

Cultural Content of Mandailing Natal and Interactive Multimedia Integration on Students' Reading Comprehension Performance

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ABSTRACT

This study examined the impact of integrating Mandailing Natal cultural content and interactive multimedia into English instruction at the senior high school level. The participants were 62 Grade X students from MAN 2 Mandailing Natal Regency, divided into experimental and control groups using a pretest-posttest equivalent group design. Data were collected through pretests and posttests measuring students' reading comprehension and were analyzed using mean scores, standard deviation, and paired-sample t-tests. The findings show that the integration of Mandailing Natal cultural content and interactive multimedia significantly improved students' reading comprehension performance, English learning competence, enthusiasm, motivation, and appreciation of cultural heritage. These results indicate that cultural content supported by interactive multimedia is an effective instructional strategy for English learning. Therefore, English textbooks and instructional materials should be revised to include operational procedures and core principles for integrating local cultural content and interactive multimedia.

Keywords: Mandailing Natal cultural content, interactive multimedia, reading comprehension.

ABSTRAK

Penelitian ini mengkaji dampak pengintegrasian konten budaya Mandailing Natal dan multimedia interaktif dalam pembelajaran Bahasa Inggris pada jenjang sekolah menengah atas. Penelitian ini melibatkan 62 siswa kelas X dari MAN 2 Kabupaten Mandailing Natal yang dibagi ke dalam kelompok eksperimen dan kelompok kontrol dengan menggunakan desain pretest-posttest equivalent group. Data dikumpulkan melalui pretest dan posttest untuk mengukur kemampuan pemahaman membaca siswa, kemudian dianalisis menggunakan nilai rata-rata, standar deviasi, dan uji-t sampel berpasangan. Hasil penelitian menunjukkan bahwa penggunaan konten budaya Mandailing Natal dan multimedia interaktif secara signifikan meningkatkan pemahaman membaca, kompetensi belajar Bahasa Inggris, antusiasme, motivasi, serta apresiasi siswa terhadap warisan budaya. Dengan demikian, konten budaya yang didukung multimedia interaktif dapat digunakan sebagai strategi pembelajaran yang efektif. Buku ajar dan bahan pembelajaran Bahasa Inggris disarankan untuk dikembangkan dengan memasukkan prosedur operasional dan prinsip dasar integrasi konten budaya lokal dan multimedia interaktif.

Kata kunci: konten budaya Mandailing Natal, multimedia interaktif, pemahaman membaca.

INTRODUCTION

Reading comprehension is a crucial ability that serves as the cornerstone of both academic achievement and lifelong learning (LaRusso et al., 2016). However, improving students' reading comprehension remains a challenge (Kočíský et al., 2018) (Aizawa et al., 2023), especially in diverse educational settings where students often struggle to connect with generic or culturally distant reading materials (Vaughn et al., 2017). Students are not only required to enhance their ability in reading comprehension but they are supposed to have high motivation in reading (Wigfield et al., 2016) hence the inclusion of culturally relevant content in teaching practices has been proposed as a strategy to enhance engagement and understanding, due to the fact that it enables pupils to connect their previous

experiences and knowledge to the content that they are reading (Siregar et al., 2023), simultaneously technological advances have introduced interactive multimedia as an innovative tool to support and enrich traditional teaching methods.

The integration of cultural elements and technology into language teaching is vital in creating meaningful and contextually relevant learning experiences (Kessler, 2018; Yuliantari & Huda, 2023). Mandailing Natal culture, with its traditions, values, and unique identity, offers significant potential as a resource for teaching English. By utilizing the cultural narratives, folklore, and practices of Mandailing Natal culture, English educators can create materials that engage students while fostering cultural awareness and cross-cultural competence. In this

study, the identified factors that support student engagement are not limited to educational technology; they also include culturally familiar reading topics, students' prior knowledge, reading motivation, teacher scaffolding, multimodal input, and opportunities for interaction during reading activities. Educational technology is therefore positioned as a supporting medium that strengthens these factors by presenting Mandailing Natal cultural narratives through more visual, auditory, and participatory formats. Furthermore, the use of interactive multimedia has proven effective in modern education, allowing for dynamic, immersive, and student-centered learning environments (Mayer, 2021). Among these factors, educational technology serves as a crucial component of student engagement because learning environments have become increasingly connected with emerging educational technologies (Naz et al., 2024).

