

Assessing the Effectiveness of Simplified Learning Workbook in Science with Manobo Translation

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ABSTRACT

This study evaluates the effectiveness of the Simplified Learning Workbook in Science, which incorporates Manobo translations, on the academic performance of Grade 8 students at Pakwan Integrated School. The implementation of the workbook resulted in a significant increase in mean test scores, rising from 8.81 to 14.57, indicating a marked improvement in students' understanding of the concept of force. A strong positive correlation (0.783) between pretest and posttest scores confirmed that students built upon their foundational knowledge effectively with the workbook's assistance. Statistical analysis revealed a significant difference in scores before and after using the workbook, validating its effectiveness as an educational tool tailored for Indigenous learners. However, increased variability in posttest scores highlighted the need for differentiated learning strategies to address the diverse needs of students. Thus, this research underscores the importance of culturally responsive teaching practices and the integration of native language support in enhancing educational outcomes for Indigenous students.

Keyword: *Simplified Learning Workbook, Manobo Translations, Academic Performance, Indigenous Learners, Culturally Responsive Teaching.*

1. INTRODUCTION

Science education plays a crucial role in developing scientific literacy among students, particularly within Indigenous Peoples (IP) education programs. For over 20 years, mathematical and scientific literacy for all students has been the goal for many of the national and international reforms in mathematics and science. However, indigenous students are still underachieving in mathematics and science when compared to majority students [2]. Tayao's study (2017) underscores the obstacles that Indigenous learners encounter, including linguistic and cultural barriers. Indigenous communities in the Philippines often have distinct languages and cultures, differing from the mainstream society. Teachers instructing students from diverse cultural backgrounds may inadvertently overlook or neglect certain students' cultures. In fact, these struggles were noted in the 2007 consolidated report of the Episcopal Commission on Indigenous Peoples (ECIP). The curriculum, both in its content and in its pedagogy, teaches a foreign culture and a worldview in a foreign language, which ends up inhibiting students' learning experiences. Most articles mention the importance of building a curriculum that dialogues with the worldviews of their communities, highlighting that, based on this procedure, teachers can motivate students' interest and improve academic performance [7] [15] [14] [12]. In subjects such as science and mathematics, the worldview present in the classroom is critical to enabling teaching and learning [13] [15] [14]. Many indigenous students generally have difficulties with content in these subjects, as they are structured in a Western cosmovision, which diverges from the knowledge systems and ontologies that shape and guide indigenous perception and thought [13].

To address these concerns, the Department of Education (DepEd) implemented the National IP Education (IPEd) Policy Framework (DepEd Order No. 62, s. 2011) and IP Education (IPEd) Curriculum Framework (DepEd Order No. 32, s. 2015). This program reflects DepEd's dedication to providing culturally appropriate primary education to indigenous peoples, respecting their identities, and emphasizing the significance of their indigenous wisdom, abilities, and cultural legacies [18]. Despite efforts, schools still face significant challenges in meeting the educational needs of indigenous communities. The current curriculum, delivered through both formal and informal education, frequently overlooks their unique challenges and does not resonate with their lifestyles, which in turn affects their customs and traditions.

To tackle this issue, the Department of Education (DepEd) has pledged to incorporate indigenous knowledge systems and practices (IKSPs) into the educational framework, ensuring the use of suitable and culturally relevant learning resources and environments tailored for indigenous learners. The creation of the National Commission on Indigenous Peoples (NCIP) underscores a dedication to preserving the customs, beliefs, traditions, and institutions of indigenous peoples while tackling challenges in indigenous education. This encompasses various aspects, including the availability of educational resources, the capacity of teachers, the development of culturally sensitive curricula, supportive policy environments, and ensuring that learners in indigenous-majority schools have access to essential educational needs.

This study focuses on the development and implementation of a Simplified Learning Workbook in Science specifically designed for Grade 8 students at Pakwan Integrated School. This initiative addresses a critical gap in science education, particularly concerning the topic of force, which has been identified as one of the least mastered competencies among students during the first quarter of the academic year 2024-2025. Recognizing the linguistic and cultural context of the students, the workbook incorporates Manobo translations to facilitate better understanding and engagement with the material.

