Flipped Learning Instructional Material (FLIM) and the Academic Performance of Grade 10 Students in Araling Panlipunan in the Largest National High School

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ABSTRACT

Integrating appropriate instructional materials in teaching is a powerful tool to enhance student learning. The Flipped Learning is a new pedagogical approach wherein students utilize video lectures or readings outside the classroom and interactive activities during in-class activities as an instructional content that promotes deeper understanding and application of concepts. This study employing experimental design ventured the development and validation of Flipped Learning Instructional Material (FLIM) as an instructional model that delivers the lesson content outside of class through videos, digital educational games and readings or in class activities such as collaborative and interactive exercises.

The integration of Flipped Learning in STE education faces several challenges specially in the field of Social Studies. Educators need to consider these challenges to enhance student engagement, encourages independent learning and develop critical thinking. The importance of flipped learning in STE education is the ability to promote active learning and caters varied learning needs and paces of students. A study by O'Flaherty and Phillips (2015) found that students in flipped Science, Technology, and Engineering (STE) classrooms demonstrated higher motivation and improved assessment performance compared to those in traditional classrooms. Implementing flipped learning for STE students necessitates a strategic, phased approach. Educators should start by creating and curating high-quality digital content and instructional materials. The study suggests that this teaching method could enhance academic performance, making it a valuable consideration for educators looking to adopt innovative strategies to improve student learning outcomes.

Keywords: Flipped Learning, Araling Panlipunan, STE students, Academic Performance

INTRODUCTION

Background of the Study

Classroom routines present new challenges daily, as strategies effective in one lesson may not work as well in the next. To keep students engaged and participative, it is crucial to adopt flexible and dynamic teaching strategies that address their diverse learning needs.

The global education landscape is evolving rapidly, with a growing emphasis on interactive and student-driven learning approaches. Traditional teaching methods often fall short in meeting the varied needs of today's learners, prompting educators to explore innovative strategies that promote deeper engagement and critical thinking. Incorporating methods such as project-based learning, gamification, and digital resources into curricula is transforming education, enabling more personalized learning experiences (Eswaran, 2024). These strategies aim not only to cater to varying learning styles but also to enhance comprehension of complex subjects, ultimately improving student motivation and academic outcome.

The Philippine Education strengthen the enactment of the K to 12 curricula develop the 21st century skills of the learners. The Philippine education highlight student participation and motivation leading to a high level of academic performance. Also, it launched the initiative to promote flipped learning to encourage student participation through interactive activities, discussions and project-based learning. Based on the study of Lapid

(2018) inverting classroom approach improve academic performance of the students that increase students' interest in learning that reduces teacher talk and increased student-centered activities.

Students interact with educational materials online outside of class and take part in dynamic learning activities like group discussions, peer collaboration, simulations, and role-playing during class sessions (Prevalla & Uzunboylu, 2019).Studies indicate that flipped learning enhances students' understanding by encouraging them to apply knowledge through real-world activities, fostering critical thinking and collaboration (Sun et al., 2017). Previous research emphasiz the benefits of this approach, particularly in social sciences, where students benefit from applying theory to practice and engaging in problem-solving scenarios (Karabulut-Ilgu et al., 2018).

At the local level, educators at Isulan National High School have noted several challenges faced by students in the Araling Panlipunan (Social Studies) classes, particularly in STE (Science, Technology, and Engineering) tracks. Reports from the School Learning Action Cell (SLAC) revealed issues such as low student attention during classroom activities, difficulty understanding complex social science concepts, insufficient time to collect information during discussions, limited learning materials, and struggles with effective communication in group tasks. These barriers are reflected in the school's Mean Percentage Score (MPS) results, where STE classes got 83% meaning satisfactory, with notable gaps in students' understanding but still have room for improvement.

Despite the promising potential of flipped classroom model, it has an evidence gap on its integration in Araling Panlipunan instruction, specifically regarding its impact on the expansion of the critical thinking and understanding social concepts. Araling Panlipunan is often context-dependent, requiring students to understand the historical, cultural, and social contexts of various events and phenomena. Moreover, creating an engaging and informative learning activities in Araling Panlipunan has remarkably challenging in integrating flipped learning in the educational process.

This study was conducted to convey this research gap by using Flipped Learning Instructional Material (FLIM) in Araling Panlipunan to improve students' learning outcomes. By integrating FLIM into social studies lessons, this study seeks to stimulate student engagement, improve academic outcome, and ultimately refine the pedagogical approach. The importance of this study is in its ability to close current gaps in student comprehension and promote creative learning experiences to address real-world challenges students may face.

Theoretical Framework

This study was grounded in the theory of Seymour Papert's Constructionism (1993) stated that harness the technologies in student learning can improve their creativity in making their own output from their potentials. He also developed a connection between progressive educational approaches and digital education to promote the relevance of education. Thus, Constructionism suggests that learners construct knowledge best through hands-on experiences. In flipped learning, students engage in active problem-solving, projects, and discussions rather than passively receiving information.

Flipped Learning also aligned on Moreno & Mayer (1999) Cognitive Theory of Multimedia Learning stated that multimedia learning is likely lead into a more meaningful learning experience. They believed that learning process has different principles in improving the performance of the students. This theory helps individuals to reduce cognitive overload and improve understanding through a combination of visuals, charts, diagrams, and audio materials that makes students to learn actively by linking visual and verbal information. Flipped learning aligns with Mayer's Cognitive Theory of Multimedia Learning by using multimedia principles, reducing cognitive load, promoting active engagement, and supporting personalized learning, all of which stregthen students' ability to process and retain concepts effectively.

Additionally, David Kolb's (1984) Experiential Learning Theory (ELT) emphasizes learning through direct experience. This holistic approach underscores the essentialities of the learning process, aligning with flipped learning. In flipped learning, students first interact with new content at home, reflect on it, and then apply and experiment with their knowledge through hands-on activities and classroom discussions. Both ELT and flipped

learning create an interactive learning environment that nurture profound comprehension, critical thinking, and practical application of knowledge. The overall effectiveness of the learning process is a synergy that helps students develop a wide range of skills.

Moreover, Vygotsky (1978) Sociocultural Theory states that learners' prior knowledge should be built through interactions with others that promote active learning by exploring new perspectives from their own capabilities. He believed that students are heavily influenced by social interactions that crucial for cognitive development. In flipped learning, emphasizes collaborative learning as students learn from one another during in class activities by working together that stimulates deeper understanding, apply concepts in meaningful ways and creates effective learning environment.

Additionally, Flipped Learning corresponds with Sweller's Cognitive Load Theory by organizing intrinsic cognitive load with modular pre-class materials, minimizing extraneous cognitive load through clear and structured resources, and enhancing germane cognitive load with interactive in-class activities, scaffolding and immediate feedback. This approach improves student comprehension engagement and personalized learning.

To sum up, this study primarily focused on the developed Flipped Learning Instructional Material (FLIM) in teaching Araling Panlipunan among Grade 10 students and determining its effectiveness with regards to the academic progress of the students. Hence, the constructionism theory, cognitive theory of multimedia learning, experiential learning theory, sociocultural theory and cognitive load theory, provided a comprehensive framework and theoretical foundation on the development of this study.

Conceptual Framework

According to Giannakos et al., (2018), meeting students' needs required adapting instructional process to accommodate diverse learning styles by "inverting the classroom" and delivering lecture materials through digital means. Salman Khan (2012), founder of Khan Academy, highlighted the benefits of lecture videos and exercises allowing students to advance according to their individual learning pace. In a review by Ahmed (2016) classrooms with a flipped setting demonstrated various methods and strategies. A student-centered learning environment, as explained by Lee and Hannafin (2016), was grounded in Constructivist Learning Theory, where students actively interpret information and construct meaningful knowledge based on their learning experiences.

Figure 1 shows that participants were categorized into two groups for this study: an experimental group and a control group. The independent variable was the integration of Flipped Learning Instructional Material (FLIM) into *Araling Panlipunan* 10, which included audio-visual presentations, conceptual maps, word clouds, infographics, games, social media, and brainstorming activities. These elements were incorporated into the FLIM developed by the researcher. The dependent variable was based on the pre-test and post-test results of the two groups evaluated using a test designed by the researcher and reviewed by five experts in *Araling Panlipunan*. The test results were statistically compared to assess learning effectiveness. For this comparison, the control group used the standard *DepEd Araling Panlipunan 10: Learners' Module*, while the experimental group used the FLIM created by the researcher.

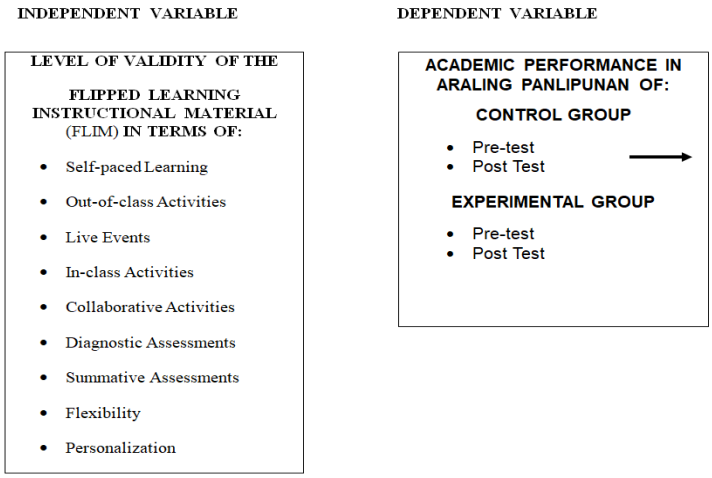

Figure 1. Conceptual Paradigm of the Study

Statement of the Problem

This study evaluated and determined the validity of Flipped Learning Instructional Material (FLIM) on the academic performance of Grade 10 students at Isulan National High School in Araling Panlipunan.

Specifically, it sought to answer the following questions:

1. What is the level of validity of the Flipped Learning Instructional Material (FLIM) in terms of:

1.1. Self-paced learning;

1.2. Out – of – class activities;

1.3. Live events;

1.4. In - class activities;

1.5. Collaborative activities;

1.6. Diagnostic assessments;

1.7. summative assessment;

1.8. flexibility, and,

1.9. personalization?

