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THE EFFECT OF INTERACTIVE TIMELINES ON STUDENTS' UNDERSTANDING OF WORLD HISTORY EVENTS

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Abstract

This study examined Grade 8 learners' understanding of selected World History competencies following the use of an Interactive Timeline at Media Once National High School. The explanatory sequential mixed-methods design combined a one-group pretest–posttest phase with follow-up interviews. Thirty-three learners participated in the quantitative phase, and 15 participated in semi-structured interviews. A validated 30-item teacher-made assessment measured understanding of the First World War, the Second World War, and Cold War ideologies and neocolonialism. Paired-samples t-tests and effect-size estimates summarized score changes, and thematic analysis examined learners' experiences. Mean scores increased from 3.88 to 6.39, 4.24 to 7.15, and 4.18 to 7.27, respectively. All three paired comparisons were reported as statistically significant ($p < .001$), but the posttest means remained below the stated performance benchmark. Learners described clearer event sequences, stronger recognition of relationships between events, and greater engagement. They also reported difficulties with dense information, unfamiliar terminology, and limited processing time. The findings informed proposed instructional strategies that pair timelines with vocabulary support, guided reading, and structured historical inquiry. The one-group design does not isolate the effect of the timeline from other influences.

Keywords: Interactive Timeline, World History, Grade 8 Learners, Explanatory Sequential Design, Historical Understanding, Mastery Benchmark

Introduction

Understanding of world history requires more than memorization of dates and events. Students must also comprehend the connections between events, their causes, and their contemporary societal impacts. However, when instruction relies primarily on lectures and rote memorization, students often struggle to develop a deeper understanding of historical processes (VanSledright, 2002). In such classroom environments, students passively receive information rather than actively constructing historical knowledge. This instructional approach may lead to superficial learning, limited retention of facts, and difficulty recognizing relationships among historical events over time (Seixas & Peck, 2004).

Studies around 2015–2016 highlighted the potential of interactive timelines to support history education. The Hi-Story Lessons project developed interactive timelines that integrated historical narratives, infographics, and primary sources to help learners understand complex historical connections (Maier & Wiatr, 2015–2016). Similarly, the Histo Chrono-Map web-based learning system was developed for secondary students studying World History and incorporated interactive timelines and multimedia elements to support historical learning (Ang & Masood, 2016). These studies demonstrated the usefulness of interactive timelines in presenting chronological information and enriching students' learning experiences. However, further classroom-based research is needed to examine their effect on students' understanding of World History and to explore learners' experiences while using them. Thus, this study examines the use of Interactive Timelines in teaching World History and uses the findings to develop a Teaching Guide.

Classroom technology has become more accessible and flexible in its visual and interactive tools. Interactive timelines, which combine visual sequencing with multimedia elements such as images, videos, primary source documents, and interactive annotations, have demonstrated promise in supporting student engagement and comprehension (Swan & Hofer, 2019). Research indicates that interactive timelines may help learners to process complex temporal information, enhance their understanding of historical contexts, and encourage active learning (Lee & Spector, 2011). Students

who used the interactive timeline applications were better able to remember and explain historical events than students who only read textbooks (Kelle, 2018).

Despite these documented benefits, the use of interactive timelines in the classroom remains under-researched, particularly in secondary World History instruction. In many local classrooms, instructional practices remain traditional and teacher-centered, which may not fully address learners' diverse needs for deeper comprehension and engagement (Rempfer & Burris, 2014). This study examines the specific effect of interactive timeline strategies on students' understanding of selected World History events to determine whether these tools can enhance learning outcomes in real instructional settings. Investigating this relationship can provide evidence-based insights for history educators and curriculum developers seeking to improve teaching practices and student achievement.

In World History instruction at Media Once National High School, how teachers present and organize historical events remains an important factor in supporting learners' understanding of complex historical developments. While teachers commonly use timelines to illustrate the sequence of historical events, they are generally presented in a conventional, teacher-directed manner, offering limited opportunities for learners to actively explore relationships, continuity, and connections among events. Although some World History teachers have incorporated Information and Communication Technology (ICT) into their instruction, its application has not been specifically extended to the interactive presentation and exploration of historical timelines. This instructional condition may limit learners' opportunities to engage with complex chronological information in a more visual, organized, and interactive manner. Therefore, there is a need to examine the potential of Interactive Timelines as an instructional strategy to enhance learners' understanding of World History events at Media Once National High School.

Therefore, this study seeks to determine the effect of interactive timelines in teaching World History events, filling a gap in the literature and offering practical implications for instructional strategies in history education.

Theoretical Framework and Legal Basis

The assumption is grounded in Connectivism Theory and TPACK Framework, proposed by George Siemens (2005) and Punya Mishra and Matthew Koehler (2006), which explains how learning occurs in the digital age through connections among information sources, technology, and social networks. Connectivism emphasizes that knowledge is not limited to what is stored in an individual's mind; rather, learning happens when individuals access, organize, and connect information from various digital platforms and resources. In modern classrooms where technology is widely integrated, learners develop understanding by using digital tools that let them explore relationships among concepts and information.

In the context of World History instruction, students often encounter complex historical events, multiple perspectives, and chronological sequences that require them to process and connect various pieces of information. Through digital tools such as interactive timelines, learners can visualize historical events, establish relationships among occurrences, and access multimedia resources that deepen their understanding of historical contexts.

Interactive timelines reflect the principles of Connectivism because they provide learners with a platform where historical information can be explored through interconnected nodes of events, images, videos, and documents. Rather than passively receiving information through lectures or textbook readings, students actively discover relationships among events and construct their own understanding of historical developments. By interacting with digital timelines, learners can trace chronological patterns, examine causes and consequences of historical events, and connect historical narratives more meaningfully. As Siemens (2005) emphasizes, learning becomes more effective when students can access and organize knowledge through digital networks that support exploration and discovery. Therefore, interactive timelines support the connectivist view that technology can enhance knowledge construction and promote deeper comprehension of complex subject matter such as World History (Downes, 2008; Siemens, 2005).

In addition to Connectivism Theory, this study is also supported by the Technological Pedagogical Content Knowledge (TPACK) Framework developed by Punya Mishra and Matthew Koehler (2006). The TPACK framework highlights the importance of integrating three essential forms of knowledge in effective teaching: content knowledge, pedagogical knowledge, and technological knowledge. Content knowledge refers to the teacher's mastery of the

subject matter, which in this study focuses on World History events. Pedagogical knowledge involves the teaching strategies used to facilitate learning, such as inquiry-based instruction, discussion, and visualization of historical events. Technological knowledge is the teacher's knowledge of how to use digital resources and technologies that support learning processes.

The study is anchored on Department of Education (DepEd) Order No. 16, s. 2023, which outlines the revised guidelines for implementing the DepEd Computerization Program (DCP) and establishes a policy framework for strengthening Information and Communication Technology (ICT) integration in basic education (Department of Education [DepEd], 2023). The program aims to supply public schools with appropriate ICT resources to support teaching and learning processes and build learners' competencies in utilizing digital tools (DepEd, 2023). Through its visual and interactive features, the tool provides learners with opportunities to engage directly with chronological sequences and establish meaningful connections among World History events (Siemens, 2005). Consequently, implementing an Interactive Timeline aligns with the DCP's broader strategic direction toward purposeful technology use to foster instructional innovation (DepEd, 2023).