2. RESEARCH QUESTION

The study aimed to investigate the effectiveness of simplified learning workbook in science with Manobo translation. It sought to answer the following questions:

1. How does a simplified learning workbook with Manobo translation affect the science academic performance of Grade 8 students?
2. How do Manobo-speaking students perceive the clarity and effectiveness of the simplified learning workbook in understanding basic concept of force?
3. Is there a statistically significant difference between the mean scores of pretest and posttest student performance in understanding force when using a Simplified Learning Workbook in science with Manobo translation?
4. What are challenges and feedback of student on the implementation of simplified learning workbook in science with Manobo translation?

3. RESEARCH METHODOLOGY

3.1 RESEARCH DESIGN

This research utilized a mixed-methods design to develop and evaluate the effectiveness of a Simplified Learning Workbook in Science with Manobo translation. The quantitative component involved administering pretests and post-tests to assess students' understanding of the concept of force. This allowed for a measurable comparison of academic performance before and after the intervention.

In addition, qualitative data were collected through focus group discussions (FGDs) and interviews, which aimed to explore students' engagement levels and their perceptions of the workbook. This dual approach not only quantified learning outcomes but also provided rich contextual insights into the students' experiences, enhancing the overall understanding of how the workbook facilitated their learning.

3.2 RESEARCH LOCALE

The study was conducted at Pakwan Integrated School, located in Barangay Pakwan, Lanuza, Surigao del Sur, Philippines. This site was chosen due to its alignment with the objectives of the research on the Simplified Learning Workbook in Science with Manobo translation, which directly targets the local student population. The school serves a predominantly Manobo community, making it an ideal setting for assessing the effectiveness of educational materials designed for this demographic. By focusing on Pakwan Integrated School, the study aims to address the specific educational needs and challenges faced by these students, thereby enhancing the relevance and impact of the intervention.

3.3 RESEARCH PARTICIPANTS

The participants were 21 Grade 8 students from Pakwan Integrated School (9 females and 12 males). This sample size was manageable for qualitative and quantitative analysis while ensuring that each student's progress could be closely monitored.

3.4 RESEARCH INSTRUMENT

The researcher employed a set of 30 questions focused on the concept of force, sourced from the Sukdanan Standardized Test Materials provided by the Department of Education, Surigao del Sur Division. These questions were utilized for both the pretest and posttest to effectively evaluate students' conceptual understanding of force. Following the administration of the pretest, the Simplified Learning Workbook in Science with Manobo Translation was implemented as an instructional intervention. This approach aimed to determine whether there was a measurable improvement in student performance after utilizing the workbook. The combination of standardized testing and targeted educational resources ensures a comprehensive assessment of learning outcomes related to the concept of force.

3.5 DATA GATHERING PROCEDURE

The data collection process for this study was conducted in several well-defined stages to ensure thoroughness and reliability. Initially, the researcher obtained the necessary permissions from the Tribal Chieftain and Barangay and Municipal IPMR for the usage of Manobo language and school administration, which facilitated the smooth execution of the study. Following this, a pretest was administered to establish baseline levels of student engagement and conceptual understanding of the concept of force. After assessing these initial metrics, the Simplified Learning Workbook in Science with Manobo Translation was integrated into classroom routines for a specified duration, allowing students to engage with the material in a structured manner.

Upon completion of the workbook activities, a posttest was conducted to evaluate any changes in student performance and understanding. In addition to quantitative assessments, participant feedback was collected to gain insights into their experiences with the workbook. The data obtained from both the pretest and posttest were meticulously analyzed to assess the effectiveness of the Simplified Learning Workbook in enhancing students' comprehension of force. To further enrich the findings, focus group discussions (FGDs) and interviews were conducted, providing qualitative insights into students' levels of engagement and their conceptual grasp of force as facilitated by the workbook. This comprehensive approach not only allowed for a robust evaluation of the educational intervention but also captured the nuanced experiences of students as they navigated their learning journey.

3.6 ETHICAL CONSIDERATIONS

To uphold the rights and welfare of all parties involved, the study adhered to stringent ethical standards throughout its execution. Necessary permissions were obtained from key stakeholders, including the parents or guardians of the students, the Tribal Chieftain, the Barangay and Municipal Indigenous Peoples Mandatory Representatives (IPMR), teachers who are native speakers of the Manobo language, and the school administration. The purpose of the study was clearly communicated to all parties, ensuring that they understood the research objectives and their role within it. Participants were assured that they could withdraw from the study at any time without any repercussions or pressure. Furthermore, confidentiality and anonymity were rigorously maintained throughout the research process to protect participants' personal information. This commitment to ethical practices ensured a respectful and supportive environment for all involved, fostering trust and cooperation during the study.

