that interactive and multimedia-enhanced E-books can boost student motivation by making learning more engaging and accessible. The use of technology may have sparked students' interest in social studies, making them more willing to engage with the material and increasing their overall academic performance.

The reduction in standard deviation from 5.31 to 3.40 suggests that the E-book intervention led to more uniform improvement in student performance. According to Fraenkel, Wallen, and Hyun (2012), a smaller standard deviation in post-test scores indicates less variability among learners, suggesting that the intervention may have supported students with diverse prior knowledge to reach more consistent levels of understanding. This implies that the E-book was effective in narrowing the performance gap and enabling a broader group of students to succeed.

The effectiveness of the E-book intervention is supported by Cognitive Load Theory (CLT), proposed by John Sweller (1988), learning is most effective when cognitive load is optimized. E-books with multimedia content can reduce cognitive load by breaking down complex information into smaller, more manageable chunks. This is particularly relevant in social studies, where students may need to grasp complex historical events, concepts, and terminology. The multimedia elements in e-books can help students process information more effectively and with less mental strain.

In addition, Mayer's (2005) Multimedia Learning Theory states that students learn better when they are presented with both visual and verbal information. E-books are an ideal medium for implementing this theory, as they often incorporate text, images, videos, and interactive elements that allow students to process information through multiple sensory channels. This multimodal approach likely enhanced students' understanding of social studies content and contributed to their improved performance.

Moreover, Vygotsky's (1978) constructivist theory posits that learners construct knowledge through interaction with their environment and peers. E-books offer an interactive learning environment where students can engage with content at their own pace, revisit concepts, and apply what they've learned in interactive ways. This aligns with the idea of active learning, which may have contributed to the students' improved academic performance (Bransford, Brown, & Cocking, 2000).

Inferential Data Analysis

The Wilcoxon Signed-Ranks Test was used to determine whether there was a statistically significant difference between the students' pre-intervention and postintervention academic performance. The quasi-experimental study investigated the impact of using an E-book as an intervention to improve the academic performance of Grade 9 students in Social Studies, a method supported by educational researchers who emphasize the value of digital tools in enhancing student engagement and learning outcomes (Larson, 2010; Woody, Daniel, & Baker, 2010).

Table 6

Difference in the Academic Performance of Grade 9 Students in Social Studies Before and After the Intervention

	Mean Rank	Sum of Ranks	Z	Sig.
Post-intervention Vocabulary Skills	.00	.00 496.00	-4.861	.000
Pre-intervention Vocabulary Skills	16.00			

*p < .01, significant

The quasi-experimental study investigated the impact of using an eBook as an intervention to improve the academic performance of Grade 9 students in social studies. The findings indicate a significant difference in students' performance from preintervention to post-intervention. Specifically, the statistical analysis reveals a Z-score of -4.861 with a p-value of .000, suggesting that the intervention has a substantial and statistically significant effect on students' academic performance. According to Field (2013), such a Z-score indicates a large effect size. In the context of statistical testing, a Z-score of this magnitude suggests that the observed differences between preintervention and post-intervention performance are highly unlikely to have occurred due to chance alone.

The Z-score of -4.861 indicates a large effect size. In the context of statistical testing, a Z-score of this magnitude suggests that the observed differences between pre-intervention and post-intervention performance are highly unlikely to have occurred due to chance alone. In fact, a Z-score with such a large absolute value is typically interpreted as a very strong indicator of statistical significance (Corder & Foreman, 2014).

In addition, the p-value of .000 further supports the statistical significance of the findings. A p-value of less than 0.05 indicates that the null hypothesis (which typically posits no effect or no difference) can be rejected. The .000 p-value suggests that the difference observed in students' performance before and after the E-book

intervention is significant and not attributable to random variation. This reinforces the conclusion that the intervention likely had a meaningful impact.

The statistically significant results, highlighted by the Z-score of -4.861 and pvalue of .000, strongly suggest that the E-book intervention was highly effective in enhancing students' academic performance in social studies. This dramatic improvement in scores indicates that the E-book provided a more engaging, interactive, and effective learning experience compared to traditional methods. Several factors likely contributed to this positive impact.

First, the E-book's multimedia features, such as interactive quizzes, videos, and diagrams, can make abstract social studies concepts more accessible and engaging, leading to better comprehension and retention.

Second, the personalized learning opportunities afforded by E-books, allowing students to work at their own pace, revisit content, and access tailored resources, may have helped them master concepts more effectively.