Furthermore, technology integration in classroom instruction is reinforced by Department of Education policies promoting reflective teaching practice, collaborative learning, and responsive instructional design (DepEd, 2016). Aligned with these administrative directives, teachers are encouraged to incorporate digital resources and interactive media that enhance student engagement and deepen comprehension of subject matter (Mishra & Koehler, 2006; DepEd, 2016).

Using interactive timelines in World History instruction harmonizes with these educational principles and institutional policy directions. By synthesizing the theoretical perspectives of Connectivism (Siemens, 2005) and the Technological Pedagogical Content Knowledge (TPACK) framework (Mishra & Koehler, 2006) with official Department of Education directives (DepEd, 2016, 2023), this study establishes a robust theoretical and policy foundation for examining the effectiveness of interactive timelines in improving secondary students' understanding of World History.

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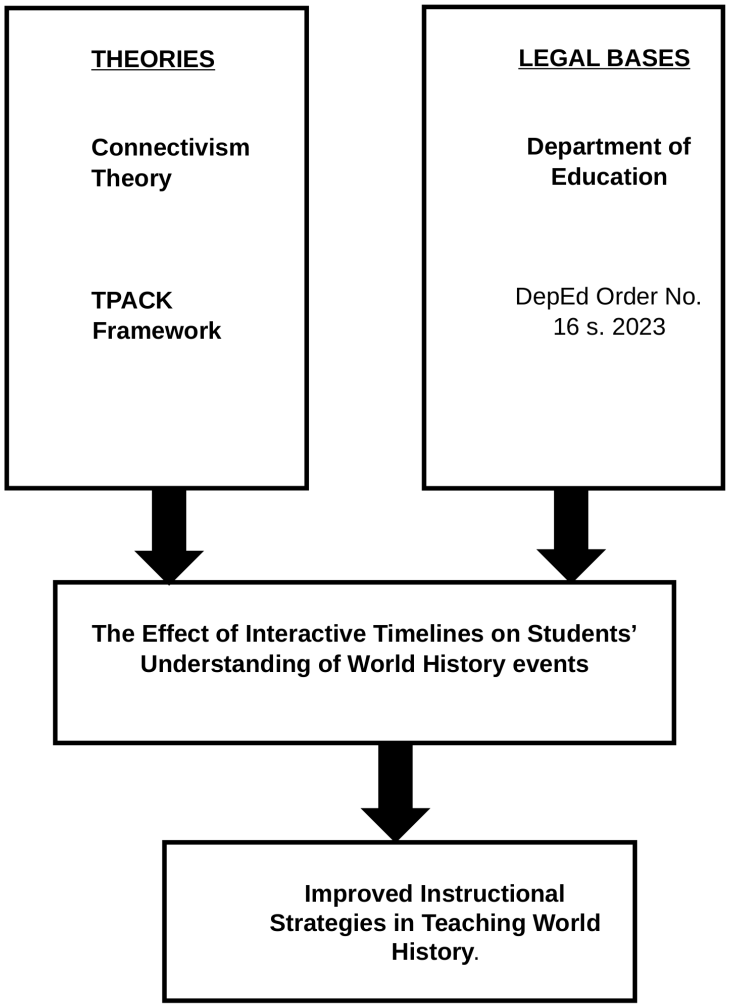


Figure 1
Theoretical Framework of the Study

Methods

Design and Study Flow

The study used an explanatory sequential research design with a one-group pre-test–post-test framework in the initial phase, followed by semi-structured interviews in the subsequent phase. The pre-test and post-test scores were scrutinized to determine whether learners' comprehension improved significantly after implementing the instructional strategy. The next phase expanded on these numerical findings by exploring learners' experiences during implementation. Their responses provided deeper insights into how they perceived the strategy, particularly regarding its contribution to their engagement, visualization of historical events, understanding of chronological relationships, and overall learning experiences. Integrating both strands provided a comprehensive explanation of the outcomes of implementing Interactive Timelines in World History instruction. Ultimately, the collected findings served as the basis for developing an Improved Instructional strategy designed to support effective, learner-centered World History instruction.

The research used the Input-Process-Output (IPO) Approach to manage information throughout the study.
Input. The study's input consisted of students' pre-test scores, which established their level of understanding of World History events before using Interactive Timelines, and their post-test scores, which determined their level of understanding after implementation.

The study also examined the difference between pre-test and post-test scores to determine changes in students' understanding after using Interactive Timelines. The research also included interviews with students about their experiences using the Interactive Timelines to gain qualitative perspectives on their learning.

Process. The study began with preparing and submitting a transmittal letter to the appropriate school authorities to formally secure permission to conduct the study and administer the research instruments. Upon approval, the gathered data from the pre-test, post-test, and interviews were systematically organized and tabulated to ensure accuracy and completeness. The tabulated data were then analyzed and interpreted using appropriate statistical and qualitative procedures to determine the students' level of understanding, examine the difference between their pre-test and post-test scores, and identify significant themes from their experiences during the implementation of Interactive Timelines. Based on the analysis and interpretation, the findings were synthesized to formulate conclusions and recommendations, which served as the basis for developing a Teaching Guide for teaching and learning World History.

Output. The study's output is the Improved Instructional Strategy in Teaching World History, developed from findings from the pre-test and post-test results, statistical analysis, and students' experiences during the implementation of Interactive Timelines. The Teaching Guide incorporates appropriate strategies and activities that use Interactive Timelines to help learners understand chronological sequences, historical relationships, continuity, and cause-and-effect connections among significant World History events. Thus, the Enhanced Teaching Guide translates the study's findings into a practical instructional resource to help teachers strengthen the delivery of World History lessons.