At the same time, technological advancements have introduced interactive multimedia as a powerful tool for modern education. Tools such as animations (Laksmi et al., 2021), videos (Nicolau et al., 2019), and interactive applications (Gan et al., 2015) offer dynamic and multisensory approaches to learning, accommodating diverse learning styles and increasing motivation (Kanaris & Mujtaba, 2024). Integrated culturally relevant knowledge with interactive multimedia may develop a more captivating and significant educational experience for pupils despite Mandailing Natal's rich cultural heritage and the growing availability of interactive multimedia tools, little research has been conducted on their integration in improving reading comprehension. Understanding how these elements influence reading performance is essential for designing instructional strategies that are both culturally responsive and technologically innovative.

Interactive multimedia along with Mandailing Natal's cultural content could improve students' reading comprehension by making learning more enjoyable and contextualized. Traditional stories, practices, and local knowledge from Mandailing Natal help students connect with the topic and become more motivated to learn (Lee, 2014). This cultural content mixed with interactive multimedia tools like movies, simulations, and digital storytelling enhances visual (Palioura & Dimoulas, 2022), auditory, and kinaesthetic learning styles and help students process and remember information (Hall, 2018). Multimedia

enhances cultural narratives, making reading more participatory and improving comprehension and critical thinking (Abdel-hack et al., 2014). This technique improves reading comprehension and text engagement by providing a rich, multimodal learning environment (Zhou & Yadav, 2017).

Previous studies have employed quantitative, qualitative, and mixed-method approaches to integrate cultural content into language learning. Khasanah (2023) conducted a quantitative study on culturally responsive teaching for Grade II elementary school students and found that incorporating cultural elements improved students' cognitive, affective, and psychomotor learning outcomes. Siregar et al. (2023) developed culturally responsive English worksheets using Medan local culture, such as "mie balap", "alip brondok", and "ulos", and reported that familiar cultural topics made English learning more effective, enjoyable, contextual, and motivating for elementary students. These findings are directly related to the present study because they show that students' prior cultural knowledge can increase engagement, curiosity, and comprehension; however, those studies did not integrate Mandailing Natal culture with interactive multimedia in senior high school reading instruction.

Damayanti et al. (2023) integrated local wisdom into civic lessons and found that the approach improved students' cognitive learning outcomes. Liu (2015) examined 50 Taiwanese junior college students and reported that cultural familiarity and background knowledge significantly affected intermediate EFL learners' reading comprehension. Sartono et al. (2022) developed interactive multimedia based on Indonesia's cultural diversity for elementary civics learning; teacher and student responses and field-test results showed that the multimedia was practical and suitable for both online and face-to-face learning. In their study, the term continual tool refers to a reusable instructional resource that can be used repeatedly by teachers and students during civics learning. These studies support the present research because they indicate that cultural familiarity and technology-mediated learning can jointly strengthen motivation, comprehension, and learner participation.

Nevertheless, none of the previous studies specifically explored Mandailing Natal local culture particularly the Mandailing community

in the highlands and “Sumando” customs in the coastal areas within interactive multimedia for English reading comprehension. This gap is important because the students’ textbooks still present culturally distant topics, such as “Superman”, “The Giant Slipper Glass Building in Taiwan”, “Casa Terracotta”, and “The History of the Black Death”. The present study addresses this gap by replacing unfamiliar content with culturally closer topics, including “The Legend of Sampuraga Pond”, “Bagas Godang”, “How to Make Daun Ubi Tumbuk”, and “A Visit to Batu Rusa Beach”. By connecting reading materials to students’ cultural background and prior knowledge, this study is expected to ease comprehension and strengthen students’ appreciation of their own culture.

The theoretical foundation of this study includes cultural relevance theory, multimedia learning, reading comprehension, and constructivist learning.