3.7 SCOPE AND LIMITATION

The scope of this study concentrated on evaluating the effectiveness of the Simplified Learning Workbook with Manobo Translation, thereby limiting the generalizability of the findings to similar educational contexts. While the study provides valuable insights, it is important to acknowledge certain limitations that may affect the interpretation

of the results. One significant limitation is the variability in student engagement, which can be attributed to differing levels of conceptual understanding of force among participants. This disparity may influence how effectively students interact with the workbook and grasp the material. Additionally, factors such as the amount of time allocated for the intervention could impact learning outcomes, as extended engagement may lead to deeper understanding. Moreover, the demographic composition of the student sample presents another variable that could affect the findings. Differences in background, cultural context, and prior knowledge may influence how students respond to the workbook and their overall performance in science. Recognizing these limitations is crucial for contextualizing the results and understanding their applicability to broader educational settings.

4 RESULTS

Table 1. Mean Test Scores and Standard Deviations Before and After Using the Simplified Learning Workbook in Science with Manobo Translation

	Mean	N	Std. Deviation	Std. Error Mean
Score on Test Before Implementation	8.8095	21	3.07602	.67124
Score on Test After Implementation	14.5714	21	5.34389	1.16613

The results presented in Table 1 provided a compelling overview of the impact of the Simplified Learning Workbook in Science with Manobo translation on student performance. Prior to the implementation of the workbook, the mean test score was 8.81 (SD = 3.08), indicating that students were achieving below half of the total possible points on their assessments. This finding suggested a significant need for improved educational resources to enhance understanding of scientific concepts among these learners. Following the introduction of the workbook, there was a notable increase in the mean score to 14.57 (SD = 5.34), reflecting a substantial improvement in student performance. This increase not only indicated that students were able to grasp more content after using the workbook but also suggested that the workbook may have effectively addressed specific learning needs within this demographic. Research explored how Manobo learners cope with challenges in acquiring English as a second language. The study found that using translation and bilingual resources helped learners bridge gaps between their native language and English, enhancing their comprehension and engagement with the material [16].

The rise in mean scores was accompanied by an increase in standard deviation from 3.08 to 5.34, revealing greater variability in student outcomes post-implementation. This variability implied that while some students thrived and significantly improved their understanding, others may have faced challenges that hindered their progress, highlighting a potential area for further investigation into differentiated learning strategies. These findings underscored the effectiveness of targeted educational materials, such as the Simplified Learning Workbook, in enhancing academic performance among Manobo-speaking students in science education.

This robust implementation aligns with the literature that emphasizes the importance of culturally responsive practices and supportive policies in indigenous education. Scholars, have extensively documented the positive outcomes associated with culturally relevant pedagogies and policies in Indigenous education [2], [4], [17], [20], [19] & [6].

Table 2. Correlation Between Test Scores Before and After Implementation of the Simplified Learning Workbook in Science with Manobo Translation

	N	Correlation	Sig.
Score on Test Before Implementation & Score on Test After Implementation	21	.783	.000