Finally, technology-based tools like E-books have been shown to increase student motivation and engagement (Mayer, 2005), likely capturing students' attention and boosting their interest in social studies. It's also important to note that while the initial focus was on vocabulary skills, E-books can significantly improve vocabulary acquisition and conceptual understanding in social studies. Interactive features like multimedia glossaries, highlighted key terms, and contextual examples help students grasp complex concepts and terminology central to the study of history, geography, and civics.

Table 7

Acceptability Level of the E-book Developed in Terms of Content and Relevance,

Technical Aspects, and Ethical Considerations

Evaluator	Content and Relevance		Technical Aspects		Ethical Considerations		As a Whole	
	Mean	Description	Mean	Description	Mean	Description	Mean	Description
1	4.89	Highly Acceptable	4.67	Highly Acceptable	4.67	Highly Acceptable	4.74	Highly Acceptable
2	4.89	Highly Acceptable	4.83	Highly Acceptable	5.00	Highly Acceptable	4.91	Highly Acceptable
3	4.22	Acceptable	4.17	Acceptable	3.67	Acceptable	4.02	Acceptable
4	4.56	Highly Acceptable	4.67	Highly Acceptable	4.00	Acceptable	4.41	Acceptable
5	4.67	Highly Acceptable	4.50	Acceptable	5.00	Highly Acceptable	4.72	Highly Acceptable
6	5.00	Highly Acceptable	5.00	Highly Acceptable	5.00	Highly Acceptable	5.00	Highly Acceptable
7	5.00	Highly Acceptable	5.00	Highly Acceptable	5.00	Highly Acceptable	5.00	Highly Acceptable
8	4.78	Highly Acceptable	5.00	Highly Acceptable	5.00	Highly Acceptable	4.93	Highly Acceptable

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Grand Mean	4.75	Highly Acceptable	4.73	Highly Acceptable	4.67	Highly Acceptable	4.71	Highly Acceptable

Note: 4.51-5.00 Highly Acceptable, 3.51-4.50 Acceptable, 2.51-3.50 Neutral, Unacceptable 1.51- 2.50, Highly Unacceptable 1.00-1.50

Table 7 presents the results of an evaluation of an E-book designed for social studies instruction. The data reveals that the E-book receives consistently high ratings across all criteria. The Grand Means for Content and Relevance (4.75), Technical Aspects (4.73), and "As a Whole" (4.71) all fall within the "Highly Acceptable" range, indicating a strong positive evaluation of the E-book's content, functionality, and overall effectiveness. The mean score for Ethical Considerations (4.67) is also within the "Highly Acceptable" range, suggesting that the E-book adheres to ethical standards. While slightly lower than the other Grand Means, it still indicates a favorable evaluation. The diversity of the evaluator group—including the perspectives of social studies teachers, IT experts, and students may have contributed to the reliability of these findings.

The relatively small variations in scores between evaluators (as reflected in the individual mean scores) suggests a high degree of consistency in the assessment of the E-book's quality. This overall positive feedback, informed by the varied expertise of the evaluators, strongly supports the E-book's suitability and effectiveness as an educational tool.

Insights of the Students After Using the E-Book

Increase Interest and Motivation

The integration of technology in education has transformed traditional learning experiences into engaging and interactive encounters for students. E-books, in particular, have revolutionized how students' access and interact with educational content, making subjects like Social Studies more appealing and comprehensible. The dynamic features of E-books—including multimedia elements, interactive activities, and customizable interfaces—have sparked renewed interest in academic subjects that were previously considered unexciting by many students. Specifically, Mateo said that,

"*Bago sa akin ang paggamit ng E-books. Mas naging interesting at informative ang Social Studies. Mas madali ko nang naiintindihan ang aralin.*" (Using E-books is new to me. Social Studies has become more interesting and informative. I can now understand the lessons more easily.)

This was supported by Sofia when she said,

"*I find Social Studies interesting and important dahil tinutulungan akong maintindihan ang mundo at ang mga lipunan. E-books add a modern and engaging way to explore history, culture, and current events. Mas nakaka-excite magbasa ngayon.*" (I find Social Studies interesting and important because it helps me understand the world and societies. E-books add a modern and engaging way to explore history, culture, and current events. Reading is more exciting now.)

 Furthermore, Miguel stated that,

"*Fascinating talaga ang Social Studies! Ang pag-aaral ng kultura, kasaysayan, at lipunan ay mas interesting na ngayon. E-books make it easier with interactive tools.*" (Learning about culture, history, and society has become more interesting now. E-books make the experience easier and more engaging through interactive tools.)