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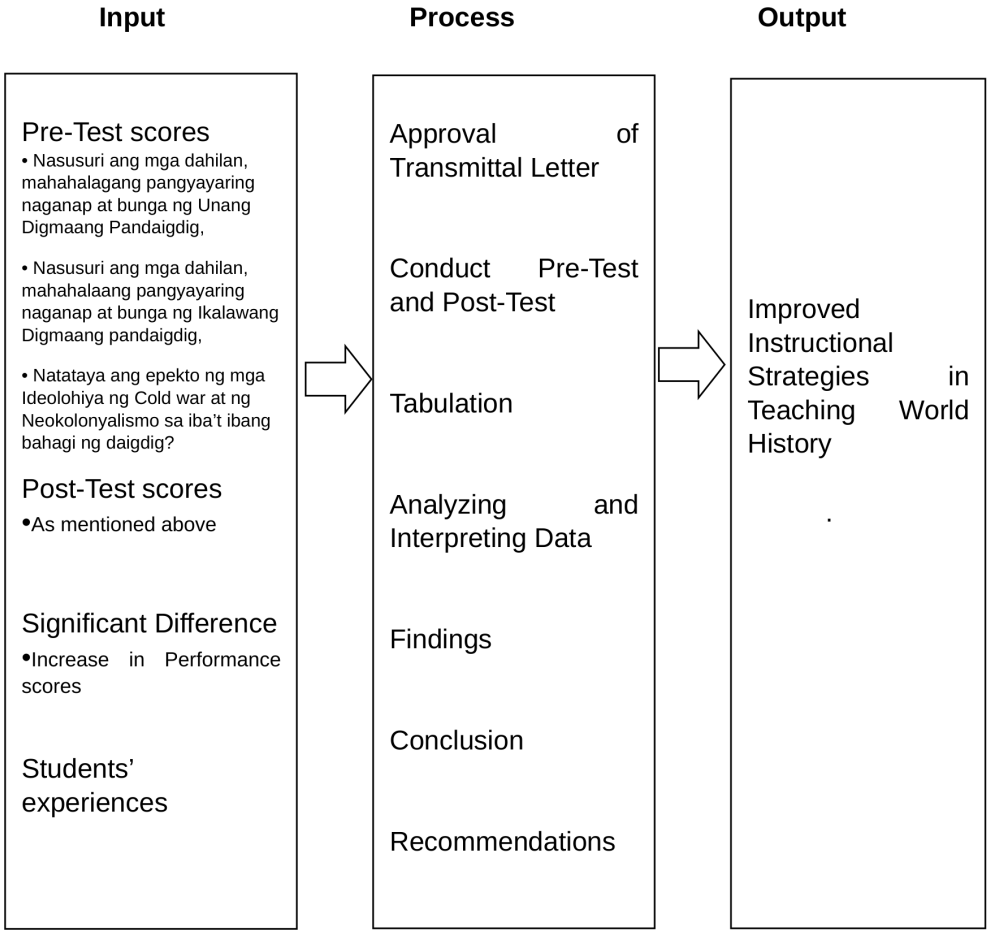


Figure 2
Flow of the Study

Research Environment

This study was conducted at Media Once National High School, a public secondary school founded in 1977. The school currently has an estimated population of 417 enrolled students and is supported by 28 teachers, including three Social Studies teachers, one of whom is the researcher. As a public secondary institution offering Junior High School, the school follows the K to 12 Basic Education Curriculum, in which World History is included as part of the Social Studies program.

Media Once National High School provides a structured classroom environment where teachers utilize both traditional and innovative instructional strategies to support student learning. These conditions make the school an appropriate setting for implementing Interactive Timelines as an instructional strategy to enhance students' understanding of World History events.

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The school also maintains regular class schedules and organized learning facilities conducive to classroom-based research. As an institution that encourages learner-centered instruction and continuous improvement of teaching practices, Media Once National High School provides a suitable context for examining the effectiveness of Interactive Timelines in improving students' comprehension of historical events.

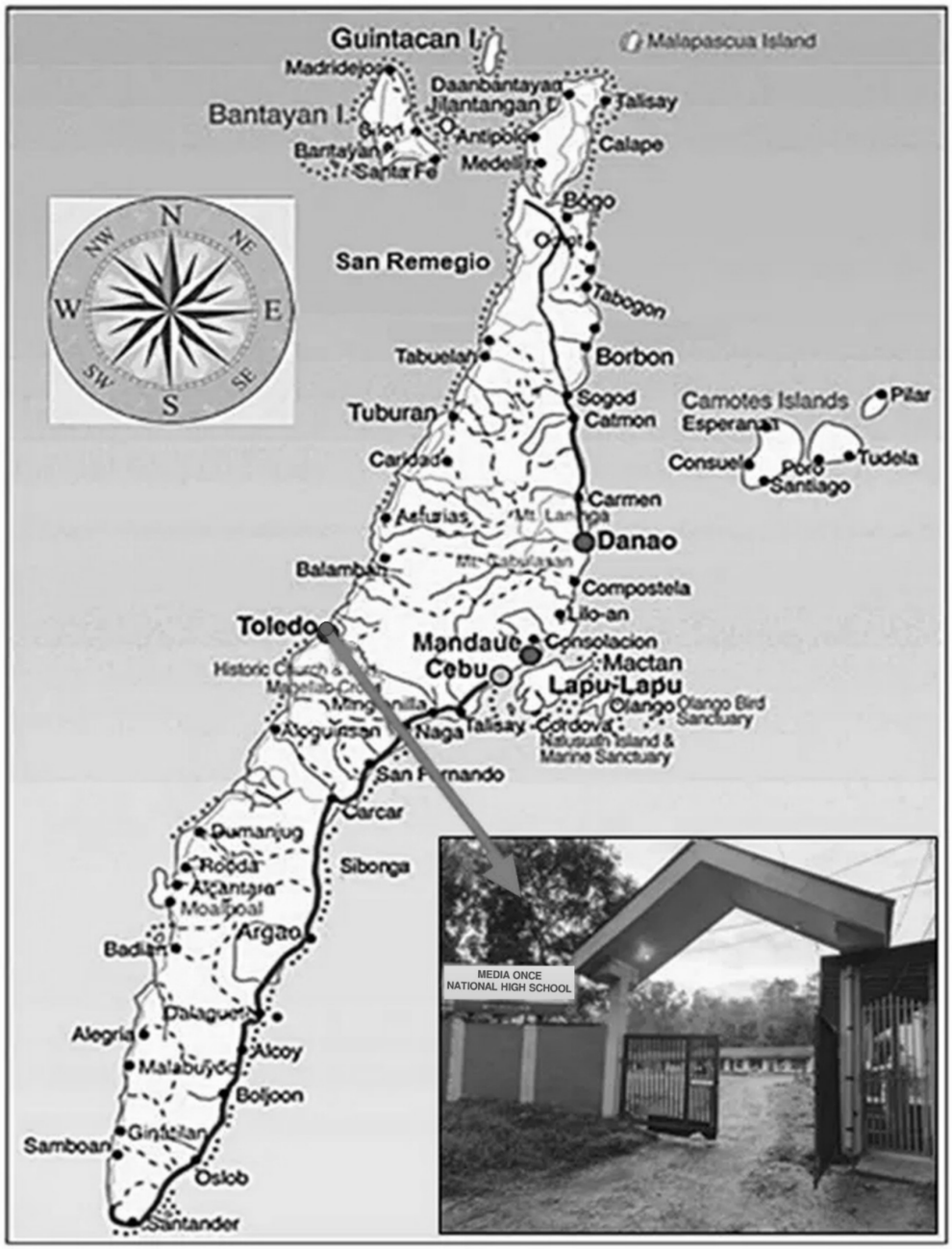


Figure 3
Location Map of the Research Environment

Participants and Sampling

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The study respondents comprised 33 Grade 8 learners from the Grade 8–Pearl section at Media Once National High School. Participant selection was executed through purposive sampling, guided by specific inclusion and exclusion criteria essential to maintaining the empirical integrity of the single-group pre-test–post-test design. To ensure consistent participation across all stages of the study—including the pre-test, the multi-week implementation of Interactive Timelines, the post-test, and the subsequent qualitative interviews—the sampling targeted regularly attending, academically performing learners who were consistently present during the intervention period. Conversely, learners categorized as Learners at Risk of Dropping Out (LARDOs) due to chronic absenteeism were intentionally excluded from the sample frame.