2. What is the level of the academic performance of the control and experimental groups during pre-test and post-test?

3. Is there a significant difference in the academic performance of the control and experimental groups based on their pre-test and post-test?

4. Is there a significant difference between the mean gained scores of the control and experimental groups?

Research Hypothesis

The study's results demonstrate a marked difference in the pre-test, post-test, and mean gain scores between the control and experimental groups that employed Flipped Learning Instructional Material. This pronounced variation validates the research hypothesis proposed in the study, leading to its acceptance.

Ha1. There is a significant difference between the pre-test, post-test, and mean gain scores of the control and experimental groups using Flipped Learning Instructional Material (FLIM).

Significance of the Study

There are many benefits of using Flipped Learning Instructional Material (FLIM) in an educational setting. Students, teachers, and educational institutions may all benefit from their convenience and versatility, whether in elementary school, high school, or college. This study may be necessary for the following:

Students. Students may learn the topic at their own-pace and it may help improve their higher-order thinking skills (HOTS).

Teachers. It may enlighten the teachers that using this Flipped Learning Instructional Material (FLIM), that may help in improving the teaching technique by engaging students into a more convenient way of learning from home to a real-world application of learning in class.

School Administrators. This research may be used to build programs that may help and guide instructors and students who use Flipped Learning Instructional Material (FLIM) to help them learn and teach.

Educational institutions. This may gain insights into the benefits of implementing Flipped Learning Instructional Material (FLIM), helping them improve their teaching and learning strategies. Additionally, they can deepen their understanding of this approach and recognize its significance, leading to potential training opportunities for teachers and staff.

The Researcher. This may support the researcher's efforts to create a generalization that demonstrates the efficacy of the Flipped Learning Instructional Material (FLIM) and how it effectively affects students' performance in school. The researcher may also incorporate it into her lessons to make her Araling Panlipunan even more engaging.

Other Researchers. This study may assist future researchers in learning more by acquiring data from previous studies. They may also discover in class how the Flipped Learning Instructional Material (FLIM) influences the students' academic achievement. This may enhance the teaching-learning process and help them learn more about this approach.

Scope and Delimitation of the Study

This research investigated the efficacy of Flipped Learning Instructional Material (FLIM) on Grade 10 students' academic performance in Araling Panlipunan at Isulan National High School (INHS).

The survey was conducted at Isulan National High School (INHS), Academic Year 2024-2025 with 60 students as participants in Grade 10 Science, Technology and Engineering (STE) class. This study conducted pre-test and post-test using the topic in Araling Panlipunan 10: Mga Hamong Pangkapaligiran, which aligned in the Department of Education Araling Panlipunan curriculum guide. The pre- and post-experimentation results were analyzed to evaluate the effectiveness of the Flipped Learning Instructional Material (FLIM) on the academic performance of grade 10 students.

Definition of Terms

To gain a clearer comprehension, common appreciation and meaning, important terminologies under this study are operationally defined as follows:

Academic Performance is the final evaluation of students' success using Flipped Learning Instructional Material (FLIM) in Araling Panlipunan 10.

Collaborative Activities are learning activities to gather information together such as group projects and group decision making.

Control Group pertains to the grade 10 students who were enrolled in Isulan National High School that utilized DepEd Araling Panlipunan 10: Learners' Module in the study.

Conventional Method refers to the teaching method applied to the control group.

Diagnostic assessment is a preliminary evaluation conducted before the lesson begins, including introductory activities.

Experimental Group pertains to the grade 10 STE students who were enrolled in Isulan National High School that used the Flipped Learning Instructional Material (FLIM) in the study.

Flexibility refers to a diversified learning activities that suited to the need of the learners.

Flipped Learning Instructional Material (FLIM) is an intervention developed by the researcher in teaching Araling Panlipunan in Grade 10 STE students.

In – class activities are learning activities use in-class time such as re- teaching an important concept.

Live Events refer to the interactive session where students apply their pre-learned knowledge through discussions, problem-solving, collaborative activities, and hands-on learning experiences.

Out of class activities refer to learning tasks that students complete before attending in-person sessions.

Personalization refers to the reflection of their own learning experiences.

Post-test Questionnaire is a test with 40 items developed by the researcher and validated by chosen experts to be given to grade 10 high school students after the implementation of Flipped Learning Instructional Material (FLIM).

Pre-test Questionnaire is a test with 40 items developed by the researcher and validated by chosen experts to be given to grade 10 high school students before the implementation of Flipped Learning Instructional Material (FLIM).

Self – Paced Learning allows learners to review content as needed and take time necessary to fully understand the material before applying it in collaborative and problem-solving activities during class

Summative assessment refers to a post assessment of the module after the discussion.

REVIEW OF RELATED LITERATURE

This chapter provides all the related information, topics, ideas, studies and observations by various researchers, writers and authors on the variables which formed the conceptual framework of this study.

The Flipped Classroom

Flipped classrooms describe a transformative educational approach that invert traditional instruction by engaging students with lecture materials online at their convenience. This model not only improve student motivation and engagement but also facilitates a more interactive classroom environment where practical applications of knowledge can occur. The following sections outline the key benefits and challenges associated with this innovative teaching method (Ahmed, 2016).

Likewise, flipped classrooms enable students to learn direct instruction to learn at home and in-class activities that mostly focus on experimentation of hands-on and engaging activities. Sarppareje, M. & Jeyasala, V.R., (2022) explore the approach of spreading out-of-class activities over a span of days, particularly two days. This strategy aims to improve student engagement and comprehension by providing ample preparation time. The extended period enables students to thoroughly explore the material, process information more effectively, and engage with the content at a more comfortable rate.

This strategy aligned with the study of Bhat, Z.A. & Bhat, G.J. (2021), who also underscores the crucial role of providing students with ample preparation time. Their findings demonstrate that students who allocate a couple of days to completing out-of-class assignments tend to be more actively engaged and show improved performance during in-class activities. By allowing students a sufficient period to work on assignments at their own pace, they become more prepared and capable of participating meaningfully in class discussions and tasks.

Blesswin & Jayapaul (2024) emphasizes the importance of extending in-class activities over multiple days in a flipped classroom environment. This approach enables students to engage more deeply with the subject matter, facilitating a stronger grasp of key concepts. By distributing activities across several sessions, students gain increased opportunities for active participation, self-reflection, and peer collaboration, which ultimately contribute to enhanced academic performance. Flipped Learning offers a variety of activities that support self-paced learning, out-of-class tasks, live sessions, in-class exercises, group work, diagnostic evaluations, summative assessments, and allows for flexibility and personalization (Calamlam, 2021).

Likewise, Herreid and Schiller (2013) discuss the advantages of extending in-class activities, such as case study discussions, beyond a single class period. They suggest that this method strengthens student engagement by allowing learners to revisit and explore complex topics in greater detail. Moreover, lengthened discussions and activities encourage critical thinking, as students have additional time to absorb information, formulate questions, and engage in meaningful discussions. By offering students an extended period to interact with course content, pedagogues can foster a more immersive and stimulating growth opportunity.

This approach fosters active learning, encouraging students to be accountable for their own learning alongside their instructors (Pogoy, 2018). By shifting the traditional learning paradigm, flipped classrooms empower educators to formulate a more vibrant environment that enhances collaboration and critical thinking skills of students. This model not only promotes deeper understanding of the material but also develops the problem-solving and teamwork of students for them to prepare themselves for the challenges of our society. Dawson (2015), stated that Flipped Learning has gained traction in various educational settings, leading to improved student outcomes and increased motivation as learners become more engaged in their own education. By shifting the traditional learning model, flipped classrooms empower students to learn from experiences that could enhance students' comprehension and cognitive retention. This innovative model not only promotes collaboration among students but also allows educators to adjust their teaching strategies to more effectively address individual learning needs and preference (Amy, Shweta, Reddy, & Jett, 2013).

Furthermore, in the study of Romero & Angeles (2021), it was emphasized that flipped classrooms differ from traditional teacher-centered education by focusing on students rather than treating them as passive recipients of knowledge. As a result, theories in student-centered learning such as active learning and collaborative learning are mostly present during the enforcement of the flipped learning in a classroom setting. In this model, instructors engage with students through various activities and instructional strategies such as using audio-visual presentations, conceptual maps, word clouds, infographics, games, and brainstorming.

According to Milhem and Smadi (2021), the flipped learning strategy offers several advantages. It allows self-directed learning by giving students out of class activities, and the flexibility to engage with the material as needed. This approach also enables teachers to identify the challenges students face while completing their assignments. Additionally, it allows teachers to add and update course materials, making it easier to adapt the educational program to accommodate students' needs. The flipped learning model increases student engagement during class and enhances the overall efficiency of the teaching-learning process. Furthermore, it provides teachers with insights into students' interests, helping to tailor instruction more effectively (Shao & Liu, 2021) .

Flipped learning supports student independence by motivating learners to construct their own learning into a new insights. This shift also alters the role of instructors. Rather than simply delivering information in a traditional, spoon-feeding manner, teachers are tasked with fostering understanding and guiding students in their learning process (Milhem & Smadi, 2021).

The flipped learning strategy offers numerous benefits, primarily due to its integration of numerous teaching methods, such as project-based and problem-based approaches, alongside active and collaborative techniques. These methods foster student cooperation, enhance problem-solving skills, and promote a more dynamic learning environment (Cabi Emine, 2018). Additionally, the flipped classroom model provides flexibility, personalization, encourages active learning, supports practical-based learning, and can even reduce costs (Baig & Yadegaridehkordi, 2023). The flipped model transitions from conventional lecture-based methods to a more engaging, student-driven approach, allowing for a more meaningful connection with the content.

The notion behind the flipped classroom is to ensure that learners better understand and retain the information they acquire outside of class. This is achieved by having students view lectures or videos before class, which allows classroom time to be spent on practical applications and discussions guided by the teacher (Cabi, 2018). The flipped model thus transforms the classroom into a space for active interaction and collaborative learning, where students can apply the concepts they've learned independently, under the guidance of the teacher.