E-books play a significant role in making learning more interesting and accessible to students. Kožuh et al. (2019) emphasized how multimedia, hyperlinks, and adjustable texts meet various learning styles and promote independent learning. These features make the reading experience dynamic and student-centered, especially in the flexible setup of digital education. With interactive components, students feel more in control of their learning, leading to increased motivation. This motivation is crucial in sustaining attention and interest in

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academic tasks, especially in Social Studies. As observed, learners tend to stay engaged longer when they can personalize how they access content. The adaptability of E-books gives students a sense of ownership and curiosity in their own learning journey.

Enhance Self-Assessment and Retention

The integration of self-assessment tools in E-books has revolutionized how students measure their understanding and retain knowledge in modern educational environments. These digital features transform traditional reading into an interactive experience that offers immediate feedback, personalized review opportunities, and continuous learning support. Self-assessment components create a virtual study companion that students can access anytime, making the learning process more efficient and tailored to individual needs while fostering academic independence. Specifically, Ana said that,

"Yung quizzes pagkatapos ng section, sobrang useful. Nagiging self-check ko siya kung tama ba ang pagkaintindi ko. Parang may mini-review ka agad pagkatapos ng lesson." (The quizzes after each section are very useful. They serve as my selfcheck to confirm if my understanding is correct. It's like having an immediate minireview after the lesson.)

This was supported by Samantha when she said,

"Isa sa mga pinaka-useful na feature para sa akin ay 'yung highlighting at notetaking. Pwede kong i-mark ang important points tapos balikan anytime. Parang may sariling reviewer na akong nagagawa habang nagbabasa." (One of the most useful features for me is highlighting and note-taking. I can mark important points and revisit them anytime. It's like creating my own reviewer while reading.)

Furthermore, Ellena stated that,

"Para sa akin, malaking tulong 'yung instant feedback after ng activities. Nalalaman ko agad kung saan ako nagkamali at kung anong part ng lesson ang kailangan ko pang balikan. Parang may study buddy ka talaga na nag-ga-guide habang nagaaral, kaya mas madali kong nare-retain 'yung mga natutunan ko." (For me, the instant feedback after the activities is a big help. I immediately find out where I made mistakes and which part of the lesson I need to review. It's like having a study buddy guiding me while I'm studying, so it's easier for me to retain what I've learned.)

E-books equipped with self-assessment tools can significantly boost learning retention. Huang and Liang (2021) showed that students using E-books with embedded quizzes retained 31% more knowledge than those using traditional materials. These tools help students test their understanding immediately after learning, reinforcing what they've studied. For Social Studies, where dates, concepts, and historical analysis matter, quick reviews can make all the difference. Self-assessments provide instant feedback, guiding learners to revisit unclear topics. Having a built-in study buddy helps make learning continuous and accessible anytime. It empowers students to take charge of their progress.

Engaging and Deep Learning

E-books have transformed Social Studies from a traditional subject of memorization into an engaging field of exploration and critical thinking through their interactive features and collaborative capabilities. These digital resources provide students with opportunities to engage with content more deeply, offering multiple perspectives and encouraging analytical thinking that traditional textbooks often fail to facilitate. The dynamic nature of E-books creates an environment where students develop not just subject knowledge but also essential critical thinking skills that extend beyond the classroom.

Specifically, Maria said that,

"Engaging ang Social Studies sa classroom lalo na kapag may E-books. They allow

deeper discussions and offer different perspectives. Nakakatulong ito para mas maging open-minded ako." (Social Studies is engaging in the classroom especially with E-books. They allow deeper discussions and offer different perspectives. This helps me become more open-minded.)

This was supported by Jose when he said,

"E-books make learning dynamic and interactive. Hindi nakakabagot ang lessons. Mas napapanatili ang interest ko sa subject." (E-books make learning dynamic and interactive. The lessons aren't boring. My interest in the subject is better maintained.

Furthermore, Isabella stated that,

"Mas na-iintindihan ko ang mga historical events at connections dahil sa visual features ng E-books. Hindi lang ako basta nagbabasa, parang nag-e-explore ako ng history mismo. Mas exciting at mas malalim ang pagkaunawa ko sa mga aralin.' These tools, according to her, make Social Studies feel like an exploration rather than just a subject to study." (I understand historical events and connections better because of the visual features of E-books. It's not just reading; it feels like I'm exploring history itself. It makes the lessons more exciting and deepens my understanding.)