The cultural relevance theory, as proposed by (Ladson-Billings, 2014), posits that the integration of students’ cultural backgrounds into pedagogical practices can enhance their engagement, comprehension, and overall learning outcomes, thereby fostering academic success, cultural competence, and critical consciousness. This approach underscores an emphasis on the significance of embracing the cultural influences of pupils into the educational process, thereby enhancing engagement and affirming their lived experiences and identities. This framework facilitates the incorporation of Mandailing Natal’s cultural content into educational reading materials, thereby allowing students to relate their existing knowledge and personal experiences to the subject matter. Research indicates that culturally relevant education significantly enhances students’ sense of identity and promotes a more profound comprehension of academic concepts (de la Garza et al., 2020).

The cultural relevance theory has been widely adopted in various educational contexts to address the challenges posed by standardized, culturally neutral curricula. For instance, integrating local culture, such as the traditions, language, and stories of Mandailing Natal, into reading comprehension materials allows students to connect their prior knowledge to new learning (Gay, 2018). Several cultural contents are “The Pond of Sampuraga”, “Seri Bulan”, “Bagas Godang”, “Gordang Sambilan”, “Tradition at Lubuk Larangan”, “Visit to Batu Rusa Beach”,

and “How to cook cassava leaves” in Mandailing recipe. Moreover, Students have a sense of being appreciated and motivated when they see their culture reflected in the English language learning process. This has a good impact on the students’ academic achievement. The findings of the research indicate that the implementation of culturally relevant pedagogy in educational settings not only enhances the academic outcomes of students but also enhances their sense of belonging and self-efficacy overall. (Howard, 2001).



Figure 1. The main display of multimedia

Figure 1 presents the main menu of a custom interactive multimedia package used by the educator with a laptop, LCD projector, speaker, animated video, interactive questions, digital books, learning videos, and Wordwall-based games during the teaching and learning process. The platform contains four Grade X text genres narrative, descriptive, recount, and procedure texts and each genre includes a digital book, interactive video, learning video, and interactive games. Thus, the multimedia tool used by the educator was not a single device but an integrated digital package that combined locally relevant Mandailing Natal cultural content with audiovisual and game-based learning activities.

Multimedia learning asserts that the acquisition of knowledge is enhanced when information is conveyed through both verbal and visual modalities, leveraging the brain’s dual-processing capacity (Mayer, 2021). The use of interactive multimedia in English learning has proven to be highly effective in enhancing student engagement, comprehension, and language acquisition (Almarabeh et al., 2015). By combining text, images, sound, and interactive elements, multimedia (Wilson & Brown, 2012) caters to various learning styles and stimulates multisensory engagement. Research highlights that integrating multimedia

tools such as videos, animations (Barut Tugtekin & Dursun, 2022), and language games (Hasram et al., 2021) can significantly improve learners' motivation and retention (Patra et al., 2022). For instance, Mayer's Cognitive Theory of Multimedia Learning emphasizes that visual-auditory integration enhances comprehension by reducing cognitive overload (Mayer, 2021). Additionally, interactive multimedia provides real-life scenarios and authentic contexts for practicing language skills, assisting pupils in the development of their reading, writing, listening, and speaking skills in a more meaningful way (Abdulrahman et al., 2020).

Moreover, interactive multimedia fosters collaborative and independent learning that succeeds the students' learning process and develops their social skills (Polat et al., 2022). Tools like virtual role-play, online discussion forums, and gamified activities (Elaish et al., 2019) enable learners to practice English in immersive and authentic contexts, increasing confidence and language fluency. Studies have also found that multimedia-supported learning can bridge cultural gaps, exposing learners to diverse accents, idiomatic expressions, and cultural nuances, which are critical for effective communication in English (So et al., 2019). However, the effectiveness of such tools relies heavily on quality content design and teacher expertise in integrating technology into language instruction (Wei, 2022). When implemented thoughtfully, interactive multimedia not only enhances language skills but also prepares students for a globalized world where English is a key medium of communication (Wang et al., 2018). By integrating cultural content with interactive multimedia, educators can create an engaging and meaningful learning environment tailored to students' needs (Serrano et al., 2019), (Ma, 2017).