Moreover, digital tools and technologies tailored the instruction into flexible learning which emphasizes the integration of innovative strategies to engage students and guide them through their learning process (Beetham & Sharpe, 2013). As Miterianifa et al., (2021) notes, higher-order thinking and collaboration are essential skills for preparing students for the workforce, making the flipped classroom an effective method for fostering these competencies.

Papert (1980) argued that knowledge is constructed through application in real-life situations, facilitated by digital tools and media. Constructionism emphasizes the use of real objects and encourages learners to discover and create knowledge. According to Papert, students learn best when they engage with tangible projects, using digital technologies as "objects-to-think-with" that facilitate problem-solving and learning. This theory highlights three key elements: appropriation, knowledge construction, and learning cultures. Appropriation refers in which learners internalize and understand new knowledge. Knowledge construction involves learners transforming information into meaningful objects or ideas, while learning cultures emphasize collaboration and shared purpose within a group. This approach is further supported by researchers like (Kynigos, 2015), who argue that learning thrives when students engage in projects that allow them to apply their knowledge practically.

In the context of flipped learning, the incorporation of digital tools such as videos, images, conceptual maps, word clouds, infographics, games, social media, and brainstorming activities helps foster an inquisitive and collaborative learning process. These strategies, rooted in constructionism where students encourage to participate interactively and create meaningful knowledge through hands-on experiences. Thus, the flipped classroom, when combined with constructionist principles, creates an environment where students work independently.

In modern education, audio-visual presentations have become essential tools in enhancing teaching and learning. Loviasyuni & Bhuana, (2023) emphasized that visual communication plays a crucial role in the classroom, surpassing the reliance on traditional oral and written instruction. Visual aids provide students with supplementary information that goes beyond what is typically found in textbooks or reading materials (Qasserras, 2024). This shift toward integrating visuals that assist students in a more deeper material, making complex concepts easier to understand and retain.

Mayer (2024) outlined several guiding principles for effectively incorporating multimedia in the classroom, which are essential for promoting student engagement. These principles include the Multimedia Principle, which encourages the use of both pictures and words instead of text alone, and the Contiguity Principle, which suggests that words and images should be presented simultaneously. Additionally, the Modality Principle highlights the effectiveness of presenting animations and words orally rather than in written form. Mayer also discussed the Redundancy Principle, where verbal and visual information should be synchronized for better comprehension. These principles provide a framework for creating engaging and accessible learning experiences through multimedia.

Furthermore, research supports the growing effectiveness of visual elements in education. Buckley & Nerantzi (2020) found out that integrating images and visuals in teaching improves learners' understanding by broadening their perspectives. The UK Professional Standards Framework (2011) also noted that images can significantly enhance communication, conveying emotions and meanings more effectively than words alone. This visual approach enables learners to structure and make sense of their learning more efficiently, helping them connect with the content on a deeper level.

The utilization of visual illustration serves as another powerful tool to enhance student learning. According to Buckley, Nerantzi, and Spiers (2017), the use of conceptual maps encourages students to gain insights into their own learning process. These tools are effective in helping students visualize and organize information, which deepens their understanding of complex topics. Edmondson & Lei (2014) further describes concept mapping as an efficient way to make the structure of knowledge explicit, allowing students to integrate new information more easily.

Collins & Nyenhuis (2020), highlighted that concept maps help create more detailed content in curricula, making them a valuable resource for teachers. The process of mapping concepts not only support students to organize their thoughts but allows them to connect prior knowledge with new concepts, fostering deeper learning. This method empowers students to build on their past experiences while constructing new understanding, promoting meaningful learning outcomes.

Furthermore, concept maps are widely implemented across educational institutions, supporting learners in their comprehension of topics. As noted by Tenzin et al., (2024), concept maps help learners construct new knowledge, making them an essential tool in promoting active, engaged learning. This approach facilitates the transition from surface-level memorization to deeper, more meaningful engagement with the material.

Also, word clouds, or "tag clouds," have proven to be valuable tools for summarizing text data and providing meaningful interpretations, as noted by Brooks et al., (2014) these visual representations allow educators and learners to quickly grasp the most prominent terms in a body of text. In educational contexts, word clouds is a versatile tool to improve literary proficiency. According to McNaught & Lam (2010) they are particularly effective in summarizing research interviews and fostering deeper engagement with text by highlighting key themes or frequently used terms.

One of the main benefits of using word clouds is their ability to visually represent text in an accessible and engaging format. As Miley and Read (2011) highlighted, word clouds help students focus on and reflect upon the most frequently used words in each text. This allows learners to gain insights into the core ideas of the material, promoting more active learning and comprehension. Moreover, the customizable nature of word clouds, including variations in font, layout, and color, helps emphasize certain words and concepts that could be easier to understand. Various online tools such as TagCrowd, ToCloud, MakeCloud, and Wordle (Coosha-Naik, 2022) allow educators to create these visual aids with ease.

Word clouds also foster critical thinking and active engagement among students. As Joyner, et. al., (2011) suggested, they can be used to stimulate student reflection and encourage deeper cognitive processes during classroom activities. In addition, word clouds are increasingly being integrated into the evaluation of student learning, as they provide a clear visual summary of a student's understanding and engagement with the material (Huisman et al., 2019). DeNoyelles & Reyes-Foster (2015) further emphasized that word clouds can be a powerful tool for exploratory textual analysis, allowing students to identify significant words or trends in research data, such as interview transcripts, and facilitating a more systematic approach to understanding complex texts. This makes word clouds an effective method for both formative and summative assessment in educational settings.

On the other hand, infographics, a combination of "Information" and "Graphics," has emerged as a powerful tool in educational settings, providing a clear and concise representation of complex data (Parveen & Husain, 2021). In the context of modern education, where students are surrounded by a variety of digital technologies, infographics offer a quick and effective way to facilitate comprehension. According to López Cupita & Puerta Franco (2019), infographics help students understand how information integrates and connects, allowing them to grasp key concepts holistically. As educational challenges evolve, especially in the digital age, integrating visual learning strategies like infographics has become increasingly important for fostering deeper engagement with material. Infographics also promote essential skills such as visual literacy, analytical thinking, creativity, and long-term retention of information (Hodson,et. al.,2014).

The design of an infographic typically includes five key components: headline, chatter, callouts, source line, and by-line (Damyanov & Tsankov, 2018). In addition, Sirichareon and Siricharoen (2015) introduced further elements, categorizing them into visual elements (color, graphics, icons, maps, etc.), content elements (facts, references, statistics, text), and knowledge elements (conclusions, messages). These components work together in making the information properly that foster retention of memory. The effectiveness of infographics as a teaching strategy lies in their ability to combine text and visuals seamlessly, catering to the visual preferences of modern learners. Research from the Visual System Division (Akhtar Parveen & Naushad Husain, 2021) highlights that visuals are processed 60,000 times faster by the brain than text, making infographics an effective tool for rapid understanding.

Furthermore, infographics are particularly valuable in transforming complex information into digestible visual narratives. Õ et al., 2016 highlight the role of infographics in simplifying difficult content and presenting core concepts in an accessible manner. This approach is especially effective for synthesizing and summarizing content, as noted by Alshehri, D.M., & Ebaid, D.M. (2016) has been proven to enhance student learning. Given the current trends in education, integrating infographics into the classroom aligns with the growing emphasis on digital literacy and visual communication. As a result, infographics not only support content delivery but also engage students in more dynamic interactive lessons. This study explores the potential of infographics to enrich instructional process, providing a relevant avenue for modern educators to foster deeper understanding in their students.

Further, games also enhance the learning experience by fostering critical thinking, creativity, and good sportsmanship among students Kirchner-krath et al., (2021). According to Yue and Zin (2009), cited in Inocencio, F. (2019), educational games encourage students to think outside the box while adhering to rules, promoting cognitive development. Alvarez, et. al., (2019) highlight the potential benefits of integrating games into education, as they help students engage more deeply with the subject matter. Educational games are also known to increase student motivation, making learning more enjoyable and entertaining (Zirawaga, 2017). This hands-on learning method can also aid students in enhancing their problem-solving and decision-making abilities through experiential learning (Okonkwo, 2023)

Additionally, incorporating educational games can enhance the learning process by making it more engaging and effective that amplifies knowledge retention and improved peer communication (Yu, et. al., 2021). Games provide an opportunity for students to learn practically by using real-world context, fostering collaboration and social skills among peers. By creating an interactive learning environment, educational games offer a dynamic and enjoyable way for students to master new concepts and enhance their overall academic experience.

Lastly, brainstorming serves as a connection between individuals and groups, facilitating the generation of ideas and the exploration of solutions to a particular topic (Mary & Ara, 2022). The Social Interaction theory of Vygotsky's emphasizes its vital function in developing relationships among entities. According to his "Zone of Proximal Development," the application of techniques like brainstorming and scaffolding can significantly enhance cognitive development. Additionally, Băbuţ (2021) highlighted that students' interest in classroom instruction and the importance of their thoughts during brainstorming are key to improving their social skills. Rashtchi (2020) further noted that brainstorming activates learners' prior knowledge, enhancing their reading comprehension. In Barrot et al., (2021) study, it is emphasized that brainstorming should be a judgment-free space, where no idea is criticized, allowing group members to collectively contribute ideas, ultimately fostering diverse perspectives and improving decision-making and critical thinking (Hidayanti et al., 2018).

Brainstorming is widely used in teaching Social Studies, where it accommodates students with an opportunity to actively participate in class discussions (Rashtchi, 2020). This technique is effective in helping students share their ideas and perspectives, creating a dynamic learning environment (Kaplan & Patrick, 2016). The process of brainstorming engages students' minds, facilitating the reconstruction of their knowledge (Ritter & Mostert, 2018). The longer students remain engaged in brainstorming activities, the more their ability to solve complex problems is enhanced (Doğan & Batdı, 2021). Researchers agree that brainstorming not only promotes active learning but also fosters creative thinking. Moreover, it helps develop students' confidence, motivation, and engagement, while supporting deeper concept learning (Sneha Ambwani, Arup Kumar Misra, 2017).