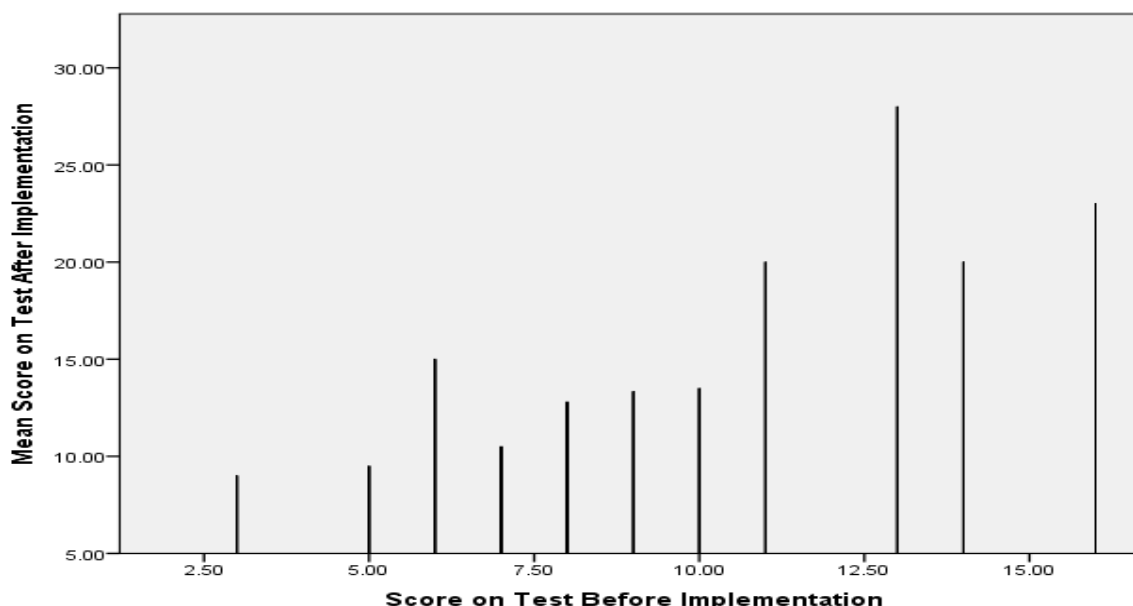
The results presented in Table 2: Correlation Between Test Scores Before and After Implementation of the Simplified Learning Workbook in Science with Manobo Translation revealed a strong positive correlation between the test scores before and after the implementation of the workbook, with a correlation coefficient of 0.783 and a significance level (p-value) of 0.000. This correlation coefficient indicated a substantial relationship, suggesting that students who performed

well on the test prior to using the workbook also tended to score higher afterward. The high significance value ($p < 0.001$) confirmed that this correlation was statistically significant, implying that the observed relationship was unlikely to have occurred by chance. The strong correlation indicated that students who had a foundational understanding of the material were able to build upon that knowledge with the help of the workbook, reinforcing their learning outcomes.

The results presented in Table 3: Paired Samples T-Test Results for Test Scores Before and After Implementation of the Simplified Learning Workbook in Science with Manobo Translation indicated a statistically significant difference in test scores before and after the implementation of the workbook. The mean difference in scores was -5.76, with a standard deviation of 3.51 and a standard error mean of 0.77. This negative mean difference suggested that, on average, students scored significantly lower before using the workbook compared to their scores afterward. The 95% confidence interval for the difference ranged from -7.36 to -4.17, indicating that the true mean difference likely fell within this range, further supporting the conclusion that the workbook had a positive impact on student performance.

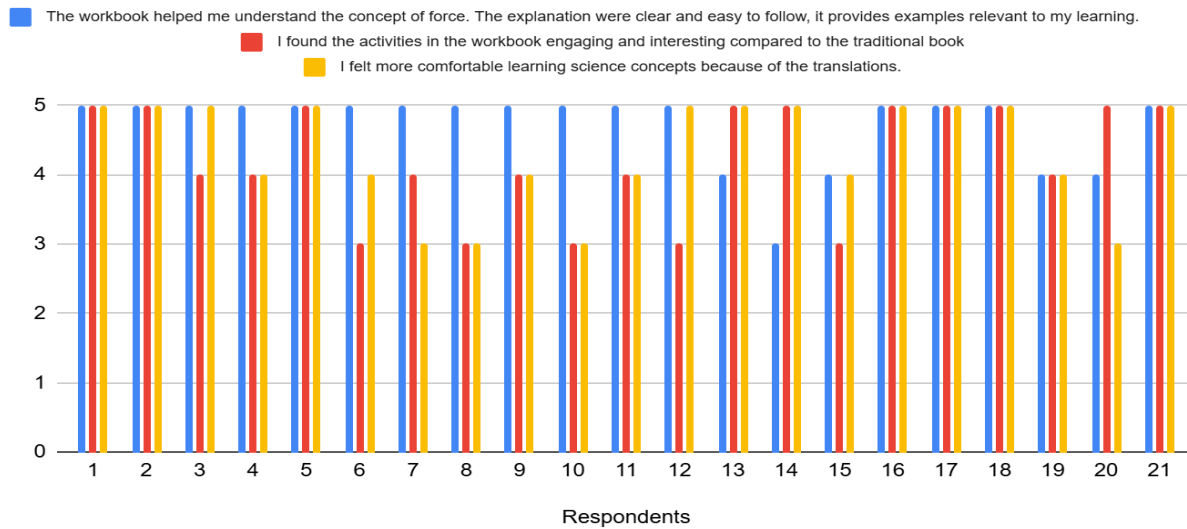
The t-value was calculated to be -7.53, with 20 degrees of freedom, and the significance level (p-value) was reported as 0.000. This p-value, being less than the conventional alpha level of 0.05, confirmed that the difference in test scores was statistically significant.