Figure 2. Interactive multimedia question

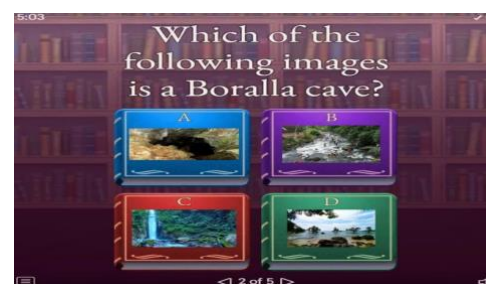


Figure 3. Interactive game

Figure 2 depicts the questions shown to the students while they were watching “The Pond of Sampuraga”. The students are required to make a direct decision regarding the correct answer, and then the responses will appear whether the answer is correct or incorrect. The third image demonstrates an interactive online game that is employed in the Wordwall application.

Comprehension involves the interaction between new information and existing mental frameworks, or schemas (Sutarsyah, 2009). Comprehending what one reads is an intricate and advanced skill. Fluency in reading is essential for understanding what people read (Saat & Özenç, 2022). Cultural content from Mandailing Natal may activate students' cultural schemas, facilitating a better understanding of texts by bridging the gap between new information and prior knowledge. When combined with interactive multimedia, this approach can further scaffold students' comprehension by providing visual and auditory cues that support schema activation (Takacs et al., 2015).

Reading comprehension is a vital competence for academic achievement and personal development since it allows individuals to derive meaning from written text and apply it effectively in various contexts. Reading comprehension involves the relationship between the reader, the book, and the exercises, requiring both cognitive and metacognitive strategies. Students with strong reading comprehension skills demonstrate higher proficiency in other academic subjects (Mcgeown et al., 2015), such as mathematics and science, where understanding complex problems and instructions is essential (Duke & Pearson, 2004). These skills also promote critical thinking, enabling readers to analyze information, draw conclusions, and build arguments, which are crucial for academic and professional success (Bean & Melzer, 2021).

Beyond academics, reading comprehension has broader implications for personal and societal growth. The ability to process written information critically is fundamental in navigating the modern world, where digital media and misinformation are pervasive. Proficient reading comprehension contributes to better decision-making and problem-solving in real-life scenarios (Ghahari & Basanjideh, 2015), including managing finances, interpreting legal documents, and participating in civic activities. Furthermore, it increases persons' capacity for empathy and cultural understanding by exposing them to a variety of viewpoints and kinds of experiences through literature. Thus, prioritizing the development of reading comprehension skills in educational systems is essential for cultivating informed, thoughtful, and engaged citizens (Elleman & Oslund, 2019).

The incorporation of Mandailing Natal's cultural material with interactive multimedia corresponds with constructivist theory, which asserts that learners actively construct knowledge via engagement with their surroundings and significant experiences. Incorporating local cultural components into interactive multimedia enables learners to participate in contextualized and authentic learning, enhancing their comprehension and personal connection to the content. Constructivism promotes student-centered learning environments that encourage discovery and the integration of past knowledge with new information (Piaget, 1950; Vygotsky, 1978). The use of culturally pertinent multimedia promotes cognitive engagement and reinforces the social constructivist focus on collaborative and culturally contextualized learning, ensuring the curriculum aligns with learners' lived experiences.

Furthermore, the incorporation of Mandailing Natal's cultural material with interactive multimedia promotes both knowledge acquisition and the maintenance of cultural identity. The constructivist theory emphasizes the significance of contextual learning environments that mirror learners' socio-cultural backgrounds, enhancing the relatability and meaningfulness of the learning experience (Vygotsky, 1978). Interactive multimedia integrates local customs, language, and art forms, acting as a conduit between contemporary educational methodologies and cultural heritage, so enabling learners to cultivate both academic and cultural competencies. This method corresponds with the principle of scaffolding,

wherein cultural context serves as cognitive assistance, facilitating learners in attaining advanced comprehension while concurrently nurturing a sense of pride and affiliation with their cultural heritage (Bruner, 1996). This approach encourages collaboration, critical thinking, and deeper comprehension of texts.

This study aims to investigate the impact of integrating the cultural content of Mandailing Natal and interactive multimedia on students' reading comprehension performance. It seeks to explore whether this combination enhances students' ability to engage with and understand reading materials, providing evidence-based insights for educators in designing effective and meaningful instructional practices.