Flipped Classroom and Students' Academic Performance

Latest findings had studied the drawbacks of flipped learning on student performance, involvement, learning outcomes, and academic aspiration. Studies have demonstrated that the flipped classroom method ameliorate student learning performance (Zengin, 2017), delivers improved learning outcomes (Smallhorn, 2017), boosts student motivation (Yilmaz, 2017).

However, there are studies that have not found the predicted gains of the Flipped Learning, despite most of the research indicating that it favorably enhances students' learning. For instance, Smallhorn (2017) did not see a

discernible improvement in student's academic performance. Ros & Graziano (2018) claimed in different research that there was no proof that the flipped learning helped students get better marks. According to research by Cabi (2018) the adoption of the flipped learning had no effect on student engagement or teacher-student interaction.

The study by Awidi and Paynter (2019) assessed the effectiveness of the flipped learning method on students' learning experiences. According to the findings, several facets of the flipped learning were well received by the pupils. Anjomshoaa et al. (2022) also assessed the influence of flipped learning on student learning outcomes in their research. The study found that the flipped learning method aligns with the updated Bloom's Taxonomy and contributes positively to student learning, including enhanced academic results, increased motivation, higher engagement, better social interactions, improved self-directed learning abilities, brain-based learning techniques, strengthened problem-solving skills, recognition of multiple intelligences, deeper student comprehension, active participation, positive attitudes, and decreased anxiety (Anjomshoaa et al., 2022).

Additionally, Shao & Liu (2021) looked at research that contrasted classes using the flipped classroom teaching style versus classrooms using traditional classroom management methods. In summary, they discovered a significant differences on the impact size in favor of the flipped classroom teaching technique (g = 0.193; p .001; with a 95% confidence range of 0.113-0.274). The data showed statistically significant heterogeneity and were normally distributed. Different fields, from business to humanities, have varying levels of impact.

The impact of flipped learning environments on students' academic outcomes has been explored in numerous studies over recent years, including one conducted by Zengin (2017). In this study, the learning environment was designed using Khan Academy, free open-source software, and the flipped classroom model. The aim of the research was to investigate the influence of the flipped learning approach on students' academic performance and their perceptions of it.

A recent study discovered that the Flipped learning environment, developed by Khan Academy and mathematics software, significantly enhanced students' academic achievement, effectively doubling their success. The research involved 28 participants enrolled in the mathematics teaching program at a state university in Turkey. According to the study's findings, the Flipped Classroom learning environment—which was created using both Khan Academy and mathematics software—doubled the students' academic success. Additionally, it was discovered that this kind of instruction promoted long-term learning, provided visualization in the teaching of mathematics, and aided in student learning (Zengin, 2017).

Quantitative analysis demonstrated flip teaching's positive impact on achievement and motivation, interacting with 12 study characteristics. The findings showed that the impact sizes were highly affected by sample size, intervention durations, and sample areas (Zheng et al., 2020). A study by Sirakaya, D.A., & Özdemir, S. (2018) examining the effects of a flip learning on students' achievement, readiness for self-learning, and academic drive found a notable difference between clustered in terms of retention, motivation, and academic achievement.

Smallhorn (2017) highlighted that a decline in both national and international student attendance at lectures has compelled educators to reevaluate their teaching methods and adopt strategies that foster student engagement. Students watch, read, and learn at home; discuss and apply in class. During face-to-face sessions, learning is applied through collaborative problem-solving with peers. Learning transformed: from passive lectures to dynamic video-based engagement. The impact of this approach was evaluated using surveys, attendance data, learning analytics, and pre- and post-implementation test results. The findings revealed increased student participation and a positive perception of the teaching method (Smallhorn, 2017).

Flipped Classroom Approach in *Araling Panlipunan*: *Mga Hamong Pangkapaligiran*

The Philippine educational system continually works to strengthen those essential learning competencies in all subject areas. The Bureau of Curriculum Development of DepEd works together in determining the most learning competencies that students can use in a lifelong learning. Essential learning competencies are

considered as the students' need in building foundational skills. The core objective of Araling Panlipunan 10 is to advocate the continuous learning of learners. In general, the first quarter coverage of Araling Panlipunan 10 comprehends that students should develop an appropriate plan to address the environmental challenge towards improving human living.

However, Yaghi & Alibeli (2017) in his study stated that there are behavioral changes towards the environmental concern of students aged 16-17 years old. Those changes lessen the awareness and initiative of students towards environmental disaster prevention and mitigation. Many studies have shown that environmental education improves participants' science knowledge, environmental awareness and environmental knowledge (Sprague, et al., 2021).

Through the integration of environmental education in Araling Panlipunan 10, Sharma (2004) cited in Punzalan (2020), that teachers should emphasize the environmental education through affective and psychomotor aspects of students' learning. Moreover, Punzalan (2020) revealed that environmental education has been combined in other subject areas in the curriculum setup of the DepEd. Interdisciplinary curriculum design combined STEM, social sciences, and civic/moral education.

Thus, Maglucot (2021) highlighted in his book "Philippine Environmental Laws: An Overview Assessment" that the curriculum setup of the Philippines through DepEd should conduct an activities that will elevate the awareness of people in natural calamities and other environmental disasters as it pursues to mitigate other problems such as deforestation, illegal mining, loss of biodiversity and other forms of pollution.

Therefore, teachers should use effective strategies and learning materials to improve student engagement and comprehension in Araling Panlipunan that will help them improve their level of competency (Seludo, J. G., & Murillo, N. M. 2023).

Synthesis

The Department of Education (DepEd) is firmed to enriching the Araling Panlipunan 10 curriculum with a strong focus on environmental awareness and disaster preparedness. This involves teaching students the importance of disaster preparedness measures, the value of cooperation in environmental response, and community-driven emergency management strategies. These competencies aim to provide students to equipped with the expertise and abilities to tackle environmental issues and enhance human living standards.

To enhance student engagement and competency in Araling Panlipunan 10, educators should adopt innovative strategies and materials. This approach is vital for raising awareness about environmental disasters and encouraging proactive measures against issues like deforestation, pollution, and biodiversity loss. Integrating environmental education across subjects can promote a comprehensive understanding of these challenges, fostering a generation of learners dedicated to sustainability and disaster resilience. Flipped Learning has proven effective in increasing students' participation and motivation by conceding them to study at their own speed and collaborate during class time. It also enhances student-teacher interactions and promotes cognitive analysis and problem-resolution talents in real-world scenarios, essential for lifelong learning.

METHODOLOGY

This chapter comprehensively describes the procedures in the investigation and the techniques used in gathering the quantitative results. It gives information on the research design, respondents of the study, locale of the study, sampling technique, data gathering instrument and procedure, and statistical techniques employed in the analysis of the gathered results.

Research Design

This study utilized an experimental design, incorporating pre-tests and post-tests, to validate the newly developed Flipped Learning Instructional Material (FLIM) for Araling Panlipunan 10. Rogers & Revesz (2020) highlighted the use of quasi-experimental methods to analyze a specific group of students and evaluate

particular learning outcomes. The study included both control and experimental groups. The pre-test and post-test approach were employed to assess the impact of an intervention on two different classes. The control group used the DepEd Araling Panlipunan 10: Learners' Module, while the experimental group used the Flipped Learning Instructional Material (FLIM) created by the researcher.

Locale of the Study

This study was carried out at the Largest National High School, located in the Municipality of Isulan, Sultan Kudarat, Philippines. Isulan National High School is a school in Sultan Kudarat, SOCCSKSARGEN situated close to Sultan Kudarat State University-Isulan Campus and the sports venue Old Capitol Gymnasium. This public secondary institution offers Junior and Senior High School programs (Grades 7-12). (INHS Handbook, 2017).

The institution is renowned for its large student body and comprehensive educational programs. For this study, the experimental group comprised Grade 10 students from Section STE 2, while the control group included Grade 10 students from Section STE 1. These sections are situated on different floors of the school's PAGCOR building, with approximately 16 meters separating them. Specifically, STE 2 is on the first floor, while STE 1 is on the second floor. This setup ensures that both groups have access to distinct resources and facilities.

According to Smith (2020), maintaining an appropriate separation between the control and experimental groups is crucial to minimize potential biases and ensure the validity of the results. This distance helps reduce interference and preserves the integrity of both groups, leading to more reliable data collection and reproducibility of the study findings. Moreover, Williams (2019) emphasized that the integrity of the research relies heavily on maintaining boundaries between the two groups. It prevents bias and ensures that any observed effects are solely attributable to the experimental manipulation. By following this procedure, the researcher became more confident that the manipulation was responsible for the study's outcome.

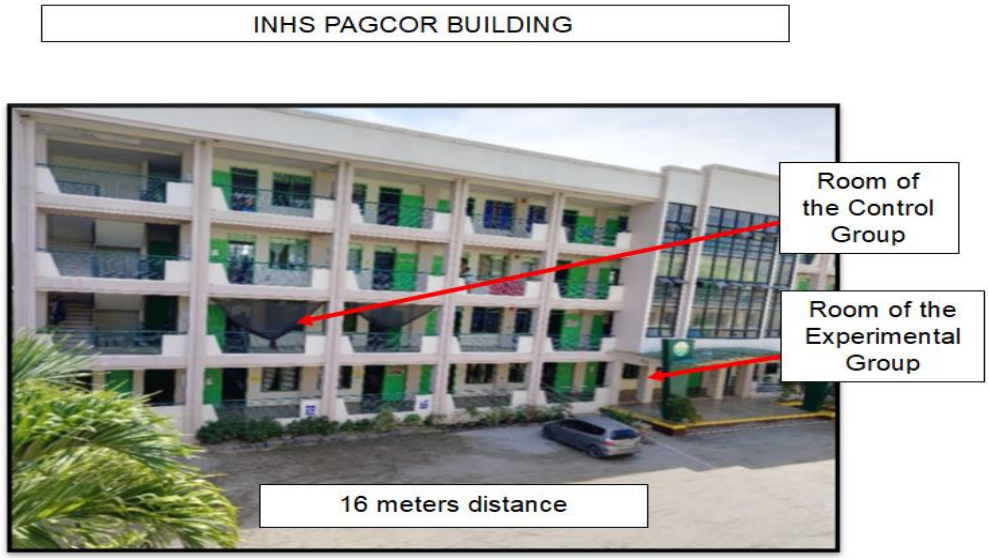

Figure 2. School Buildings Showing Rooms of the Control and Experimental Groups

Respondents of the Study

The study involved the Grade 10 students of Isulan National High School along the Academic Year 2024 - 2025.There were two (2) sections of Science, Technology and Engineering (STE) students in grade 10 to be included to take part in the study. Moreover, a report on the observation of the subject teachers on the academic growth of the grade 10 STE students in Araling Panlipunan revealed that students had lack of attention during class activities and mostly received a low score result during the summative assessment. Also, Maspul (2024), recommended that STE students that ages 15 - 16 years old need to develop their problem-solving skills, appreciate and understand opinions of others and improve organizational skills. Additionally, Piaget's theory highlighted adolescents aged 15-16 are at a critical stage of development where their natural

curiosity, exploring new ideas and desire to discover to learn are more pronounced.

