

The Effectiveness of Technology Integration by Redefinition in Teaching Asian History Among Grade 7 Learners in a Catholic School



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ABSTRACT. Technology plays a pivotal role in education by enabling innovative teaching methods. Anchored in the Technological Pedagogical Content Knowledge (TPACK) framework, this study assessed the effectiveness of the Substitution, Augmentation, Modification, and Redefinition (SAMR) model's "Redefinition" level in teaching Asian History to Grade 7 students at a Catholic school on Negros Island. Utilizing a quasi-experimental design, the research compared a control group receiving conventional instruction with an experimental group benefiting from redefined technology-integrated strategies. The results demonstrated a statistically significant improvement in the academic performance of the experimental group. These findings confirm that integrating technology at the redefinition level moves beyond simple substitution, significantly enhancing learner engagement, comprehension, and overall academic achievement.

1.0. Introduction

Technology is the application of scientific knowledge to create devices, machinery, and systems that solve problems and improve people's quality of life. Modern technology has completely transformed our lives, enhancing our luxury and convenience through smooth travel and international communication (Simplilearn, 2023). Additionally, according to Santander (2023), more than 60% of people have access to the Internet, 6.5 billion people own smartphones, and over 2.14 billion people made at least one online purchase in 2021. These are just three examples of how our lifestyle has changed and how far technology has come in the modern era.

Technology plays a vital role in the educational system and continues to develop and evolve (Hanifah et al., 2019). In a broad sense, technology integration is the utilization of existing tools, equipment, or materials (Okojie et al., 2018) with the presence of smartphones, computers, and other gadgets that have become part of the everyday lives of teachers and students (Drexel

University School of Education, 2000). In addition, technology integration helps teachers to build up students' motivation to participate actively and gives them meaningful experience in class (LSU Online, 2020). Furthermore, 21st-century teachers should efficiently integrate technology into their teaching pedagogy (Petalla, 2025; Shin et al., 2019), specifically Social Studies teachers to have immense knowledge and experience in integrating technology into their instruction (Shin et al., 2019) to help shape social, civic, and economic aspects of the students and help them meet global learning goals and standards (Asia Society, 2020). Based on Aslam et al. (2020) findings, technology integration can benefit the teacher-student process and is associated with teacher instructional pedagogy, content knowledge, and technological competency.

In the Philippine context, Hero (2019) states that technology integration is the most notable component of Philippine K-12 education. Furthermore, the Department of Education (DepEd) issues the Policy Guidelines On Daily Lesson Preparation through the DepEd Order No.42,s.2016 specifically discusses the aim to empower teachers to carry out quality instruction that recognizes the diversity of learners inside the classroom, is committed to learners' success, and allows the use of

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varied instructional and formative assessment strategies, including information and communications technologies (ICTs). The results of a study on the use of Web 2.0 technology in social science education indicate a moderate level of use (Echeng et al., 2016). Conversely, social studies teachers used Aralinks 554 times in 2021. In addition, Petalla's (2025) study suggests that educators need to create new teaching methods and evaluations to incorporate technology into their instruction. Teachers can design lessons that allow students to use ICTs to access, organize, and process information, produce and develop products, and work together and communicate with others.

Last October, during the Philippine Accrediting Association of Schools, Colleges, and Universities (PAASCU) accreditation, one of the most important recommendations was to move to more interactive, learner-centered approaches. The recommendation on page 4 of their final report is to avoid the heavy reliance on PowerPoint lectures, particularly for subjects such as Social Studies. Teachers were duplicating book material onto slides today without using the capability of making learning an experiential, interactive activity and leveraging technology to construct vibrant simulations, collaborative projects, or interactive maps – all facilitating curiosity and teamwork. It is about making learning an interactive process in which students are not simply passive recipients but participatory learners engaging and relating with what they are learning.

According to the respondent's evaluation of the SAMR Model, there were notable variations in substitution but not augmentation, modification, or redefinition. These findings offer strategies for teaching mathematics effectively (Flores, 2022). Moreover, Flores and Adlaon (2022) state that Science teachers utilized digital technology with improved functional change instead of traditional tools. This approach aids teachers in giving a general picture of how English language acquisition is implemented (i.e., reading, writing, and listening). The basic SAMR model is undoubtedly like a model initially used in cognitive education (Yayu Suryani et al., 2019). However, there were limited studies established on the effectiveness of technology integration by the Redefinition in substitution, augmentation, modification, and redefinition model of Social Studies teachers in Catholic schools in Negros Island.