METHODOLOGY

A true experiment study was employed by having a pretest and posttest equivalent group design, several steps were taken in this study, including the following: (1) Initial training of educators took role in this research; (2) Initial questionnaire and pre-test to measure students' reading comprehension; (3) Implementation of cultural content and interactive multimedia; and (4) Evaluation to measure students' skills and motivation through the use of the post-test and the final questionnaire. Two groups participated in this study, and both of them were studying English for Young Learners throughout the same semester. A control group consisting of 31 students and an experimental group composed of 31 students. At the Madrasah Aliyah Negeri 2 Mandailing Natal. The following is a symbolic representation of the experimental design.

Table 1. Experimental Design

RE=	T	O ₁
RC=	-	O ₂
Difference=	O ₁	- O ₂

R stands for random selection
E = Experimental
C = Control
T = Treatment
O = Observation

English studies were taught to students in the experimental group through the use of cultural content and interactive multimedia. The traditional method was used to instruct the same subjects to the control group, which was the opposite of the case.

Questionnaires, pretest and posttest were the instruments utilized in this research project. The questionnaire was the first instrument. In total, there were two sections to the questionnaire. Both the initial and the final questionnaires are included. The primary purpose of the initial questionnaire was to evaluate the needs or problems, both the students and the teacher had about their English learning. The purpose of the final questionnaire was to assess the answers of students to the model of the Likert scale namely point 1 for strongly disagree, point 2 for disagree, point 3 for undecided, point 4 for agree and point 5 for strongly agree to the statements. In addition, the examination was carried out with the purpose of evaluating the students' reading comprehension in relation to the local culture, both of which were presented in an interactive multimedia format. Both a pre-test and a post-test were included in the examination. In order to achieve the students' reading comprehension performance the pretest and posttest are utilized to evaluate them.

We tested the validity and reliability using Statistical Package for the Social Sciences (SPSS) 27, applying content validity to accurately measure the test items with the significance level 5% must be <0.05 and as the result was 13 valid questions and 2 others were not because Corrected Item-Total Correlation was lower than correlation coefficient table r (0.355) with $N= 31$. Cronbach's alpha was employed to measure the reliability on 15 questionnaires of students' motivation in English learning by cultural content and interactive multimedia with 0.788. The Kuder Richardson-20 was used to assess the internal consistency of a test score with the value 0.78 meaning those test items were reliable as it's higher than the standard >0.70 , it was calculated by this formula:

To ensure the instrument's reliability (Gay I.R., Geoffrey, 2015). The pre-test of reading comprehension achievement had a reliability coefficient of 0.70, which measures its dependability.

This is a visual representation of the data collection method for the study, the stage describes the essential activities involved, from preparation to analysis.

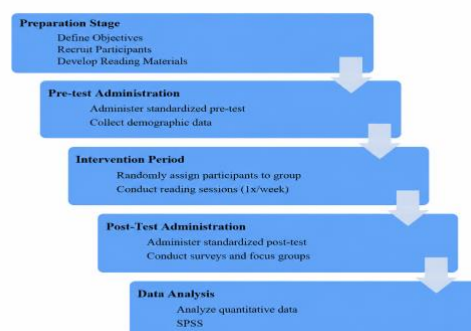


Figure 4. Data Collection Methods

Figure 4 illustrates the data collection process that was used. During the preparation stage, the research objectives were set, participants were recruited, and culturally relevant and neutral reading materials and multimedia intervention tools were constructed. This is just one example of the tasks that are included in each of the five stages. In order to evaluate the participants' baseline reading comprehension, standardised pre-tests were administered to each and every participant. In addition, demographic information was gathered for the purpose of analysis. During the intervention phase, using a random assignment method, the participants were placed into one of two groups: the organization that serves as the control, the cultural content and the interactive multimedia group. For a period of four weeks, participants were required to keep daily activity and would attend one reading session per week. The level of engagement was tracked. After the session, standardized post-tests were administered in order to evaluate the students' level of comprehension.

Observational data was provided by the instructors, and quantitative test results were used to investigate the effects of questionnaire analysis, cultural content, and interactive multimedia on reading comprehension. To ensure that a methodical approach is used to comprehending the research objectives of the study, each phase and its actions are carried out. For the purpose of determining whether or not there was a significant difference between the two groups, the data that was obtained through pre- and post-tests of academic attainment were tabulated and analyzed in the statistical package for social science (SPSS) version 16 using the mean, standard deviation, and paired sample t-test.