Numerous studies from Ozdamli & Asiksoy (2016) have shown that flipped learning improves student engagement, active learning and academic outcomes particularly in STE education. This study also intended to improve environmental awareness and ethics of grade 10 STE students towards their commitment to sustainable development through the intervention of Flipped Learning Instructional Material (FLIM).

Sampling Technique

A simple random sampling method was applied to assign control and experimental groups. The researcher, who handles two STE sections, used lottery technique to determine the groupings. Consequently, one section was selected as the control group, while the other was assigned as the experimental group. According to Tajik & Golzar (2022), simple random sampling ensures that every individual has an equal chance of being included in the study, resulting in a uniformly distributed population. This method is frequently employed to systematically select a smaller sample group, as it involves straightforward selection from the population. This approach ensures statistical representativeness through equal selection probabilities.

Research Instrument

The researcher developed Flipped Learning Instructional Material (FLIM) was utilized to evaluate the effectiveness of flipped learning instruction on Grade 10 Araling Panlipunan students' academic performance. This module inverts traditional pedagogy, delivering instructional content digitally and reserving class time for collaborative, interactive exercises.

Recognizing that the FLIM aligns with the principles of 21st-century learning by supporting modern teaching strategies tailored in today's educational demands. The researcher adopted the 21st-Century e-Learning Module Assessment Tool (21CELMAT), developed by Jose Mari Calamlam in 2021, to assess its validity. According to Calamlam (2021), this tool is widely used to evaluate 21st-century teaching approaches, including blended learning, flipped learning, and personalized learning, as integrated into course materials. It specifically verifies the nine essential quality elements of 21st-century learning modules: self-paced learning, out-of-class activities, live events, in-class activities, collaborative activities, diagnostic assessments, summative assessments, flexibility, and personalization.

Rating Scale tool of the Flipped Learning Instructional Material (FLIM)

A five-point Likert scale of measurement was employed in this study:

RATING	RANGE OF MEAN	DESCRIPTIVE RATING	INTERPRETATION
5	4.30 – 5.00	Excellent	Meets above 91 – 100% Quality Standard
4	3.40 – 4.29	Very Satisfactory	Meets above 75 – 90% Quality Standard
3	2.60 – 3.39	Satisfactory	Meets above 60 – 74% Quality Standard
2	1.80 – 2.59	Fair	Meets above 35 – 39% Quality Standard
1	1.00 – 1.79	Poor	Meets above 34% Quality Standard

The members of the validation team were the five (5) experts in the field of Araling Panlipunan and Curriculum Development: an education program supervisor in Araling Panlipunan of Sultan Kudarat Division, an education program specialist of Sultan Kudarat Division, a master teacher in Araling Panlipunan of Isulan National High School an Araling Panlipunan Subject Head of Isulan National High School and a Division Module Evaluator of Quality Assurance Team in the Division of Sultan Kudarat. The module underwent substantive revisions guided by expert recommendations.

Moreover, the pre-test/post-test questionnaire was a researcher-made test that had undergone modifications, validation and reliability test. It is composed of three (3) distracters and one (1) correct answer. Every correct answer merits one (1) point each. Furthermore, the researcher adopted the validation tool of Veloso (2014) in

determining the validity of the test questionnaire. It contains criteria for content, item, level of difficulty, structure, instructions, language and ethics/social considerations.

The validation criteria of 40-item test followed the Veloso (2014) scale below:

Scale	Description
4	All indicators are observed
3	Most of the indicators are observed
2	Some the indicators are observed
1	No indicators observed

Results from the experts' content validity revealed that out of 50 questions, 40 items have a content validity 3.85 mean (SD=0.28) indicating strongly agree and meets above 75 – 90% quality standard.

Likert Four Point Scale Range Interpretation used to interpret the results of pre-test/post-test content validity:

Point	Scale Range	Descriptive Rating
4	4.00 – 3.00	Strongly Agree
3	2.99 – 2.00	Agree
2	1.99 – 1.00	Disagree
1	1.00 – 0.99	Strongly Disagree

The Pre-test/Post-test questionnaire was pilot tested at Bambad National High School. It underwent item analysis and reliability test using Cronbach's Alpha (Abdullah, 2015). Questionnaires are one of the most often used instruments for data collection (Taherdoost, 2018). The fundamental goal of a questionnaire is to gather key findings in the highest degree of accuracy and reliable procedure. Thus, a key component of research techniques known as validity and reliability is the accuracy and consistency of surveys and questionnaires.

The value to be established showed not lower than 0.6 to imply that the item has acceptable instrument reliability. The interpretation was adopted from Raagas (2010) as pointed out by Abdullah (2015) based on the rule of thumb below:

Cronbach's Alpha	Internal Consistency
0.9 – 1.0	Excellent
0.7 – 0.89	Highly Acceptable
0.6 – 0.69	Acceptable
0.5 – 0.59	Poor
0.0 – 0.49	Unacceptable

Meanwhile, Cronbach alpha was utilized to determine the questionnaire's internal consistency that obtained an alpha value of 0.95 indicating that the test questionnaire was excellent as an assessment tool in this research.

Rating Scale	Descriptive Rating
90% - 100%	Outstanding
85% - 89%	Very Satisfactory
80% - 84%	Satisfactory
75% - 79%	Fairly Satisfactory
Below 75%	Did Not Meet Expectations (DNME)

Lastly, to evaluate the students' academic performance in control and experimental group, the researcher adopted the description of the Mean Percentage Score (MPS) and rating scale of the DepEd Memorandum Order no. 8, s. 2015 using the following:

Data Gathering Procedure

First, the researcher developed an instructional material entitled Flipped Learning Instructional Material (FLIM) and pre-test/post-test assessment tools. Then, it was validated with the help of content validators.

Following the validation process, formal approval was granted and addressed to the principal of Bambad National High School, where the pilot testing of the research was to be conducted. Once approval was received, the researcher proceeded with the pilot testing at Bambad National High School. The Grade 10 STE students at the said school were the respondents of the pilot testing. The raw gathered from the pilot testing was used for the item analysis and computation of the test reliability using Cronbach's Alpha. Revision, finalization and reproduction of the materials were followed needed for the study (Abdullah, 2015).

Subsequently, a formal letter was submitted to the Dean of the Graduate School, requesting study approval among Grade 10 STE students at Isulan National High School. A separate request letter was submitted to the Sultan Kudarat Schools Division Superintendent, seeking permission to carry out the research. Additionally, a similar letter was provided to the principal of Isulan National High School, where the study was implemented within classroom instruction.

Before the experimentation, the researcher administered a pre-test to the selected Grade 10 STE students. During the experimental phase, one group was isolated to prevent exposure to the teaching tools intended for the intervention. The control group was taught using the standard method, adhering to the DepEd: Araling Panlipunan Learners' Module as specified in the teacher's daily lesson guide. Both groups were subjected to equal conditions, with factors such as time-of-day and duration of treatment kept consistent. The same teacher, who was also the researcher, conducted the instruction for both groups. A research-designed post-test evaluation was conducted with both groups to determine differences in academic outcomes.

The researcher collected, verified, encoded, and analyzed the pre-test and post-test data. The findings were then interpreted, and based on the analyzed results, the researcher developed conclusions and recommendations.

Below is a flow diagram of the process of data-gathering procedure:

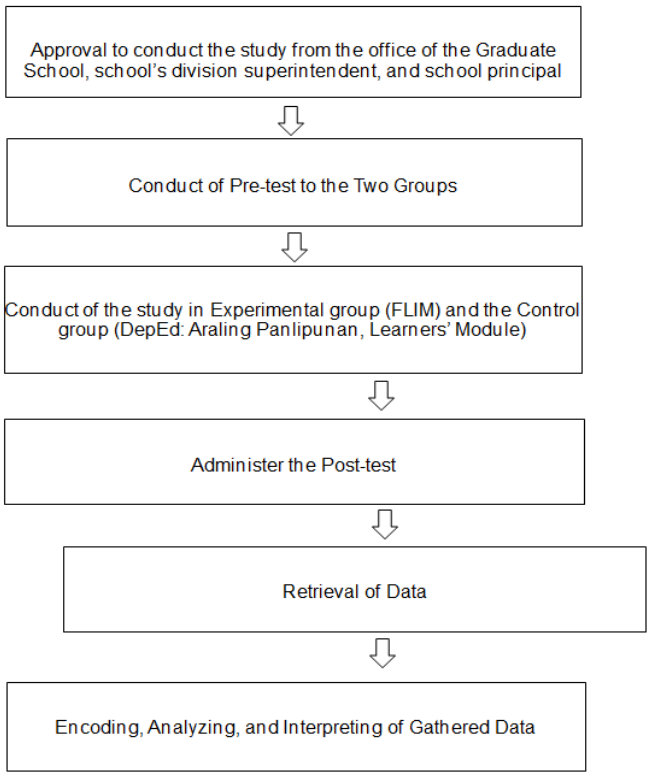

Figure 4. Flow chart of Data Gathering Procedure

Statistical Treatment

The data was collected from the pre-test and post-test questionnaires were recorded, encoded, analyzed and interpreted. The following results were presented using the following statistical tool.