This criterion was established to mitigate subject attrition and prevent threats to internal validity, specifically by avoiding cases in which a participant completed the initial pre-test but was absent during the instructional intervention or the final post-test administration. The demographic distribution of the selected sample (N = 33) showed that 13 respondents (39.39%) were male and 20 respondents (60.61%) were female. Quantitative performance data from the paired pre-test and post-test assessments measured changes in learners' historical understanding, while subsequent semi-structured interviews provided detailed qualitative accounts of their learning experiences. Integrated findings from both strands provided the empirical foundation for developing an Enhanced Teaching Guide for World History instruction.

Table 1
Distribution of the Respondents

Respondents	Male (f)	Male (%)	Female (f)	Female (%)	Total
Grade 8 - Pearl	13	39.39%	20	60.61%	33
Total	13	39.39%	20	60.61%	33

Instruments and Procedure

The study utilized three principal research instruments to gather the data necessary to address the research questions: a teacher-made pre-test, a teacher-made post-test, and a semi-structured interview guide. The pre-test and post-test will be used to determine the learners' level of understanding of selected World History events before and after the implementation of the Interactive Timeline. Both tests consisted of thirty (30) multiple-choice items aligned with the identified Grade 8 Araling Panlipunan fourth-quarter competencies, Mahahalagang Pangyayari sa Unang Digmaang Pandaigdig (World War I), Mahahalagang Pangyayari sa Ikalawang Digmaang Pandaigdig (World War II), and Epekto ng mga Ideolohiya ng Cold War at Neokolonyalismo sa iba't ibang bahagi ng daigdig. The items assessed learners' understanding of significant historical concepts, including chronological relationships, causes and consequences, major events, important personalities, and the social, political, and economic effects of historical developments. Each item contained four alternative responses with one correct answer. The pre-test established the learners' baseline understanding, while the post-test measured their understanding after implementing the Interactive Timeline.

The Interactive Timeline served as the primary instructional material used during the study. It organized significant World History events chronologically and incorporated visual and interactive elements to support learners' exploration and understanding of historical information. By presenting events in an organized and visually accessible manner, the material gave learners opportunities to examine chronological relationships, identify connections among historical developments, and understand the causes and consequences of major events. The Interactive Timeline therefore functions as the instructional strategy through which the identified World History competencies are taught, rather than as a data-gathering instrument. Before implementation, the research adviser and qualified Araling Panlipunan subject specialists reviewed the instructional materials and assessment instruments to establish their content validity and alignment with the study's intended competencies and objectives.

Qualitative insights about the learners' experiences during the implementation of the Interactive Timeline were gathered using a semi-structured interview guide. The interview included open-ended questions designed to encourage respondents to describe their experiences, perceptions, challenges, and perceived benefits of the instructional strategy.

The questions focused particularly on learners' engagement, visualization of historical sequences, understanding of relationships among World History events, and overall learning experience. The interview responses complemented the quantitative findings by providing contextual and experiential information that cannot be adequately captured through test scores alone. The qualitative data gathered through the interviews were systematically analyzed to identify recurring categories and themes, providing greater insight into learners' experiences and contributing to the development of improved instructional strategies in Teaching Social studies based on the study's overall findings.

Prior to the conduct of the study, the necessary approval was secured from the appropriate school authorities through the submission of a formal letter requesting permission. Upon approval, coordination was established with the school principal and concerned personnel of Media Once National High School regarding the implementation schedule. An orientation was conducted for the 33 Grade 8–Pearl learners to explain the purpose of the study, the research activities, the administration of instruments, and the proper use of the Interactive Timeline. The respondents were likewise informed of the applicable consent requirements, the voluntary nature of their participation, and the strict confidentiality of all gathered data.

Following the preliminary preparations, the study was carried out over a total duration of three (3) weeks, with each instructional session lasting 45 minutes per day across a five-day weekly schedule. The execution followed a systematic weekly cycle corresponding to each of the three targeted World History competencies. On Day 1 of each week, a pre-test was administered to measure baseline understanding for the specific competency. From Day 2 through Day 4, the Interactive Timeline intervention was implemented during regular class hours to present historical events chronologically and facilitate analysis of cause-and-effect relationships. On Day 5 of each week, a post-test was administered to evaluate learning gains for that specific competency.

After completing the quantitative phase, researchers conducted semi-structured interviews with selected respondents to gather qualitative data on their experiences during implementation. The interviews gave learners opportunities to share their perceptions, challenges, and perceived benefits of the instructional strategy, particularly regarding engagement, visual organization, and chronological understanding. The researchers organized, compiled, and analyzed quantitative evaluation data using descriptive and inferential statistics. Interview transcripts were analyzed using thematic analysis. Both components were ultimately combined to provide the empirical basis for the study's findings, suggestions, and formulation of Enhanced Instructional Strategies in Social Studies education.

The documented study design describes a single group. The thesis includes definitions for experimental and control groups and for an observation checklist, but the reported analysis does not identify a separate control group or checklist results.

Analysis and Scoring

The data gathered in the study were organized, analyzed, and interpreted in relation to the specific research questions. Appropriate quantitative and qualitative procedures were employed to provide a comprehensive interpretation of the learners' understanding of World History and their experiences during the implementation of Interactive Timelines.

Research Questions 1 and 2. To determine the learners' level of understanding of World History events before and after the implementation of Interactive Timelines, the pre-test and post-test scores were tabulated and summarized using appropriate descriptive statistics. The learners' performance was described by frequency, percentage, mean, and standard deviation. In the 30-item assessment. The obtained scores were also interpreted using the established scoring criteria and descriptive levels of understanding. These measures provided a basis for describing the learners' baseline understanding before implementation and their level of understanding after using Interactive Timelines.

Research Question 3. To see if there was a significant difference between the learners' pre-test and post-test scores, a paired-samples t-test was used. This statistical procedure is appropriate because the same 33 respondents completed both assessments in a one-group pre-test-post-test design. The test determined whether the difference between learners' scores before and after implementing Interactive Timelines was statistically significant. The level of significance was set at 0.05, and the resulting p-value was used to determine whether the observed difference was statistically significant.

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Research Question 4. To examine learners' experiences during the implementation of Interactive Timelines, the data from the semi-structured interviews were analyzed using thematic analysis. The interview responses were systematically reviewed, coded, categorized, and examined for recurring patterns and meaningful themes related to the learners' engagement, visualization of historical events, understanding of chronological relationships, perceived benefits, and challenges encountered during the implementation. The emerging themes were interpreted alongside the quantitative findings to provide broader insight into the learners' experiences.