Instructional evaluation of the ability to comprehend what is read. Reading comprehension abilities were evaluated using two different tests that were developed by the researcher. The first test was the pre-test, and the second test was the post-test. Both tests were administered. For the 2024/2025 school year, the materials for the pre-test and post-test were developed based on the narrative named "The Invisible Man on Lake Ontario, America." This narrative corresponds to the theme "The Pond of Sampuraga" that is found in the students' textbook, which is called Pathway to English. These tests were developed with the purpose of determining the level of reading comprehension that students possess when reading narrative materials.

Table 2. Demographic information of MAN 2 Mandailing Natal participants.

Measure	N	Percentage (%)
Gender		
Male	17	27.5
Female	45	72.5
Ethnicity		
Mandailing	12	19
Sumando	43	69
Java	3	0.4
Malay	2	0.3
Batak	2	0.3
Phone Intensity		
> 5 hours	14	22.5
< 5 hours	46	74.1
Never	1	0.1
Mother Tongue		
Mandailing	12	19
Sumando	46	74.1
Javanese	1	0.1
Malay	1	0.1
Bataknese	-	-
Indonesian	2	0.32

Table 2 presents the demographic characteristics of participants from MAN 2 Mandailing Natal, categorized by gender, ethnicity, phone usage intensity, and mother tongue. In terms of gender, 72.5% of participants are female (n = 45), while 27.5% are male (n = 17). Most participants (69%) have a Sumando cultural background (n = 43), followed by Mandailing (19%, n = 12), and smaller representations from Java, Malay, and Batak cultures, each accounting for 0.3–0.4%. Regarding phone usage, the majority (74.1%, n = 46) reported using their phone for less than 5 hours daily, while 22.5% (n = 14) exceeded 5 hours of use, and only one participant (0.1%) reported never using a phone. In terms of mother tongue, 74.1% (n = 46) speak "Sumando", 19% (n = 12) speak Mandailing, and smaller proportions speak Javanese, Malay, or Indonesian, with no participants identifying Bataknese as their primary language.

RESULTS AND DISCUSSION

Findings regarding the first research problem

This study investigated the efficacy of a cultural content and interactive multimedia method in English Studies at the senior high school level.

Table 3. Independent samples statistics

Measurement	N	Mean	Std. Deviation	Std. Error Mean
Pair 1				
Experimental Pretest	31	64.16	8.414	1.511
Control Pretest	31	47.80	8.692	1.561

Table 3 shows the descriptive statistics are used to make a comparison between the pre-test performance of an experimental group and a control group. In each of the two groups, there were a total of 31 individuals. The experimental group had a mean score that was greater than the control group, coming in at 64.16, with a standard deviation of 8.414 and a normative error of 1.511. On the other hand, the group that served as the control had a mean score of 47.80, a standard deviation of 8.692, and a standard error of 1.561. Comparable standard deviations imply that there is comparable variability within both groups. On the other hand, the difference between the experimental group and the control group during the pretest stage is that the experimental group performed much better than the control group, as evidenced by the mean scores.

Findings regarding the second research problem

Table 4. Paired samples test

Category	Paired Differences			T	Df.	Sig.
	Mean	Mean Difference	Std. Deviation			
Experimental group pretest	64.16					
Experimental group post-test	90.87	26.70	9.699	1.742	15.332	30 000

Table 4 presents a paired-sample t-test was carried out in order to examine the impact of an intervention on the performance of an experimental group. The results of this test are presented below. There was a considerable improvement in the group's mean score, which went from 64.16 on the pre-test to 90.87 on the post-test, with a mean difference of 26.70. This improvement was related with a standard deviation of 9.699 and a standard error of 1.742,

which indicates that participants achieved consistent gains over the course of the study. As a result of the t-test, which produced a t-value of 15.332 with 30 degrees of freedom and a p-value of.000, it was demonstrated that the improvement that was noticed was statistically significant. Based on these findings, it appears that the intervention had a significant and dependable favorable impact on the performance of the group.