The study assessed the effectiveness of technology integration by Social Studies teachers in the new normal, aiming to create interactive materials following the Redefinition in Substitution, Augmentation, Modification, and Redefinition model for teaching Asian History on imperialism and nationalism in Japan, China and the Philippines in Negros Island Catholic school and identifying appropriate training needs.

2.0. Framework of the Study

The theoretical assumption that the use of technology can make learning more effective for students has been considered in this paper. Specifically, it proposed that high school students could improve their knowledge of Asian History using technology to change how Asia's History is taught, in particular, imperialist and nationalism from China, Japan, or the Philippines.

The study was anchored in the Technological Pedagogical Content Knowledge (TPACK) framework developed by Mishra and Koehler (2006). TPACK framework stresses the need for teachers to thoroughly understand what they are teaching, how it is being taught effectively, and how they use technology to complement both. It discourages using technology solely for its purposes and instead highlights the potential of technology to improve teaching and the delivery of content to students.

This study examines the effect of technology on Grade 7 students' learning outcomes in Asian History, using the TPACK framework by Mishra and Koehler (2006). It compares pretest and posttest mean scores between control and experimental groups from Catholic schools to evaluate the effectiveness of technological interventions. By analyzing proficiency levels before and after the intervention, the study determines significant differences and mean gains in scores. Technological Pedagogical Content Knowledge (TPACK) emphasizes integrating technology to enhance teaching and learning, aligning with the substitution, augmentation, modification, and redefinition model's redefinition level, suggesting technology can create new, previously impossible learning experiences, and improving student engagement and understanding of complex historical concepts.

3.0. Methodology

Quasi-experimental designs are frequently employed when the random assignment of participants is not practical or ethical. In such cases, researchers must utilize existing groups, like different classrooms or schools, to compare the impact of an intervention or treatment. This approach aligns with Thomas's (2020) assertion that quasi-experimental research seeks to establish a cause-and-effect relationship between independent and dependent variables. However, a key distinction from true experiments is the absence of random assignment. Instead, participants are assigned to groups based on pre-existing or non-random criteria. For instance, in this study, the respondents were 160 Grade 7 junior high school students from a Catholic school.

Purposive sampling was utilized to determine and assign the respondents. The researcher selected the respondents by identifying the average grade of the six sections of grade 7 learners. In contrast, the sections that

got the highest and the lowest average from the first to third quarter were excluded from the study and used as participants to validate the test questionnaires. On the other hand, "Toss a coin" was used to identify the first two sections that got the average under the control group, and the second two were under the experimental group. The intervention for the experimental group was exposure to technology integration by redefinition for three weeks, and the control group was taught using the conventional approach.

A research-made questionnaire was utilized as an instrument. The basis for making the researcher-made test questionnaire, which served as a pretest and posttest, was taken from the Department of Education's Most Essential Learning Competencies, Social Studies, Asian History 7, Fourth quarter. The research consisted of 65 items subjected to a validity test. A table of Specifications was used to distribute items following Bloom's Taxonomy. Since the instrument was researcher-made and subjected to validity and reliability testing. Jury validation was employed to determine the validity of the questionnaire. In this study, the lesson plan was submitted to the head of the Information Technology Department to validate the following technology-integrated strategies that imply the topics. On the other hand, a questionnaire was submitted for analysis and evaluation conducted by ten (10) experts who were holders of Master of Arts in Education Social Science degrees and Doctor of Philosophy in Social Science degrees and experts in making assessments. The researcher used the Content Validity Ratio (CVR) for the instrument's validity, identifying the essential items needed for the final instrument, and Cronbach's Alpha to determine the instrument's reliability.