E-books can go beyond surface-level learning and encourage students to think critically. Ramírez-Montoya and Lugo-Ocando (2020) documented how collaborative Ebooks with discussion features improved critical thinking skills among students. These tools promote dialogue, reflection, and peer learning—essential elements in developing deeper understanding. In Social Studies, where analysis and interpretation are key, having embedded tools for collaboration can enhance classroom discourse. When learners engage with content and each other, they begin to see multiple perspectives and think more analytically. E-books help shift learning from passive reading to active inquiry. With the right tools, Social Studies becomes not just informative, but transformative.

Visual and Interactive Enhancements

The visual and interactive capabilities of E-books create a multi-sensory learning experience that captivates students' attention and enhances their engagement with educational content. By incorporating videos, animations, and interactive elements, Ebooks transform static information into dynamic learning experiences that appeal to different learning preferences and maintain student interest. These enhancements make complex or challenging topics more accessible and enjoyable, turning potential academic obstacles into opportunities for deeper understanding and appreciation.

Specifically, Mateo said that,

"I think to make the E-book more interesting; it should have more videos. Hindi lang siya basta nagpapakita ng information, kundi nagiging mas masaya at engaging para sa amin. Mas magiging meaningful yung learning experience kapag may visual and audio components din." (I think to make the E-book more interesting; it should have more videos. It doesn't just show information but becomes more fun and engaging for us. The learning experience becomes more meaningful when there are visual and audio components too.)

This was supported by Sofia when she said,

"A lot of animation is one of the best things to improve in the E-book. Kapag mas maraming animation, mas nagiging interesting ang lesson, lalo na sa mga mahihirap na topics. Kasi, parang hindi lang kami basta nagbabasa—mas entertaining at engaging pa." (A lot of animation is one of the best things to improve in the E-book. With more animations, the lesson becomes more interesting, especially for difficult topics. Because it's not just reading—it's more entertaining and engaging.)

Furthermore, David stated that,

"I would suggest adding more visuals like videos and animations. Mas engaging siya at mas nakakatulong sa mga concepts na mahirap intindihin. Kaya pag may visual aids, mas nakikita ko kung paano nangyayari ang mga historical events at connections nila." (I would suggest adding more visuals like videos and animations. It's more engaging and helps with concepts that are hard to understand. So, with visual aids, I can see how historical events happen and their connections.")

Visual and interactive enhancements in E-books increase student engagement and retention. Tzeng and Hsu (2022) emphasized that adding animations, clickable diagrams, and interactive lessons helped improve focus and comprehension. In Social Studies, these enhancements turn static content into lively narratives. Students enjoy learning more when information is delivered in dynamic, visual formats. These features help both visual and kinesthetic learners connect with the material. E-books become tools not just for reading but for exploration. It makes the experience mentally stimulating and visually enjoyable.

Visual Aid for Understanding

Visual elements in E-books serve as powerful cognitive scaffolds that bridge abstract concepts with concrete representations, making complex information more accessible and comprehensible for students. The strategic integration of images, interactive diagrams, and sequential visual presentations helps learners process information more efficiently and develop deeper conceptual understanding. These visual aids transform the learning experience by providing clear pathways through complex material and encouraging exploration of educational content at individual paces.

Specifically, Maria said that,

"Para sa akin, sobrang nakakatulong 'yung images sa E-book kasi mas mabilis kong naiintindihan ang aralin. May mga detalyadong impormasyon rin na malinaw at direkta. Kaya mas madali kong nasusundan ang topic." (For me, the images in the E-book are incredibly helpful because I can understand the lessons more quickly. There are detailed pieces of information that are clear and direct. This makes it easier for me to follow the topic.)

This was supported by Jose when he said that,

"Sobrang helpful ng visual sequence ng E-book—parang step-by-step ang dating. Kapag nagki-click ako sa mga part ng lesson, parang may bagong info agad na lumalabas. Nakaka-curious tuloy mag-explore pa." (The visual sequence of the Ebook is extremely helpful—it feels like a step-by-step process. When I click on different parts of the lesson, new information pops up right away. This makes me curious to explore even more.)

Furthermore, David stated that,

"Ang images at charts ng E-book ay sobrang nakakatulong sa akin. Kapag may timeline o graph, mas madaling i-connect ang mga pangyayari. Hindi lang ako basta nagbabasa—nakikita ko talaga ang buong picture." (The images and charts in the E-book are really helpful to me. When there's a timeline or graph, it's easier to connect the events. I'm not just reading—I can really see the whole picture.)