Research Question 5. The study's conclusions and recommendations were based on a quantitative analysis of the pre-test and post-test results and qualitative themes derived from learners' interview responses. These findings, too, guided the development of Improved Instructional Strategies designed to enhance the teaching and learning of World History by deliberately embedding Interactive Timelines and other learner-centered pedagogical techniques.
Scoring Procedure

The learners' understanding of selected World History competencies was measured using a 30-item teacher-made multiple-choice test administered as both a pre-test and post-test. Each item had four possible answer choices, with only one correct response. Each correct answer earned one (1) point, while an incorrect or unanswered item received zero (0) points. Thus, the highest possible raw score for each assessment was 30 points. The same scoring procedure was applied to the pre-test and post-test to ensure consistent measurement and facilitate comparison of learners' performance before and after implementing the Interactive Timeline.

The scoring procedure was applied consistently to both the pre-test and post-test results. The pre-test scores described the learners' initial level of understanding before implementing the Interactive Timeline, while the post-test scores described their level of understanding after implementation. The resulting scores and descriptive interpretations were summarized and compared through the appropriate statistical procedures to determine whether a significant difference existed between the learners' pre-test and post-test performance. The scoring results therefore provided the quantitative basis for addressing the study's first three research questions.

Qualitative data on learners' experiences during the implementation of the Interactive Timeline were collected through a semi-structured interview, in addition to the quantitative assessment. Unlike the pre- and post-tests, the interview responses were not scored numerically. The responses were then systematically sorted, coded, categorized, and analyzed for recurring patterns and themes reflecting learners' experiences, perceptions, challenges, and perceived benefits of using the Interactive Timeline. The responses focused on learners' engagement, visualization of historical events, understanding of chronological relationships, and the overall learning experience. The emerging themes were interpreted alongside the quantitative results to better understand the implementation and to provide an additional basis for developing Improved Instructional Strategies in teaching World History.

The Methods scoring description lists raw-score bands of 27–30 (Outstanding), 24–26 (Very Satisfactory), 21–23 (Satisfactory), 18–20 (Fairly Satisfactory), and 0–17 (Did Not Meet Expectations) for a 30-item assessment. The results tables apply different cutoffs to each 10-item competency. The tables retain the categories and cutoffs displayed in the source results.

Results and Discussion

Pretest and Posttest Performance

All 33 learners fell below expectations on each pretest. Posttest scores were higher, although the reported means for all three competencies remained below the stated performance benchmark.

Table 2

First World War (Pretest)

Grading Scale	Score	Frequency	Percentage	Level
90–100	9–10	0	0.00	Outstanding

Grading Scale	Score	Frequency	Percentage	Level
85–89	-	0	0.00	Very Satisfactory
80–84	8	0	0.00	Satisfactory
75–79	-	0	0.00	Fairly Satisfactory
Below 75	0–7	33	100.00	Did not meet expectations
Total		33	100	
Mean	3.88			Did not meet expectations
Standard Deviation	1.02			

Note. The score ranges use the DepEd performance descriptors shown. Each item in a 10-item test is worth 10 percentage points; scores in the ranges 85–89 and 75–79 cannot be attained.

Table 3
Second World War (Pretest)

Grading Scale	Score	Frequency	Percentage	Level
90–100	9–10	0	0.00	Outstanding
85–89	-	0	0.00	Very Satisfactory
80–84	8	0	0.00	Satisfactory
75–79	-	0	0.00	Fairly Satisfactory
Below 75	0–7	33	100.00	Did not meet expectations
Total		33	100	
Mean	4.24			Did not meet expectations
Standard Deviation	0.79			

Table 4
Cold War Ideologies and Neocolonialism (Pretest)

Grading Scale	Score	Frequency	Percentage	Level
90–100	9–10	0	0.00	Outstanding
85–89	-	0	0.00	Very Satisfactory
80–84	8	0	0.00	Satisfactory
75–79	-	0	0.00	Fairly Satisfactory
Below 75	0–7	33	100.00	Did not meet expectations
Total		33	100	
Mean	4.18			Did not meet expectations
Standard Deviation	0.88			

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Table 5
First World War (Posttest)

Grading Scale	Score	Frequency	Percentage	Level
90–100	9–10	2	6.06	Outstanding
85–89	-	0	0.00	Very Satisfactory
80–84	8	6	18.18	Satisfactory
75–79	-	0	0.00	Fairly Satisfactory
Below 75	0–7	25	75.76	Did not meet expectations
Total		33	100	
Mean	6.39			Did not meet expectations
Standard Deviation	1.43			

Note. The score ranges use the DepEd performance descriptors shown. Each item in a 10-item test is worth 10 percentage points; scores in the ranges 85–89 and 75–79 cannot be attained.

Table 6
Second World War (Posttest)

Grading Scale	Score	Frequency	Percentage	Level
90–100	9–10	4	12.12	Outstanding
85–89	-	0	0.00	Very Satisfactory
80–84	8	12	36.36	Satisfactory
75–79	-	0	0.00	Fairly Satisfactory
Below 75	0–7	17	51.52	Did not meet expectations
Total		33	100	
Mean	7.15			Did not meet expectations
Standard Deviation	1.20			

Table 7
Cold War Ideologies and Neocolonialism (Posttest)

Grading Scale	Score	Frequency	Percentage	Level
90–100	9–10	5	15.15	Outstanding
85–89	-	0	0.00	Very Satisfactory
80–84	8	9	27.27	Satisfactory
75–79	-	0	0.00	Fairly Satisfactory
Below 75	0–7	19	57.58	Did not meet expectations
Total		33	100	

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Grading Scale	Score	Frequency	Percentage	Level
Mean	7.27			Did not meet expectations
Standard Deviation	1.07			

Table 8
Summary of Performance Categories Before and After the Intervention

Competency	Assessment	Outstanding (90–100)	Very Satisfactory (85–89)	Satisfactory (80–84)	Fairly Satisfactory (75–79)	Did Not Meet Expectations (Below 75)	Total
1. Unang Digmaang Pandaigdig (Nasusuri ang mga dahilan, mahahalagang pangyayari, at bunga)	Pre-Test	0 (0.00%)	0 (0.00%)	0 (0.00%)	0 (0.00%)	33 (100.00%)	33 (100%)
1. Unang Digmaang Pandaigdig (Nasusuri ang mga dahilan, mahahalagang pangyayari, at bunga)	Post-Test	2 (6.06%)	0 (0.00%)	6 (18.18%)	0 (0.00%)	25 (75.76%)	33 (100%)
2. Ikalawang Digmaang Pandaigdig (Nasusuri ang mga dahilan, mahahalagang pangyayari, at bunga)	Pre-Test	0 (0.00%)	0 (0.00%)	0 (0.00%)	0 (0.00%)	33 (100.00%)	33 (100%)
2. Ikalawang Digmaang Pandaigdig (Nasusuri ang mga dahilan, mahahalagang pangyayari, at bunga)	Post-Test	4 (12.12%)	0 (0.00%)	12 (36.36%)	0 (0.00%)	17 (51.52%)	33 (100%)
3. Cold War at Neokolonyalismo (Natataya ang epekto ng mga Ideolohiya sa daigdig)	Pre-Test	0 (0.00%)	0 (0.00%)	0 (0.00%)	0 (0.00%)	33 (100.00%)	33 (100%)
3. Cold War at Neokolonyalismo (Natataya ang epekto ng mga Ideolohiya sa daigdig)	Post-Test	5 (15.15%)	0 (0.00%)	9 (27.27%)	0 (0.00%)	19 (57.58%)	33 (100%)