To ensure the validity of the questionnaire, the researcher used Lawshe's Content Validity. This standard content validity contains the knowledge or skills that each item on the test assesses is "essential," practical, not necessary," or "not necessary." Each item in the survey questionnaire must have a minimum content validity ratio of 0.78. Out of 96 items, 82 were considered valid, with an overall content validity index of 0.94. To determine the instrument's reliability, pilot testing was conducted on the star section of Grade 7 learners of the same school; however, they were not included as actual study respondents. Additionally, item analysis was performed to identify the respondents' scores. The pilot test involved 30 participants and 65 questions. The questions were mixed with easy, average, complex, and difficult. Moreover, Cronbach's Alpha was used to establish a 0.943 value, meaning the survey questionnaire was reliable.

The quantitative data were analyzed using the following: a descriptive and comparative research design. These were treated as scale data to determine the

academic performance of Grade 7 students in experimental and control groups in the Social Studies and Asian History subjects regarding their pre- and posttests. Quantitative research is the process of collecting, analyzing, interpreting, and writing the results of a study. Descriptive analysis provides insight into the dataset without forming generalized conclusions. It provides an overview of data collection without sweeping conclusions based on the sample data. It typically uses the mean to represent central tendency, the standard deviation to demonstrate how much the data varies around the mean, and the percentage distribution for the proportions. Finally, frequency counts are applied to find the number of instances for each unique value in the data, which helps us understand the spread of categorical data.

Kolmogorov-Smirnov test was used to assess the normality of our variables. The results indicated that both the pretest data [KS=0.075, p=0.027] and posttest data [KS=0.097, p=0.001] were not normally distributed. Given this non-normal distribution, nonparametric tests were used to address the inferential questions. Analysis of Covariance (ANCOVA) was then utilized to compare group means while controlling for covariates. Both comparative and descriptive analyses helped us understand the relationships and interactions within our data.

Lastly, the researchers adhered to the Philippine Health Research Ethics Board (PHREB) ethical guidelines.

4.0. Results and Discussion

Pretest and posttest mean scores of Grade 7 learners in Asian History

Table 1 presents the pretest and posttest mean scores of Grade 7 learners in Asian History. The results show the students approaching proficiency during the pretest (M=31.26, SD=8.89). Meanwhile, the positive outcome of the students was that they were proficient during the posttest (M=50.35, SD=9.33).

The results show not just that things got better in terms of numbers but also that the intervention worked to create meaningful learning experiences. The strategy probably considered different learning styles and promoted higher-order thinking skills by getting students involved in more interactive and student-centered activities. This way of designing lessons may have helped the students understand historical ideas better and develop connections between different subjects, which is an important part of becoming good at Asian History. The fact that all participants made the same amount of progress in school shows that the technique was fair and gave everyone the same chances to do well, no matter what their differences were. These implications give us

Table 1*Pretest and Posttest Mean Scores of Grade 7 Learners in Asian History*

Test	M	SD	Interpretation
Pretest	31.26	8.89	Approaching Proficiency
Posttest	50.35	9.33	Proficient

a strong basis for comparing the current results to earlier studies that also stress how new methods can affect the social studies classroom.

This result backs up Mapacpac's (2023) research, which showed that interactive and contextualized tactics make it easier to grasp and remember history. It also agrees with Estrella's (2020) study, which indicated that both control and experimental pretests were at the mastery level. This supports the premise that strategic interventions can help students do better. Helms (2021) also stresses how important it is to include advanced technology in the social studies curriculum to get students more involved and help them study better. These results all point to the need to use well-designed, evidence-based teaching methods to help students do better in social studies.

Level of proficiency in Asian History of Grade 7 learners under the control group before and after intervention

Table 2 presents the Asian History proficiency levels of Grade 7 learners in the control group at a Catholic school before and after the instructional period. Initially, students were classified as approaching proficiency (M=31.41, SD=8.55). Following the instruction, scores increased (M=44.53, SD=8.71), indicating that the group successfully achieved proficiency. While these scores reflect positive growth, the gains were not as substantial as those observed in the experimental group. The relatively moderate standard deviations suggest a consistent improvement across the learners, indicating that the standard instruction was generally effective and fair, though it did not yield the maximizing effects of the experimental intervention.