The validity of the FLIM was assessed using weighted mean and standard deviation. Moreover, it was also used to assess academic performance, pre-test and post-test scores of control and experimental groups.

Furthermore, a t-test statistical analysis was performed to evaluate the significant differences between the mean gain scores of the control and experimental groups. According to Bevans (2023), this statistical method is employed to determine if there is a significant difference between the means of two groups, thus helping to establish whether the observed difference is statistically significant.

Presentation, Analysis, and Interpretation

This chapter presents the results, analysis, and interpretation of the data gathered according to the order by which the problem statements were presented in this study. It involves evaluating the developed module using the 21st-Century e-Learning Module Assessment Tool (21CELMAT), as well as analyzing the results and the significant difference between the pre-test and post-test scores of the control and experimental groups.

Level of validity of Flipped Learning Instructional Material (FLIM) in terms of Self-paced Learning, Out-of-class activities, live events, in-class activities, collaborative activities, diagnostic assessments, summative assessments, flexibility and personalization.

The succeeding table 1 to 10 presents the validity of the Flipped Learning Instructional Materials in nine evaluation parameters based on the 21st Century e- learning Module Assessment Tool (21CELMAT) by Jose Mari Calamlam (2021).

Table 1. Level of Validity of the Flipped Learning Instructional Material (FLIM) in terms of Self – paced Learning

Indicators	Mean	SD	Interpretation
Considers the diverse needs of learners.	4.60	0.55	Excellent
Developed skills for learners before venturing into live events activities.	4.80	0.45	Excellent
Provides immediate feedback on learners' performance.	4.80	0.48	Excellent
Presents requirements and easy to follow instructions arranges tasks carefully to provide meaningful flow of ideas.	4.80	0.45	Excellent
Overall Mean	**4.75**	**0.47**	**Excellent**

Table 1 reveals that the developed instructional material in terms of Self – Paced Learning is excellent as evidenced by an overall mean of 4.75 (SD=0.47). It simply means that the module meets 95 percent and above quality standards. Moreover, the excellent rating also indicated that the module could cater diverse needs of learners that helped them ventured learning activities. The rating implies that the module is highly effective that allows students to engage with the material at their own pace, accommodating a wide range of learning styles, abilities, and preferences. As a result, it provides individual needs, flexibility to progress and foster greater independence.

Moreover, Hart (2014), that self-paced learning acknowledges the different learning styles, abilities and preferences of the students. It also helps learners develop their ability to learn on their own that can improve students' deeper sense of ownership of their academic outcome by setting their own personal goal. Thus, the FLIM was a highly effective tool in enhancing student autonomy, promoting personalized learning, and nurturing 21st-century skills.

Table 2. Level of Validity of the Flipped Learning Instructional Material (FLIM) in terms of Out – of – class Activities

Indicators	Mean	SD	Interpretation
Accesses contents best delivered through direct instruction online.	4.75	0.55	Excellent
Creates and/or collects contents that are relevant for the learners in achieving lesson objectives.	4.78	0.55	Excellent
Provides memorization component with examples used in context learners how to annotate a piece of text.	4.78	0.48	Excellent
Allows learners to learn at their own paces and provides space for thoughtful reflection.	4.77	0.48	Excellent
Differentiated learning to make content accessible and relevant to all learners.	4.77	0.48	Excellent
Considers way to motivate learners to complete their out-of-class works.	4.77	0.48	Excellent
Overall Mean	**4.77**	**0.48**	**Excellent**

Table 2 reveals that the developed instructional material in terms of Out-of-class Activities is excellent as evidenced by an overall mean of 4.77 (SD=0.48). It simply means that the module meets 95.4 percent and above quality standards. The result implies that out-of-class activities create an opportunity for students to reflect in their own learning that leads to a more meaningful engagement in the content that they could experience through online and actual learning.

In addition, it can be inferred that the module provides the learning material accessible and relevant to all learners. The module also contains motivated activities that stimulate students' interest and provide self-learning reflections. In , O'Flaherty & Phillips (2015), stated that out of class activities make learners more responsible of their own learning and students can do meaningful learning activities as it resulted in a positive intervention of learning. Also, students' participation in out-of-class activities, are not only reinforcing classroom learning but also internalizing knowledge in a way that supports long-term retention and practical application using differentiated learning activities.

Table 3. Level of Validity of the Flipped Learning Instructional Material (FLIM) in terms of Live Events

Indicators	Mean	SD	Interpretation
Uses a variety of learning strategies (e.g. lecture, collaborative, inquiry, etc.) that are suited to the lesson content and learners' needs.	4.8	0.45	Excellent
Creates opportunities for deeper learning and discussion of the lesson.	4.8	0.45	Excellent
Offers learners numerous meaningful interactions with the teacher.	4.6	0.55	Excellent
Provides interactive activities that encourage participation from all types of learners.	5	0.00	Excellent
Delivers live demonstrations for learners to observe targeted skills.	4.4	0.55	Excellent
Overall Mean	**4.72**	**0.40**	**Excellent**

Table 3 reveals that the developed instructional material in terms of live-events is excellent as evidenced by a mean of 4.72 (SD = 0.40). It simply means that the module meets 94.4 percent and above quality standards.

The table clearly shows that the module contains various learning strategies and opportunities for learners to interact and participate actively. Further, it implies that with the use of differentiated learning activities it gives opportunities for learners to collaborate actively and not only enhance students' immediate understanding of the content but also build role clarity and understanding diverse perspectives.

It is highlighted in the study of Claro & Ananiadou (2009) stated by Melissa Bond (2020) that student engagement gives an increase opportunities for students to develop 21st century skills specifically higher-order thinking skills, collaboration, teamwork and problem solving. Thus, maintaining students' engagement in the classroom may have a strong willingness of students to express their own personal viewpoints without reserve (Ha et.al.,2019).

Table 4. Level of Validity of the Flipped Learning Instructional Material (FLIM) in terms of In-class Activities

Indicators	Mean	SD	Interpretation
Gives students opportunities to engage in meaningful activities without the teacher the center of the class attention.	4.6	0.55	Excellent
Offers scaffolds to all learners through differentiation and feedback.	4.8	0.45	Excellent
Involves application, face-to-face interaction, and instructor/peer feedback in class activities and demonstrations.	5	0.00	Excellent
Uses class time to address learners' concerns, re-teach an important concept, or review of lesson content.	4.8	0.45	Excellent
Engages learners to apply or build upon the content learned in out-of-class activities.	4.4	0.55	Excellent
Overall Mean	**4.72**	**0.40**	**Excellent**

Table 4 reveals that the developed instructional material in terms of In - Class Activities is excellent as evidenced by a mean of 4.72 (SD = 4.72). It simply means that the module meets 94.4 percent and above quality standards.

For specificity, the table shows that the module highlighted the importance of teacher in providing feedback and reviewing lesson content that gives opportunities for learners to have meaningful activities in the instructional process. It further indicates that the module consistently provides students with opportunities to engage in meaningful, student-centered activities, empowering learners to be responsible in their own learning. Also, the FLIM is highly conducive in promoting a dynamic and engaging learning environment that supports both independent and collaborative learning.

The module also provided an opening for learners to have a deeper cognition, retention of concepts and enhancing communication skills. It is also identified in the study of Johnson et.al., (2014) that students inside the class activities encouraged students to develop teamwork, creativity and accommodated diverse learning preferences. When students to take part in classroom activities it incorporates a variety of teaching strategies that ensure students to engage meaningfully with the learning aid in a way that suits their individual learning styles.

Table 5. Level of Validity of the Flipped Learning Instructional Material (FLIM) in terms of Collaborative activities

Indicators	Mean	SD	Interpretation
Gives learners opportunities to communicate with fellow learners.	4.8	0.45	Excellent
Promotes group interactions that allow learners to dissect information together.	5	0.00	Excellent
Allows learners to receive feedback from their fellow learners. Provides group projects that require group discussion, group management, and group decision making.	5	0.00	Excellent
Overall Mean	**4.93**	**0.15**	**Excellent**

Table 5 reveals that the developed instructional material in terms Collaborative Activities is excellent as substantiated by a mean of 4.93 (SD=0.15). It simply means that the module meets 98.6 percent and above quality standards.

The result indicates that module contain collaborative activities that allows learners to express their opinions altogether through group discussions and group management. The excellent result suggests that collaborative learning strategies are well-implemented in the module. It enhances student engagement and communication, strong peer learning and knowledge retention and development of social and leadership skills. Deysolong (2023) strengthened the collaborative learning as a tool for students' effective communication, develop social skills and nurtures personal growth and professional endeavors. Thus, in the study of Halili,et.al.(2014), stated

that in the Flipped Classroom it makes the learning more active especially when students work together by exchanging their ideas and opinions. It also produces a much higher level of critical thinking. Thus, educators should continue integrating group-based activities, enhance structured peer feedback, and ensure that all students remain actively involved in the learning process.

Table 6. Level of Validity of the Flipped Learning Instructional Material (FLIM) in terms of Diagnostic Assessment

Indicators	Mean	SD	Interpretation
Provides introductory activities to identify learners' interest and prior knowledge on the module.	4.80	0.45	Excellent
Conducts pre-assessments before the lesson that determine learners' readiness and prior knowledge.	4.60	0.55	Excellent
Gives assessments in the middle of the module to evaluate if different aspects of content are understood and retained so that adjustments in instructions are made.	4.40	0.55	Excellent
Uses data from learners' profile and standardized tests results as a reference in adjusting learning experiences.	4.60	0.55	Excellent
Overall Mean	**4.60**	**0.52**	**Excellent**

Table 6 reveals that the developed instructional material in terms Diagnostic Assessment is excellent as indicated by a mean of 4.60 (SD=0.52). It simply means that the module meets 92 percent and above quality standards.