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Table 9
Summary of Mean Scores and Standard Deviations

Competency	Assessment	Mean	SD	Level
1. Unang Digmaang Pandaigdig (Nasusuri ang mga dahilan, mahahalagang pangyayari, at bunga)	Pre-Test	3.88	1.02	Did Not Meet Expectations
1. Unang Digmaang Pandaigdig (Nasusuri ang mga dahilan, mahahalagang pangyayari, at bunga)	Post-Test	6.39	1.43	Did Not Meet Expectations
2. Ikalawang Digmaang Pandaigdig (Nasusuri ang mga dahilan, mahahalagang pangyayari, at bunga)	Pre-Test	4.24	0.79	Did Not Meet Expectations
2. Ikalawang Digmaang Pandaigdig (Nasusuri ang mga dahilan, mahahalagang pangyayari, at bunga)	Post-Test	7.15	1.20	Did Not Meet Expectations
3. Cold War at Neokolonyalismo (Natataya ang epekto ng mga Ideolohiya sa daigdig)	Pre-Test	4.18	0.88	Did Not Meet Expectations
3. Cold War at Neokolonyalismo (Natataya ang epekto ng mga Ideolohiya sa daigdig)	Post-Test	7.27	1.07	Did Not Meet Expectations

Reported Paired Comparisons

Table 10
Paired-Samples Comparisons and Reported Effect Sizes

Competency	Pretest Mean	Posttest Mean	Mean Difference	t	p	Effect Size
First World War	3.88	6.39	2.52	9.12	<.001*	1.59
Second World War	4.24	7.15	2.91	13.54	<.001*	2.36
Cold War Ideologies and Neocolonialism	4.18	7.27	3.09	12.48	<.001*	2.17

Table 11
Reported Decisions and Interpretations for the Paired Comparisons

Competency	Decision	Interpretation
First World War	Reject Ho	There is a significant difference
Second World War	Reject Ho	There is a significant difference
Cold War Ideologies and Neocolonialism	Reject Ho	There is a significant difference

Note. *p < .05 indicates a significant difference. Source effect-size categories: 0.20–0.49 small, 0.50–0.79 medium, 0.80–1.29 large, and 1.30 or above very large.
The reported comparisons indicate higher posttest scores in the study group. The one-group design does not isolate a causal effect, and the posttest means remained below expectations.

Learner Experiences

Following the quantitative pre-test–post-test phase, a qualitative investigation was conducted using semi-structured interviews to explore learners' experiences, perceptions, and classroom engagement during the implementation of the Interactive Timeline. To ensure a representative and comprehensive qualitative sample, the fifteen (15) interview participants were selected using stratified purposive sampling based on their post-test performance levels: five (5) participants representing the highest score tier, five (5) participants from the average score tier, and five (5) participants from the lowest score tier. This stratified selection criterion provided balanced qualitative perspectives across varying academic ability levels, explaining how high-, average-, and low-performing learners experienced the instructional tool. The semi-structured interview protocol used open-ended, non-leading prompts focused on participants' overall experiences, helpful features of the timeline, temporal sequence recognition, cause-and-effect comprehension, learning challenges encountered, active classroom participation, and future instructional preferences.

The qualitative data obtained from the audio-recorded and transcribed interviews were systematically organized, reviewed, and analyzed using Braun and Clarke's six-phase thematic analysis framework. The transcripts of the 15 stratified participants underwent rigorous inductive analysis to identify recurring patterns, semantic similarities, and core experiential concepts related to the Interactive Timeline. Initial codes were generated directly from raw student responses and systematically clustered into broader conceptual categories based on shared meanings. These categories were subsequently synthesized into overarching themes that captured the essential qualitative experiences of the learners across performance tiers.

The preliminary themes were iteratively reviewed, refined, and validated against the full dataset to ensure interpretive trustworthiness and empirical accuracy. This refinement process involved constant comparative analysis of participant statements, ensuring that the synthesized themes authentically reflected the nuanced accounts of learners from high, average, and low post-test score groups without imposing predetermined researcher bias. The final themes were explicitly defined, named, and structured to explain the intervention's cognitive, affective, and structural dimensions.

Visual-Organizational Scaffolding and Enhanced Historical Comprehension

The first major theme reveals that the Interactive Timeline functioned as an effective visual-organizational scaffold. By replacing dense, unstructured textbook readings with chunked information blocks, visual anchors, and clear spatial layouts, the tool transformed abstract historical narratives into accessible visual concepts.

Student 1 (Q1): "Masaya po ang experience ko kasi mas madali kong nakikita kung ano ang mga nangyari sa kasaysayan."

Student 3 (Q2): "Para sa akin, yung mga larawan po ang nakatulong kasi mas naiintindihan ko ang pangyayari kapag may nakikita akong picture."

The qualitative accounts under Theme 1 demonstrate that integrating visual cues—such as historical photographs, date markers, and concise textual summaries—supported real-time comprehension and long-term memory retention. Learners noted that presenting historical content in structured, short information blocks prevented cognitive fatigue and made learning far less intimidating than traditional text-heavy instruction. Rather than encountering historical developments as isolated fragments, students could synthesize historical periods into unified, memorable concepts.

Chronological Mastery and Causal Reasoning in Historical Narratives

The second theme shows that the linear structure of the Interactive Timeline enabled learners to advance beyond mere rote memorization toward chronological mastery and cause-and-effect reasoning.

Student 4 (Q1): "Naging mas madali po sa akin ang pag-aaral dahil nakaayos ang mga pangyayari ayon sa pagkakasunod-sunod."

Student 8 (Q2): "Nakatulong po ito kasi nakikita ko ang connection ng isang pangyayari sa mga sumunod na pangyayari."

The transcripts in Theme 2 highlight a qualitative shift from memorizing dates to relational historical thinking. Students emphasized that seeing events in chronological order clarified how earlier developments laid the groundwork for major historical turning points (causes) and how later events unfolded as direct outcomes (effects). This spatial continuity prevented students from confusing dates and helped them perceive history as an interconnected narrative rather than a collection of unrelated facts. Timeline-based instruction also supports the development of chronological thinking and understanding relationships among historical events, as learners can better organize events sequentially and interpret historical connections (Nory & Ofianto, 2020; Wilson, 2007).

Affective Engagement, Sustained Attention, and Active Classroom Participation

The third theme illustrates the positive impact of the Interactive Timeline on student motivation, classroom participation, and sustained attentiveness during World History instruction.
Student 2 (Q1): "Para sa akin, naging mas interesting po ang pag-aaral ng World History dahil may Interactive Timeline."
Student 3 (Q6): "Mas naging active po ako sa discussion dahil mas naiintindihan ko ang lesson."
Theme 3 shows that moving from traditional, text-heavy lectures to dynamic visual media transformed the classroom's affective atmosphere. Students consistently noted feeling more curious, attentive, and willing to participate in class discussions when guided by the Interactive Timeline. The visual progression kept learners interested in "what happens next," turning passive listening into active intellectual engagement.