Table 2*Level of Proficiency in Asian History of Grade 7 Learners under the Control Group Before and After the Intervention*

Test	M	SD	Interpretation
Pretest	31.41	8.55	Approaching Proficiency
Posttest	44.53	9.33	Proficient

Table 3*Level of Proficiency in Asian History of Grade 7 Learners under the Experimental Group Before and After the Intervention*

Test	M	SD	Interpretation
Pretest	31.11	9.27	Approaching Proficiency
Posttest	56.18	5.55	Advanced

Ultimately, the results suggest that while traditional teaching methods are beneficial, they are less effective than tailored, innovative instructional strategies. This highlights the importance of continuously refining teaching methods to optimize student performance in complex subjects like Asian History. These findings align with Almacen and Labitad (2024), who observed that students in control groups improve, but not to the same extent as those receiving targeted interventions. Furthermore, Diaz et al. (2024) noted similar trends in the improvement of social science skills, reinforcing the conclusion that structured, well-designed lessons are essential for ensuring students fully grasp difficult academic concepts.

Level of proficiency in Asian History of Grade 7 learners under the experimental group before and after the intervention

Table 3 illustrates a significant improvement in the proficiency of Grade 7 students in the experimental group following the intervention. The mean score rose substantially from 31.11 (Approaching Proficiency) to 56.18 (Advanced), while the standard deviation decreased from 9.27 to 5.55. This reduction in variance indicates that the intervention not only elevated overall academic performance but also stabilized learning outcomes, effectively narrowing the performance gap among learners. These findings suggest that the intervention fostered a more inclusive and equitable classroom environment, outperforming traditional techniques by addressing diverse learning needs and ensuring consistent academic advancement across the group.

These positive outcomes underscore the value of integrating multimedia technologies into social studies instruction. The results align with Akram et al. (2022) and Haleem et al. (2022), who assert that technology enhances authentic learning experiences and offers students meaningful opportunities for self-expression.

Furthermore, Klopfer et al. (2015) support this by noting that technology facilitates innovative methods of study and communication that develop essential skills. Frye et al. (2010) similarly observed that adopting new, technology-driven teaching methods increases engagement for both teachers and students, ultimately leading to superior learning outcomes.

Difference in the level of proficiency in Asian History of Grade 7 learners before intervention

The Mann-Whitney U test was utilized to determine if there was a significant difference in Asian History proficiency between Grade 7 learners in the control and experimental groups prior to intervention. The analysis yielded a p-value of 0.842, which exceeds the 0.05 threshold, indicating no statistically significant difference between the control group ($M = 31.26$) and the experimental group ($M = 31.11$). This confirms that both groups possessed a similar level of knowledge at the outset. Establishing this equivalence is crucial for the study's internal validity, as it implies that any subsequent divergence in performance can be attributed to the intervention itself rather than pre-existing advantages.

Table 4 further illustrates this baseline equivalence, demonstrating that the groups were well-matched from the start. This comparability is essential; as Delima et al. (2024) emphasize, similar starting points ensure that observed changes are genuinely linked to the intervention rather than inherent differences. By eliminating confounding variables related to initial proficiency, this shared baseline provides a reliable foundation for evaluating the teaching method's effectiveness. Consequently, the study can accurately quantify the intervention's impact, which later data suggests successfully improved the experimental group's skills compared to the control group, highlighting the utility of technology in social studies education.

Table 4

Difference in the Level of Proficiency in Asian History of Grade 7 Learners before Intervention

Group		U	z	p
Control	Experimental			
31.26	31.11	3141.500	-0.200	0.842
(8.55)	(9.27)			

Note: the difference is significant when $p < 0.05$

Difference in the level of proficiency in Asian History of Grade 7 learners after intervention

Analysis of Covariance (ANCOVA) was employed to evaluate the difference in Asian History proficiency between Grade 7 learners in the control and experimental groups at a Catholic school following the intervention. The experimental group ($M = 56.18$, $SD = 5.55$) significantly outperformed the control group ($M = 44.53$, $SD = 8.71$), with the analysis yielding an F-value of 146.426 ($df = 1, 158$) and a p-value of 0.000 ($p < 0.05$). These statistics confirm that the intervention had a substantial positive impact on student learning. Furthermore, the lower standard deviation in the experimental group indicates that the teaching method not only improved overall skill levels but also reduced

disparities in learning, leading to more consistent performance across the group.