The result indicates that module contain pre-assessments to determine students' learning experiences. The results indicate that the module provide instructional strategies that is highly effective in assessing and addressing learners' prior knowledge, readiness, and progress. The high ratings across all indicators suggest that the teacher effectively integrates formative assessments and data-driven decision-making to enhance learning experiences. This also suggests that continuing these activities can further strengthen adaptive learning, ensuring that instructional methods remain responsive and student-centered.

Research collected by Treagust (2012), stated that to have an effective pedagogy, diagnostic assessment should be a procedure in determining students' prior knowledge and experiences. In addition, it is necessary to diagnose students' learning to have better understanding about the nature of students' understanding and to remedy the misconceptions of students in a particular area/s. Thus, the success of formative assessments could really enhance student learning experiences and confirms a well-structured instructional approach.

Table 7. Level of Validity of the Flipped Learning Instructional Material (FLIM) in terms of Summative Assessment

Indicators	Mean	SD	Interpretation
Measures attainment of lesson objectives comprehensively.	4.80	0.45	Excellent
Differs and proportions items appropriately in terms of difficulty (e.g. easy, moderate, difficult)	4.80	0.45	Excellent
Varies items to comply with different levels of thinking (Blooms Taxonomy)	4.60	0.55	Excellent
Provides items with at least acceptable validity and reliability	4.60	0.55	Excellent
Overall Mean	**4.70**	**0.50**	**Excellent**

Table 7 reveals that the developed instructional material in terms Summative Assessment is excellent as indicated by a mean of 4.70 (SD=0.50). It simply means that the module meets 94 percent and above quality standards.

It can be claimed that the module is excellent as it attained the lesson objectives through summative tests that implies different levels of thinking that could cater learning differences of learners. This suggests that the

assessment tools used in FLIM effectively measure students' attainment of lesson objectives and provide a well-balanced distribution of question difficulty. The assessments used in FLIM were not only measure students' achievement but also support differentiated learning by incorporating a variety of question types and cognitive levels. Also, it implies that FLIM provides a strong and effective assessment framework that supports meaningful learning evaluation and contributes to improved student performance.

It further explained in the study of Toledo (2019), that summative assessment is an indicator of the effectiveness of teaching and learning. Similarly, Haladyna and Rodriguez (2013) suggest that a well-structured summative assessment should include a mix of easy, moderate, and difficult questions to cater to diverse learners. Hence, the FLIM offers a strong assessment structure that measures students' mastery of learning objectives and improves students' academic performance.

Table 8. Level of Validity of the Flipped Learning Instructional Material (FLIM) in terms of Flexibility

Indicators	Mean	SD	Interpretation
Devices a scheme that observes and monitors learners to adjust as appropriate.	4.40	0.55	Excellent
Uses diversified learning activities that provides learners with choices on their learning experiences.	4.40	0.55	Excellent
Modifies class plans based on what learners don't understand or identified areas for needed reinforcement.	4.40	0.55	Excellent
Provides activities can be accessed and accomplished in a variety of ways. (e.g. digitally or physically)	4.80	0.45	Excellent
Overall Mean	**4.50**	**0.52**	**Excellent**

Table 8 reveals that the developed instructional material in terms Collaborative Activities is excellent as indicated by a mean of 4.50 (SD=0.52). It simply means that the module meets 90 percent and above quality standards.

Result implies that the developed module enhanced students' interest as it provided learning activities that can be accessed and accomplished in a variety of ways. Similarly, it provided learners a new learning experience to overcome learning gaps, lack of interest to learn and participate. Moreover, it implies that the FLIM provides students with multiple opportunities to engage in learning based on their individual needs, preferences, and learning styles.

According to Kolb & Kolb (2017) stated by Aventijado, et.al., (2020) believes that students could learn more effectively by knowing their experiences wherein students can easily recall and adapt the knowledge if they apply it in the real-life situations. Also, Vaughan et al. (2013) found that flexible instructional design, such as modifying lesson plans and monitoring student progress, leads to better academic performance. Thus, the result conforms that FLIM provides a flexible instructional strategy that promotes personalized learning and student engagement.

Table 9. Level of Validity of the Flipped Learning Instructional Material (FLIM) in terms of Personalization

Indicators	Mean	SD	Interpretation
Gives opportunities to learner to take part in setting objectives of module.	4.60	0.55	Excellent
Encourages internalization of importance of a certain learning experience.	4.40	0.55	Excellent
Takes in learners' personal preferences on their learning.	4.00	0.00	Excellent
Guides learners in generalizing concepts using their own understanding.	4.80	0.45	Excellent
Makes learners interact and reflect on their learning as needed.	4.80	0.45	Excellent
Overall Mean	**4.52**	**0.40**	**Excellent**

Table 9 reveals that the developed instructional material in terms Personalization is excellent as evidenced by a mean of 4.52 (SD=0.40). It simply means that the module meets 90.4 percent and above quality standards.

Result implies that the developed module guides the students to reflect self-directed learning by achieving the learning goals sets in the module. Personalization in a flipped learning environment has a crucial role to play in understanding the concepts in Araling Panlipunan 10. Moreover, the result implies that the FLIM uphold learners' personal preferences and gives opportunities to have a better understanding on the content and emphasized a learner-driven setting.

In the context of Flipped Learning, one way of developing learners the ability to manage their learning preferences requires a deep understanding of their learning and what they are supposed to learn (Moeller, 2021). Furthermore, in a flipped learning environment, students must know how to take charge of their learning by adapting change, enhancing creativity and develop interactive communication among groups (Brandt, 2020).

Moreover, the result implies that personalization enhanced student engagement, motivation, and academic achievement by providing personal learning paths that fosters a student-centered approach. Sota (2016) highlighted that the use of blended learning models in class supports personalized learning goals to understand learners' expectations, strengths, weaknesses and needs for learning. Thus, the Flipped Learning Instructional Material (FLIM) successfully facilitates personalized learning, creating a student-focused environment where learners are deeply involved in directing their own educational path.

Table 10. Summary of the Grand Mean Ratings on the Self-paced Learning, Out-of-class activities, Live events, In-class activities, Collaborative activities, Diagnostic Assessments, Summative Assessments, Flexibility and Personalization

VARIABLES	Mean	SD	Interpretation
1. Self – paced Learning	4.75	0.47	Excellent
2. Out – of – Class	4.77	0.48	Excellent
3. Live Events	4.72	0.40	Excellent
4. In – Class Activities	4.72	0.40	Excellent
5. Collaborative Activities	4.93	0.15	Excellent
6. Diagnostic Assessment	4.60	0.52	Excellent
7. Summative Assessment	4.70	0.50	Excellent
8. Flexibility	4.50	0.52	Excellent
9. Personalization	4.52	0.40	Excellent
Overall Mean	**4.69**	**0.43**	**Excellent**

Table 10 presents the summary of the grand mean ratings on the validity of the Flipped Learning Instructional Material (FLIM).

The result indicates that all the parameters in the validation of FLIM obtained an excellent rating from the evaluators. Generally, the FLIM shown by a consistent verbal description of excellent with an overall rating of 4.69 (SD=0.43).

It also implies that Flipped Learning Instructional Material (FLIM) in teaching Araling Panlipunan can be used as an intervention in breaking the old mold of instructional process as it works toward the development of creativity, active learning, and enhances 21st century skills of learners. The strong ratings across all variables suggest that this teaching and learning method is highly effective and positively received by students. It offers a thorough and engaging learning experience that accommodates learners to different learning preferences, fosters collaboration among peers, and provides flexibility, allowing students to approach their studies in ways that best suit their individual needs and learning styles.

Moreover, Naik (2023) asserted flipped learning as an active learning experience that promotes collaboration, enhanced critical thinking skills, cultivate deeper understanding of the concepts of the subject matter and nourish personalized learning experiences. Hence, using of FLIM is a beneficial tool in enhancing the learning outcomes of Grade 10 students in Araling Panlipunan. Furthermore, FLIM fosters the development of the

critical thinking of students and deeper comprehension of the content which are fundamental skills for the success in the 21st century learning.

Level of the academic performance of the control and experimental groups in the pretest and posttest, along with the significant difference observed after the intervention was applied.

Tables 11 to 14 present the pretest and posttest scores of the control and experimental groups, analyzed using Mean and Standard Deviation, along with their significant differences determined through t-test statistical analysis.

Table 11. Level of Academic Performance of Control and Experimental Groups in the Pre-test and Post-test

Groups	Mean Score	SD	MPS	Interpretation
Control				
Pretest	13.03	3.58	73.03	DNME
Post-test	33.27	2.35	93.27	Outstanding
Experimental				
Pretest	12.63	2.45	72.63	DNME
Post-test	35.67	2.59	95.67	Outstanding

Table 11 explains the academic performance level in Araling Panlipunan 10 of control and experimental groups in the pretest and post-test. During the pretest, the control and experimental groups obtained an academic performance of 13.03 (SD=3.58) and 12.63 (SD=2.45) respectively, with equivalent mean percentage scores of 73.03 and 72.63 and interpreted as did not meet expectations (DNME). The data further implies that before the experimentation, the two groups have no prior knowledge of the concepts of *Isyu at Hamong Pangkapaligiran*, as indicated by the mean percentage scores which are all below the passing level and interpreted as not meeting expectations.

On the other hand, during the post-test the control and experimental groups obtained an academic performance of 33.37 (SD=2.35) and 35.67 (SD=2.59) respectively, which is equivalent to an MPS of 93.27 and 95.67 and both interpreted as outstanding. The result further implies that both groups significantly improved their learning outcomes in Araling Panlipunan 10 from pre-test to posttest after they were exposed to different teaching approaches.

The data implies that after being exposed to various teaching approaches, both groups made substantial gains in academic performance. The post-test results show that both the control and experimental groups significantly improved their understanding of the content after the instructional interventions, which led to better test scores. However, the techniques used with the experimental group proved to be particularly effective in aiding the students' learning and boosting their academic performance in Araling Panlipunan 10.