Cognitive Overload, Reading Constraints, and Processing Barriers

The fourth theme offers a balanced qualitative evaluation by capturing the specific learning difficulties, information density challenges, and reading constraints experienced by students during the implementation.
Student 1 (Q5): "Minsan po nahihirapan ako kapag maraming information na kailangang basahin."
Student 2 (Q5): "May mga words po na hindi ko agad naiintindihan kaya kailangan ko pang magtanong."
Student 3 (Q5): "Minsan po nalilito ako kapag maraming dates na magkakalapit."
Theme 4 captures critical pedagogical constraints that explain why some students faced learning bottlenecks despite the intervention's visual benefits. Rapid discussion pacing, information density, unfamiliar historical terms, and closely spaced dates presented temporary cognitive processing barriers, particularly for learners with lower baseline reading comprehension. These qualitative accounts provide essential context for understanding why post-test scores improved significantly yet still left room for further academic mastery.

Output of the Study

The proposed instructional strategies build on the reported score gains while addressing the gap between posttest performance and the expected benchmark. The guide uses interactive timelines to organize key dates, events, and relationships across the three World History competencies.
The interview findings informed the proposed use of shorter timeline segments, explicit vocabulary support, guided processing questions, and time to revisit complex events. The lesson plans below are proposed teaching resources.

IMPROVED INSTRUCTIONAL STRATEGIES IN TEACHING WORLD HISTORY

Rationale
Teaching World History requires learners to understand historical events within their proper sequence and context. Topics such as the First World War, Second World War, Cold War, and neocolonialism involve numerous dates, events, personalities, causes, and consequences. When these elements are presented primarily through conventional text-based instruction, some learners may have trouble in organizing the information and recognizing relationships among historical developments.

The Interactive Timeline provides a visual and chronological framework for presenting these historical elements. By arranging events according to their temporal sequence, learners are given an opportunity to examine what happened first, what followed, and how different developments are related. The timeline can therefore function not merely as a display of dates but as an instructional resource that supports questioning, comparison, sequencing, discussion, and interpretation.

Recent studies support the use of timeline-based media in history instruction. Interactive timeline media has been found to be feasible and practical for history learning and to support the development of chronological thinking. Timeline media has also been reported as feasible and practical and has contributed to improving students' chronological thinking skills (Nory & Ofianto, 2020; Pratiwi & Ofianto, 2022). These findings provide support for incorporating timeline-based activities into a structured teaching resource.

The present Improved Instructional Strategies further respond to the specific needs identified among the Grade 8 learners in the study. Since learners reported difficulties involving information density, unfamiliar terms, closely spaced dates, and the need for additional processing time, the strategies emphasize concise information, clear sequencing, relevant visual materials, guided questions, and opportunities for review and discussion.

The Improved Instructional Strategies are Segmented to serve not as a replacement for existing teaching strategies, but as a supplementary resource that teachers may adapt according to the learning competency, classroom context, available ICT resources, and learners' needs.

Objectives

The Improved Instructional Strategies aim to:
1. support the teaching of selected World History competencies through the integration of Interactive Timeline activities;
2. help learners organize historical events chronologically by presenting significant events according to their temporal sequence;
3. facilitate understanding of historical relationships by providing opportunities to examine connections among events, causes, developments, and consequences;
4. provide meaningful visual support using dates, images, key information, and other appropriate timeline elements;
5. encourage active learner participation through guided questions, discussions, sequencing tasks, and short analytical activities;
6. address learners' reported difficulties by presenting historical information in concise, organized, and manageable segments;
7. provide teachers with a structured supplementary resource that can be adapted to different World History lessons and classroom conditions.

Coverage of the Improved Instructional Strategies

The Improved Instructional Strategies cover the three World History competencies addressed in the study:
1. Nasusuri ang mga dahilan, mahahalagang pangyayaring naganap at bunga ng Unang Digmaang Pandaigdig (WWI);
2. Nasusuri ang mga dahilan, mahahalagang pangyayaring naganap at bunga ng Ikalawang Digmaang Pandaigdig (WWII); and
3. Natataya ang epekto ng mga Ideolohiya ng Cold War at ng Neokolonyalismo sa iba't ibang bahagi ng daigdig.
Each competency is supported by Interactive Timeline activities intended to help learners examine historical events in sequence and identify relationships among significant developments. The activities are aligned with the intended learning competency so that the timeline serves a clear instructional purpose within the lesson.

Structure of Improved Instructional Strategies

The Improved Instructional Strategies follow a structured sequence that integrates the Interactive Timeline into appropriate stages of instruction. Each lesson may include the following components:

1. Learning Competency.

The specific World History competency is identified as the focus of the lesson.
2. Learning Objectives.
The objectives specify what learners are expected to understand and demonstrate after the lesson.
3. Key Historical Content. The essential dates, events, personalities, concepts, causes, and consequences related to the competency are identified and organized.
4. Interactive Timeline Presentation. The selected historical information is presented through an Interactive Timeline. Dates, images, brief descriptions, and significant events are arranged chronologically to establish a clear temporal framework.
5. Guided Processing Questions. Questions are provided to guide learners in identifying sequences, comparing events, examining relationships, and considering possible causes and consequences.
6. Learner Activity. Learners participate in sequencing, matching, comparison, discussion, interpretation, or other timeline-based activities that allow them to engage directly with the historical content.
7. Assessment. Assessment activities are provided to determine learners' understanding of the targeted competency. These may include questions requiring learners to identify chronological relationships, explain historical connections, or analyze causes and consequences.
8. Reflection or Enrichment. Additional questions or activities may be provided to encourage learners to reflect on the significance of the historical developments and make connections among related events.

Scheme of Implementation

The Improved Instructional Strategies may be implemented as a supplementary instructional resource during regular World History classes. The teacher may begin the lesson by activating learners' prior knowledge and introducing the historical topic through selected timeline entries. Important dates, events, and visual materials may then be presented sequentially to establish the chronological framework of the lesson.

During the development of the lesson, learners may be guided to examine the timeline and identify significant events and relationships. Rather than requiring learners to memorize dates alone, the teacher may use guide questions that encourage them to determine what happened before and after a particular event, identify relationships among developments, and examine possible causes and consequences.

During the processing stage, learners may participate in activities such as arranging events in chronological order, identifying missing events, comparing developments across periods or regions, and explaining how one event relates to another. These activities are intended to encourage learners to use the timeline as a basis for discussion and interpretation.

The assessment component may then be used to determine whether learners can apply their understanding of the historical sequence and relationships presented in the lesson. The teacher may provide sufficient time for learners to review the timeline, clarify unfamiliar terms, and revisit information that may require further explanation.

The scheme emphasizes the appropriate integration of the Interactive Timeline into the teaching-learning process rather than its use as a stand-alone presentation. The teacher remains responsible for facilitating discussion, providing clarification, and connecting the timeline content to the intended learning competency.