Table 5. Paired samples test

Category	Paired Differences				T	Df.	Sig.
	Mean	Mean Difference	Std. Deviation	Std. Error Mean			
Control group pretest	47.80						
Control group posttest	53.32	5.516	9.861	1.771	3.114	30	.0004

Table 5 summarizes the findings of a paired-sample t-test that was carried out in order to assess the changes in performance that occurred within a control group between the pre-test and the post-test measurements. With a mean difference of 5.516, the mean score went from 47.80 on the pre-test to 53.32 on the post-test, indicating that the mean score saw a rise. There was some variation in the score changes across the participants, as indicated by the fact that this difference had a standard deviation of 9.861 and a standard error of 1.771. Based on the results of the t-test, which yielded a t-value of 3.114 with 30 degrees of freedom and a p-value of.0004, it can be concluded that the observed improvement in scores is statistically significant. Based on these findings, it appears that the performance of the control group has showed a slight but significant improvement over the course of time.

Findings regarding the third research problem

Table 6. Paired samples test

Category	Paired Differences				T	Df.	Sig.
	Mean	Mean Difference	Std. Deviation	Std. Error Mean			
Experimental group posttest	90.87						
Control group posttest	53.32	37.54	46.796	2.189	17.146	30	.000

Table 6 presents the results of a paired-sample t-test that compared the performance of the experimental group and the control group after

the post-test. There was a mean difference of 37.54 points between the experimental group and the control group, with the experimental group achieving a higher mean score of 90.87 and the control group scoring 53.32. Because there was some variation in the scores between the two groups, the standard deviation of the differences was 46.796, and the standard error was 2.189. This indicates that there was some degree of variability. Based on the results of the t-test, which showed a t-value of 17.146 with 30 degrees of freedom and a p-value of.000, it can be concluded that there is a statistically significant difference in the post-test scores between the two groups. These findings indicate that the intervention that was carried out by the experimental group had a significant and meaningful impact in comparison to the group that served as the control.

Several numbers varied significantly in both control and experimental groups, the pupils who participated in the experimental class felt excited and motivated being taught the new approach such as this close topic to their life. In implementing this strategy, the teacher revealed the cultural contents of Mandailing Natal, the teacher needs to understand well the appropriate materials, media, lesson plan, students' worksheet, assessment rubrics and curriculum to engage the entire students in English learning with the heterogeneous students' ethnics but similar understanding of local culture. Here is the way how teacher had taught students in the classroom.

The learning process

The experimental learning process began with a comprehensive pre-intervention assessment designed to evaluate students' initial reading comprehension levels, cultural background knowledge, and technology familiarity. This diagnostic phase provides important baseline data for measuring the effectiveness of the intervention and designing personalized learning experiences. The core intervention focused on integrating Mandailing Natal cultural narratives with an interactive multimedia platform.

A pretest was conducted on the control and experimental classes before the intervention, after finding out the initial scores on students' reading comprehension skills with 15 multiple-choice questions related to the narrative stories of "Sampuraga" and "Bagas Godang", then the control class was taught using conventional methods focusing on textbooks as teaching

resources while in the experimental class, the teacher taught narrative and descriptive texts by integrating local cultural stories and delivered audio-visually through interactive multimedia with speakers and LCD projector support. Therefore, students who engage with digital modules are carefully presented to embed local historical stories, traditional contexts, and linguistic elements into reading comprehension exercises. These multimedia resources are dynamically adjusted to the learning profiles of individual students, ensuring that the delivery of this personalized content is engaging.

The teaching strategy emphasizes a holistic approach that combines problem-based learning, situational learning methodologies, and culturally responsive pedagogical techniques. Students navigate through interactive storytelling modules that require active interpretation, cultural analysis, and linguistic decoding. The learning process builds reading comprehension skills by progressively increasing complexity and providing immediate feedback mechanisms.

Collaborative learning segments are strategically incorporated to enhance student interaction and knowledge construction. Gamification elements motivate learners, transforming reading comprehension from a potentially monotonous task into an engaging and culturally immersive experience. An adaptive multimedia platform tracks individual progress, adjusts content difficulty, and provides targeted learning interventions. The assessment methodology goes beyond traditional testing, incorporating multiple dimensions of evaluation. After the entire intervention given then the teacher administered the post-test and compared the pre-tests and post-tests to measure quantitative improvement, this approach ensures a comprehensive understanding of the impact of diverse interventions on students' reading comprehension performance.