Bergmann and Sams (2012), the founders of flipped learning, showed that altering the conventional classroom structure promotes increased student engagement with the material, leading to a more profound understanding of complex ideas. This method has proven especially effective in subjects like social studies, where interactive activities and discussions enhance learning. In the case of Araling Panlipunan, which focuses on societal issues and environmental challenges, flipped learning offers students a chance to explore these subjects in a more engaging and collaborative way.

Table 12. The Paired t-test Result of the Mean Scores of the Academic Performance of the Control Group in the Pre-test and Post-test.

Control Group	N	Mean Score	SD	MPS	df	t – computed value	p-value
Pre - test	30	13.03	3.58	73.03			
Post test	30	33.27	2.35	93.27	29	25.99*	0.00
Mean Difference		**20.24**					

*Significant at 0.05 level of significance

Table 12 presents the conducted paired sample t-test to determine the significant difference between the pre-test and post-test scores of the control group. Based on the analyzed result, there is a significant difference between the pre-test (M=13.03, SD=3.59) and post-test (M=33.27, SD=2.35) scores of the control group, [t(29)=25.99, p<0.05]. This implies that the academic performance of Grade 10 students in Araling Panlipunan improved using the conventional teaching as reflected on the increased of their mean score of 13.03 in the pre-test to 33.27 in the post-test with a mean difference of 20.24. The result implies that the conventional teaching approach helped students gain a better understanding of the topic, possibly through structured lessons, direct instruction, and teacher-guided activities that typically involve direct teacher instruction, textbook-based learning, and individual assessments.

Similarly, Yildirim and Sahin (2020) conducted research on the effects of traditional teaching methods on student performance in social studies and found that direct instruction was particularly help in aiding students' comprehension of intricate societal concepts. Thus, a conventional approach of teaching is a teacher-guided approach that helped students gain understanding of the subject that requires careful planning and teacher support.

Table 13. The t-test Result of the Mean Scores of the Academic Performance of the Experimental Group in the Pre-test and Post-test

Experimental Group	N	Mean Score	SD	MPS	df	t – computed value	p-value
Pre - test	30	12.63	2.45	72.63			
Post test	30	35.67	2.59	95.67	29	35.34*	0.00
Mean Difference		**23.04**					

*Significant at 0.05 level of significance

Table 13 presents the conducted paired sample t-test to determine the significant difference between the pre-test and post-test scores of the experimental group. Based on the analyzed result, there is a significant difference between the pre-test (M=12.63, SD=2.45) and post-test (M=35.67, SD=2.59) scores of the experimental group, [t (29)=35.34, p<0.05]. This implies that the academic performance of Grade 10 students in Araling Panlipunan greatly improved after they undergone to Flipped Learning Instructional Material (FLIM) intervention. The result further implies that FLIM as intervention approach in teaching Araling Panlipunan 10 indicating a substantial improvement in students' apprehension and proven effective in enhancing the academic performance of the students as reflected on the significant increase of their mean score of 23.04 from pre-test to post-test.

This approach likely promoted deeper learning by enabling students to interact with the material in a more individualized and adaptable manner, providing them with the time to absorb and reflect on the content before using it in discussions or activities. Further, Johnson, Johnson, and Smith (2014) stated that flipped learning fosters a deeper understanding of the material and promotes critical thinking. In the experimental group, FLIM likely facilitated such interactions, contributing to the students' improved academic performance. Moreover, Zainuddin and Perera (2019) conducted a study on flipped classrooms found that students who participated in flipped learning scored higher in both formative and summative assessments compared to those who experienced traditional teaching methods. Similarly, in this study, the experimental groups' post-test performance significantly improved after exposure to FLIM, indicating that flipped learning can be an effective intervention in enhancing student performance. Therefore, the notable enhancement in academic achievement seen in the experimental group of this study supports these results, indicating that FLIM may be a highly effective teaching method in Araling Panlipunan.

Table 14. The Independent Sample t-test Result of the Mean Gain Scores of the Control Group and Experimental Group.

Groups	N	Mean Gain	SD	MPS	df	t – computed value	p-value
Control	30	20.24	4.26	80.23			
Experimental	30	23.04	3.67	83.03	58	2.73*	0.008
Mean Difference		**2.80**					

*Significant at 0.05 level of significance

Table 14 presents the results of an independent samples t-test conducted to examine the significant difference between the mean gain scores of the control and experimental groups. The analysis revealed a significant difference between the mean gain score of the control group (M = 20.23, SD = 4.26) and that of the experimental group (M = 23.03, SD = 3.67), [t(58) = 2.73, p = 0.008].

These results suggest that the use of Flipped Learning Instructional Materials (FLIM) in the experimental group led to a significant enhacnement in academic performance compared to the conventional method used with the control group. The experimental group's higher mean gain score of 23.03 reflects a more substantial improvement in understanding the concepts taught in Araling Panlipunan 10, indicating that FLIM is a more effective teaching approach in this context. The control group, which was taught using conventional method, demonstrated a smaller improvement with mean gain score of 20.23. This suggests that while traditional teaching methods can still lead to academic improvement, FLIM, with its focus on active and personalized learning, offers a more effective means of enhancing student performance.

The significant difference 2.80 between the control and experimental groups indicates that FLIM provides a more effective method for improving students' understanding of the subject. This suggests that incorporating flipped learning into the curriculum can lead to better learning outcomes by fostering greater student engagement, active participation, and deeper understanding of complex concepts. Bergmann and Sams (2012), the founders of flipped learning, showed that changing the conventional classroom structure, where students review content outside of class and then apply it through in-class activities that resulted into a better student performance. This study also supports the findings of of Zainuddin and Perera (2019) also mentioned that students in flipped classrooms performed better in assessments compared to those in traditional learning environments that supports students in understanding and applying the content more effectively, leading to improved academic performance.

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

This chapter presents the summary of findings, conclusions and recommendations based on the results of the investigation.

Summary

Based on the result of the study the following findings are summarized.

The evaluated validity of the developed Flipped Learning Instructional Material (FLIM) obtained an overall excellent rating based on the nine (9) parameters such as self-paced learning, out-of-class activities, live-events, in-class activities, collaborative activities, diagnostic assessment, summative assessment and flexibility. Moreover, the validators validate the FLIM through the 21st-century e-Learning Module Assessment Tool (21CELMAT) by Jose Mari Calamlam (2020). Each indicator has garnered excellent rating and meets the above quality standard as well. However, the module's Flexibility received the lowest rating during the validation process.

Ultimately, experimental design was the valuable tool in this study since it investigated the effectiveness of the FLIM through the result of the pretest, posttest scores and its significant difference. A simple random sampling using the lottery method ensured that each participant of the study was unbiasedly selected.

Moreover, before the implementation of the experimentation the control and experimental group had both no prior knowledge of the concepts in Araling Panlipunan 10 as indicated in the mean percentage scores of 73.03 and 72.63 with a verbal description of did not meet expectations (DNME).

The study compared the academic performance of students who received conventional teaching methods (control group) with those who experienced Flipped Learning (experimental group). The findings indicated a significant disparity in the scores obtained by the two groups.

Specifically, the control group, which received traditional instruction, demonstrated: Lower scores compared to the experimental group, limited improvement in academic performance, possible reliance on rote memorization rather than deeper understanding. In contrast, the experimental group, which utilized Flipped Learning, exhibited: Higher scores compared to the control group, significant improvement in academic performance, enhanced understanding and application of concepts, probably because of the engaging and cooperative aspects of Flipped Learning.

The study's results indicated a significant difference between the mean gain scores of the control and experimental groups. The findings suggest that the experimental group showed higher mean gain scores compared to the control group. Consequently, the researcher-developed module, Flipped Learning Instructional Material (FLIM), has a notable impact on enhancing the academic performance of Grade 10 students, especially in the Araling Panlipunan subject area.

Conclusion

Based on the findings of this study, the conclusions below are set.

The Flipped Learning Instructional Material (FLIM) is highly effective and well-received by students, as evidenced by the consistently excellent ratings across all areas. The high scores in self-paced learning, out-of-class activities, live events, in-class activities, collaborative activities, diagnostic assessments, summative assessments, flexibility and personalization demonstrate that the teaching methods successfully involve students and meet their needs to various learning needs. Thereupon, this instructional material provides a comprehensive, engaging, and adaptive learning environment that supports student success and fosters a higher impact on students' academic performance.

Furthermore, the findings from the grand mean ratings on the validity of the FLIM emphasize its effectiveness as a modern and engaging educational tool in the 21st century learning that promote creativity, active participation and inclusive teaching method that allows students to approach their studies in the way that can be tailored to their individual preferences.

Analysis from the findings from the independent samples t-test indicate the incorporation of Flipped Learning Instructional Materials (FLIM) in teaching Araling Panlipunan 10 has a significantly positive effect on student academic performance compared to the conventional teaching method. The significant increase in score of experimental group indicates that the students were also able to understand and apply complex concepts related to societal issues and environmental challenges more effectively using the developed FLIM as a new instructional material in teaching Araling Panlipunan. Overall, the findings suggest that both FLIM and conventional teaching method can be a valuable intervention in teaching Araling Panlipunan. However, the FLIM demonstrated greater effectiveness compared to traditional teaching methods in enhancing students' comprehension and academic performance, as it emphasizes active learning, teamwork, and the cultivation of critical thinking skills.

Recommendations

Based on the summary of findings and conclusions drawn, the following recommendations are drawn.

1. Subsequent to the FLIM's validation obtained an excellent rating, then it may be integrated in other subject area in improving the delivery of instruction most especially during asynchronous learning due to weather crisis or in large classes by reducing lecture time and during blended or online learning.
2. Teachers in Araling Panlipunan may be encouraged to utilize the FLIM since it was proven effective in improving the students' academic performance.
3. Additional studies should be carried out to assess the impact of flipped learning across various subjects and educational stages. This will help identify any challenges and obstacles faced during its implementation. Through incorporating Flipped Learning, educators may help all learners that boosts academic achievement and motivating students' interest to become more active members of the society by unlocking students' potential to sustained learning.

4. Other educators and future researchers may examine long-term implications of flipped learning to examine sustained impacts on student achievement.

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