Expected Contribution of the Teaching Guide

The Improved Instructional Strategies are expected to provide teachers with a practical resource for organizing selected World History lessons through chronological and visual presentation. Their design responds to the learning needs and experiences identified in the study, particularly learners' reported preference for visual and organized information and their perceived difficulty with numerous dates, unfamiliar terms, and lengthy explanations.

For learners, the strategies are intended to provide opportunities to view historical events within a clearer chronological framework, examine relationships among developments, and participate more actively in classroom activities. For teachers, they provide a structured basis for integrating Interactive Timeline activities into lesson delivery while allowing flexibility in the selection of content, activities, and assessment strategies.

The Improved Instructional Strategies should therefore be regarded as a supplementary and adaptable instructional resource, rather than a replacement for established World History teaching practices. Their use may be modified according to the learning competency, available technology, classroom conditions, and specific learning needs of the learners.

Overall, the output translates the findings of the study into a practical instructional resource. The quantitative findings provide empirical support for its development, while the qualitative findings provide specific considerations regarding organization, visual presentation, learner engagement, processing time, and instructional support. Through these features, the Improved Instructional Strategies provide a structured approach to integrating the Interactive Timeline into the teaching of selected World History competencies.

Table 12
School and Grade Identification in the Teaching Guide

MEDIA ONCE **NATIONAL HIGH SCHOOL**	**JUNIOR HIGH SCHOOL** **GRADE 8**

Summary of the Proposed Lesson Plans

First World War. Learners review the causes of the war, watch a video, and report in groups on assigned aspects of the conflict. A guided PowerPoint and interactive timeline discussion helps them sequence major events and examine the fighting on the Western Front. The lesson closes with a multiple-choice assessment, assigned reading on the consequences of the war, and a brief written reflection.

Second World War. Learners review the causes of the war, read in groups, and report on major events and consequences. Guided questions and an interactive timeline help them sequence events such as the invasion of Poland, Pearl Harbor, and D-Day. Learners complete a multiple-choice assessment and consider the war's consequences and the possibility of future conflict.

Cold War Ideologies and Neocolonialism. Learners review the effects of the world wars, watch a short video, and report on the effects of the Cold War in assigned regions. The timeline and guided discussion connect ideological rivalry and neocolonial influence to regional developments. Learners complete a multiple-choice assessment, investigate a current example of neocolonialism, and reflect on national self-determination.

Conclusion

Based on the empirical findings of the study, it was concluded that while Grade 8 learners' scores increased following the use of the Interactive Timeline in World History instruction across all targeted learning competencies, the absolute post-test performance of the learners remained below institutional mastery benchmarks and national proficiency standards. Although learners achieved measurable score increases in competencies covering the First World War, the Second World War, and the effects of Cold War ideologies and Neocolonialism, the one-group design does not establish what caused the gains, and the post-test means remained below the reported benchmark. These outcomes align with the core principles of Connectivism, which posits that learning is a process of navigating digital nodes and recognizing actionable patterns; while the interactive timeline successfully expanded learners' digital and temporal networks, complete knowledge construction was hindered without robust guidance. Furthermore, this dynamic supports the TPACK (Technological Pedagogical Content Knowledge) framework, illustrating that while digital technology and content interaction were successfully merged, true mastery requires balancing technological affordances with explicit pedagogical scaffolding, vocabulary development, and reading comprehension support.

The quantitative and qualitative findings converged to explain both the cognitive gains achieved and the persistent performance deficit through the lens of these theoretical frameworks. On one hand, the interactive timeline functioned as a vital digital node under Connectivism, providing a visible temporal anchor that allowed learners to sequence complex events, trace cause-and-effect relationships, and synthesize dense historical narratives. Qualitatively,

participants described the tool as highly engaging, increasing active participation and mitigating baseline confusion. However, the qualitative data also revealed persistent processing bottlenecks, such as cognitive overload, unfamiliar technical terminology, and reading comprehension constraints. In terms of TPACK, these accounts suggest that some learners needed more support with vocabulary and reading to engage in historical analysis. Consequently, the study concludes that digital visual tools represent a valuable supplementary strategy but must be systematically embedded within a comprehensive framework of explicit literacy instruction and pedagogical support to support progress toward topic mastery.

In summary, the study concludes that the Interactive Timeline represents a highly valuable, dynamic supplementary strategy for secondary World History instruction. To translate statistically significant progress into benchmark-level academic mastery, however, digital visual tools must be systematically embedded within a comprehensive instructional framework. They must be paired with explicit pre-teaching of vocabulary, guided reading strategies, targeted diagnostic remediation, and structured inquiry prompts. These synthesized conclusions establish the direct empirical and theoretical imperative for the proposed Improved Instructional Strategies in Teaching Social Studies, which systematically pairs interactive digital timelines with explicit literacy and pedagogical scaffolding to support progress toward topic mastery in World History instruction.

Recommendations

Based on the empirical findings, conclusions, and specific panel insights—particularly regarding the need to bridge the gap between post-test score improvements and target mastery expectations—the following recommendations are proposed to optimize the implementation of the Interactive Timeline and elevate student achievement in World History:

Institutionalization of the Output: Adopt and institutionalize the developed Improved Instructional Strategies in Teaching Social Studies framework as an authorized supplementary instructional resource for secondary history education.

Curricular Policy Alignment: Issue guidelines supporting the integration of digital interactive timeline tools paired with explicit reading comprehension supports and literacy frameworks to help bridge national proficiency gaps in Araling Panlipunan.

Targeted Professional Development (TPACK Framework): Provide continuous professional development workshops focused on Technological Pedagogical Content Knowledge (TPACK), equipping history educators with both technical digital skills and pedagogical strategies to support low-performing readers.

Administrative and Resource Support: School administrators and social studies coordinators should ensure that the guide's lesson plans—which combine digital timeline integration with remedial strategies and vocabulary development—are made accessible and adapted flexibly across grade levels.

Integration of Explicit Scaffolding and Vocabulary Instruction: Pair the Interactive Timeline with explicit vocabulary instruction, pre-teaching of key historical concepts, and structured graphic organizers to address reading comprehension barriers and unfamiliar terminology.

Targeted Diagnostic Remediation and Tiered Support: Utilize pre-test and ongoing formative assessment data to identify struggling learners early, systematically providing differentiated instructional activities, small-group remediation, and guided review sessions.

Curricular Pacing and Chunking of Information: Apply cognitive load theory principles by segmenting complex historical narratives into manageable visual units, extending instructional pacing so students have sufficient time to process dates and events.

Integration of Higher-Order Historical Thinking Prompts: Embed analytical cause-and-effect prompts, comparative matrix tasks, and guided inquiry questions directly into timeline activities to transition learners from basic chronological recognition to analytical mastery.

Active Engagement with Digital Tools: Take an active role in independently operating the Interactive Timeline interface, navigating temporal nodes, and discovering historical events across specific dates to build chronological reasoning.

Collaborative Inquiry and Reflection: Fully engage in collaborative sorting tasks, guided historical inquiry prompts, and structured discussions to strengthen historical imagination, analyze cause-and-effect relationships, and improve conceptual retention.

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