The robust statistical results suggest that the observed benefits were directly caused by the intervention rather than extraneous factors, supporting the case for technology-integrated education. These findings align with previous research by Iqbal and Kazimi (2023) and Petalla (2022), which observed that innovative, technology-based teaching methods enhance student performance, motivation, and interest. The integration of digital tools and interactive materials likely created a more dynamic classroom environment, facilitating better comprehension and increased engagement. Ultimately, this study underscores the value of incorporating technology into social studies curricula to create meaningful learning experiences and elevate student achievement.

Table 5

Difference in the Level of Proficiency in Asian History of Grade 7 Learners after Intervention

Group		F	df	p
Control	Experimental			
44.53	56.18	146.426*	1, 158	0.000
(8.71)	(5.55)			

*Note: *the difference is significant when $p < 0.05$*

The effective integration of technology into Asian history instruction significantly enhances student engagement and understanding through the use of interactive tools. This strategy fosters a learner-centered approach, enabling students to explore content at their own pace and demonstrate their knowledge through creative digital mediums. Beyond the traditional classroom, technology facilitates diverse engagement opportunities and extends learning boundaries. Moreover, it promotes inclusive education by providing assistive tools that accommodate diverse learning needs, thereby ensuring meaningful participation for all students in the study of Asian history.

Furthermore, the effective application of technology contributes to improved academic performance. By catering to various learning styles, interactive tools aid in the comprehension and retention of complex historical concepts. Technology also streamlines the feedback process, allowing students to efficiently monitor their progress and identify specific areas for improvement. Ultimately, the increased engagement and motivation resulting from these technological interventions lead to better overall academic outcomes.

5.0. Conclusion

The study's findings highlight the significant influence of effective technology integration on improving student performance, particularly when grounded in robust pedagogical frameworks like SAMR and TPACK. Results from the experimental group

demonstrated that technology-based interventions led to substantial academic enhancements, confirming that technology enriches the learning experience when applied judiciously. By combining the TPACK framework—which harmonizes technical tools, pedagogical tactics, and content knowledge—with the SAMR model’s progression from substitution to redefinition, educators can ensure technology serves as a fundamental component of learning rather than a mere adjunct. This convergence facilitates the creation of novel, pedagogically effective experiences that foster collaboration, critical thinking, and engagement. Ultimately, the study confirms that the synergistic use of these frameworks not only elevates academic achievement but also cultivates a more inclusive and inspiring classroom environment.

6.0. Limitations of the Findings

Despite the positive findings, this study is subject to several limitations. First, the focus on a single grade level restricts the generalizability of the results to other educational settings. Second, the small sample size reduces the statistical power necessary to identify significant effects. Third, the intervention was isolated to the "redefinition" level of the SAMR model, which limits insights into how effectiveness varies at lower levels and obscures the scaffolding process required to transition toward higher technology integration. Finally, participants' pre-existing knowledge and conditions may have influenced their responses to the interventions. Future research should acknowledge these constraints and control for such variables to ensure the validity and reliability of the study.

7.0. Practical Value of the Paper

The effective integration of technology in teaching Asian History lies in empowering teachers and students to move beyond traditional approaches by utilizing the redefinition level of the SAMR model. This innovative framework allows educators to design interactive instructional materials that foster higher-order thinking skills, critical thinking, and comprehension, shifting students from passive observation of presentations to active, real-world exploration. The study's findings serve as a guide for tailoring these strategies to student needs, ensuring that learning is both engaging and academically effective. To fully realize these benefits, however, it is essential to guarantee technology access, provide necessary teacher training, and promote digital literacy to ensure students use technology safely and meaningfully.

8.0. Directions for Future Research

To maximize the benefits of integrating technology into social studies and Asian History, future research

should expand participant selection across multiple grade levels to enhance the generalizability of findings. Additionally, studies utilizing larger sample sizes are necessary to increase statistical power and accurately identify significant effects. It is also crucial to explore interventions across all SAMR levels, rather than focusing exclusively on the "redefinition" stage, to provide a comprehensive understanding of technology integration and the necessary scaffolding for progression. Finally, researchers must precisely evaluate and control for participants' pre-existing knowledge to minimize bias; this will ensure reliable results and contribute to a more meaningful application of technology within the educational context.

9.0. Declaration of Conflict of Interest

The authors declare that there are no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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