Theoretically grounded in sociocultural learning theory, the cognitive load principle, and the multimedia learning framework, this experimental process represents an innovative approach to English language education that respects cultural heritage while leveraging technological advances to enhance learning outcomes.

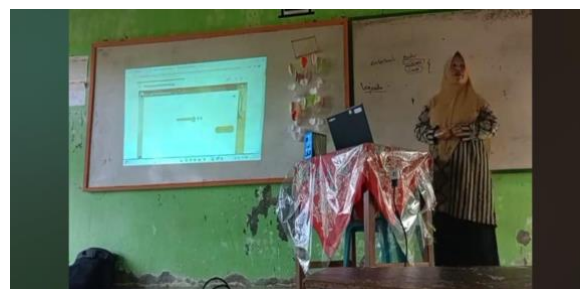


Figure 5. English Teaching in Experimental Group

Figure 5 displays the teacher explained the narrative text to the experimental group students by elaborating on the main parts of the narrative text such as definition, generic structure, language feature, and types, and displaying the example of “The Pond of Sampuraga” which became the well-known legend story in Mandailing Natal in an animated video with interactive questions interaction during the learning process then students do the reading comprehension exercises related to the watched video after that continued with some word wall games and a crossword puzzle, this treatment gave significant impact to the students' performance from 37.19 in the pre-test to 82.90 in the post-test. While the control group students have a distinct method and results of their reading comprehension score as the teacher implemented the conventional method as below.



Figure 6. English Teaching in Control Group

Figure 6 displays the English teacher elaborated the lesson in the control group of students by applying the conventional method with the extraordinary topic from the students' textbooks, the narrative text entitled the invisible man on lake Ontario because the materials provided in textbooks were complicated to understand therefore the students could not answer the questions after reading the text and the result there is no significant impact of control group students with the pre-test score was 47.80 to the post-test 53.32, here is the conventional

method of English teaching in the classroom without interactive multimedia and the topic doesn't relate to cultural contents.

Experimental research on Mandailing Natal cultural content integrated into interactive multimedia demonstrates significant implications for educational fields. Findings show that the experimental group performed much better than the control group after the treatment had been implemented in their classroom by mean scores 64.16 compared to 47.80 means that there is a significant increase in numbers from pre to posttest scores of the experimental group. This study illustrates the transformative potential of integrating local cultural narratives into English language education, providing a strategic method for enhancing reading comprehension using contextually pertinent multimedia resources. This study verifies a new educational system that integrates indigenous cultural content with an interactive technological platform, transcending the conventional English language teaching paradigm. The results indicate that culturally contextualized multimedia interventions can markedly improve students' engagement, motivation, and linguistic proficiency, while also fostering more real, meaningful, and enjoyable learning experiences.

This study offers essential insights into adaptive learning design, illustrating how digital platforms can be created to facilitate personalized learning routes while preserving cultural authenticity. This study underscores the necessity of creating educational tools that are both technically advanced and culturally attuned, as well as contextually relevant. The sociocultural ramifications are significant, as this study underscores the capacity of educational technology to function as a formidable instrument for culture preservation and identity reinforcement. This technique links academic learning with genre narratives about local culture, fostering students' deeper awareness of their traditions and improving their linguistic proficiency. This study methodologically enhances interdisciplinary comprehension by illustrating the importance of amalgamating technological, educational, and cultural viewpoints. It offers an extensive foundation for future inquiries into culturally sensitive educational technology, with recommendations for teacher training, resource development, and continuous study on multimedia-enhanced learning practices.

CONCLUSION

In line with the findings, this study concludes that incorporating cultural content and interactive multimedia significantly enhances students' language proficiency, particularly in reading comprehension. Furthermore, it influenced students' English proficiency, interests, and motivation in English language acquisition, as well as fostering an appreciation for their cultural heritage. Consequently, educators, instructors, and other language professionals are urged to contemplate incorporating cultural content and interactive multimedia into their curricula. The present study concentrated on reading proficiency within the context of English language acquisition, with the participant pool being restricted in scope. Consequently, it is advisable to conduct additional research on other language competencies, including writing, speaking, and listening, with a broader range of respondents. The effectiveness of the process in teaching and learning English will be improved as a result. The entire process of English learning in the classroom relates to the social constructivism.

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