Digital features in E-books serve as powerful visual aids for better comprehension. Bus, de Jong, and Verhallen (2006) found that these features support prediction, connection, and inference-making strategies in students. By allowing learners to visualize concepts and stories, E-books help deepen understanding. In Social Studies, where students often deal with abstract ideas or historical narratives, visuals can bring lessons to life. Interactive maps, animations, and illustrated timelines help learners grasp complex ideas faster. These aids promote active thinking and long-term memory.

Visual learning makes information easier to retain and apply.

CONCLUSIONS

The findings from this quasi-experimental study highlighted the effectiveness of E-books in improving the academic performance of Grade 9 students in Social Studies. Initially, the least mastered competency was identified as "Sektor ng Paglilingkod," based on the lowest percentage of correct responses. Before the intervention, students' performance was generally categorized as "low," indicating that many struggled to understand and engage with the content. After the implementation of the E-Book intervention, there was a significant improvement in academic performance of the students, categorized as "very high." This dramatic shift not only indicated a highly significant difference between the pre- and post-intervention results but also suggested that the E-book had a substantial and positive impact on students' learning outcomes.

Furthermore, the E-book was rated highly across all evaluated areas,

including content, technical aspects, and ethical considerations, reflecting its overall high level of acceptability. Qualitative feedback from students also reinforced the E-book's value, with recurring themes such as enhanced self-assessment and retention, increased interest and motivation, visually stimulating content, deeper engagement, and improved understanding through visuals.

These results demonstrated that E-books not only improved academic

performance but also enriched the learning experience. The integration of interactive, multimedia-rich, and student-centered digital tools like E-books can therefore serve as an effective strategy for enhancing educational outcomes, fostering consistent learning gains, and increasing student engagement in Social Studies.

Implications

Accordingly, the first major theoretical implication of the present research is the affirmation and application of three foundational learning theories: Constructivist Learning Theory, Multimedia Learning Theory, and Cognitive Load Theory. The findings suggest that interactive electronic books (E-books) contribute significantly to improved academic performance by aligning with these theories. Constructivism was seen in how students actively engaged with content and built knowledge through exploration. Multimedia Learning Theory was evident in students' increased comprehension when visual and auditory elements were combined. Moreover, Cognitive Load Theory was supported as the E-book's structured content helped reduce extraneous load, allowing students to focus on key concepts in Social Studies. These theories collectively frame the effectiveness of the intervention and support its replicability in other contexts.

An important implication drawn from the study lies in how technology can

practically support instruction in traditionally challenging subjects like Social Studies. Prior to the intervention, students showed low performance and disengagement; however, the introduction of a multimedia-rich E-book facilitated not only higher comprehension but also improved consistency in scores, as shown by the reduced standard deviation. This implies that incorporating educational technology like E-books is not merely about digital innovation but about designing effective learning experiences that meet pedagogical goals. The E-book bridged the gap between students with varying abilities, supporting differentiated instruction and creating a more equitable learning environment.

In analyzing the findings and linking them to practical classroom dynamics,

the researchers established the potential for this intervention to be integrated not only within one classroom but also across broader school systems. Educational institutions, particularly in resource-constrained settings, could benefit from adapting this type of digital material to enhance curriculum delivery. The use of interactive features—such as quizzes, videos, timelines, and self-assessment tools—offered students autonomy over their learning and helped foster engagement, which may have long-term benefits in knowledge retention and academic interest.

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It also implies the growing importance of reimagining instructional materials in ways that speak to 21st-century learners. This includes moving beyond traditional textbooks and fostering active learning through digital means. The positive feedback from student participants in terms of usability, clarity, and motivation further validates that well-designed E-books are not just supplementary materials but viable central tools in instruction. Teachers, therefore, are encouraged to integrate E-books into their lesson planning and adopt learner-centered strategies that maximize their potential.

Accordingly, this research brings forward a crucial issue—how to continuously support the meaningful integration of educational technology through teacher training and curriculum innovation. This includes addressing challenges related to access, digital skills, and institutional readiness. Based on the findings, the development of E-books should be accompanied by ongoing evaluation and refinement. Reflective practice, user feedback, and collaboration with subject experts and technologists are vital in sustaining the effectiveness of such innovations.

In conclusion, the findings offer a timely contribution to both theory and

practice. They reinforce established educational principles while presenting a concrete, validated instructional tool that addresses real classroom challenges. The significant improvement in students' academic performance highlights the value of integrating interactive digital resources into the Social Studies curriculum. This study demonstrates that when theory and technology merge with contextualized pedagogy, transformative learning outcomes can be achieved.

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