Table 4. Graph on the impact of Simplified Learning Workbook in Science with Manobo Translation on Student Performance



The graph illustrated the impact of the Simplified Learning Workbook in Science with Manobo translation on student performance. The x-axis represented test scores before the workbook's implementation, while the y-axis reflected mean scores after its introduction. Each vertical line indicated the score change for specific groups of students based on their pre-intervention scores. The graph demonstrated that the workbook had a positive effect on student performance. Students who scored lower before the intervention experienced significant increases in their scores afterward, indicating that the workbook effectively supported those struggling with scientific concepts. This improvement underscored the workbook's potential as a valuable educational resource. Conversely, the impact was less pronounced for students who had already achieved higher scores prior to the intervention, suggesting that they may not have benefited as much from the additional support.

Table 5. Student Evaluation of the Simplified Learning Workbook in Science with Manobo Translation



The results of the student evaluation of the Simplified Learning Workbook in Science with Manobo translation reflected a highly positive response, as shown by the Likert scale ratings. On a scale where 1 represented "strongly disagree" and 5 represented "strongly agree," students indicated that the workbook was an effective educational resource.

Table 6: Mean Scores and Variability of Student Evaluations for the Simplified Learning Workbook

	Statement1	Statement2	Statement3
Mean	4.7143	4.2381	4.3333
N	21	21	21
Std. Deviation	.56061	.83095	.79582
% of Total Sum	100.0%	100.0%	100.0%
% of Total N	100.0%	100.0%	100.0%

Table 6. Mean Scores and Variability of Student Evaluations for the Simplified Learning Workbook presented the results of student evaluations regarding the effectiveness of the workbook in Science with Manobo translation. The table included three statements that reflected different aspects of the workbook's impact on student learning. For Statement 1, the mean score was 4.71, indicating a strong positive response from students. This suggested that they found this aspect of the workbook particularly effective, reflecting a high level of agreement with the statement. Statement 2 had a mean score of 4.24, which still represented a favorable evaluation but was lower than that of Statement 1. This indicated that while students had a positive perception, there might have been areas for improvement or variability in how this aspect was received. Finally, Statement 3 received a mean score of 4.33, also indicating a positive response, though it was the lowest among the three statements.

Table 7. Student Comments on the Simplified Learning Workbook in Science with Manobo Translation

Student comments	Translation of student comments
"Sajon ra ma'am kai tag translate nan manubo. Kai mas makasabot kami nan amo sinultihan kaysa sa English na sinultihan"	"It's easy, ma'am, because it has already been translated into Manobo. We find it much easier to understand when it's in our native language rather than in English."
"Sajon ra kay tag translate nan manobo kaysa sa una waya tag translate og manobo"	"It's easy because it was translated into Manobo, rather than being left untranslated."

<p><i>"Sa ako kaugalingon na opinion kay pinta gajud ka sajun nan ini na liksyon kay tag translate na manobo, pero sa english dili ako makasabot gamay ra an ako masabtan. Nakasabuter na gajud ako about sa ini na lesson in I thank you"</i></p>	<p>"In my opinion, this lesson is really easy to understand because it was translated into Manobo. I have difficulty understanding it in English, as I only grasp a little. However, I have learned a lot from this lesson, and I thank you."</p>
<p><i>"Sajon ra kay tag translate nan manobo kay sauna waya e translate nan manobo sanan sauna dugay ako makasabot"</i></p>	<p>"It's easy because it was translated into Manobo; back then, I did not understand it."</p>
<p><i>"Mas ma padali ang aming pag intindi kasi nakatranslate na ito ng manobo kaya hindi ito mahirap answeran"</i></p>	<p>"It's so easy for us to understand when it is translated into Manobo; it's not difficult to answer."</p>
<p><i>"Kan na learn kot seini leksyon so masajun kuno mahadat so ig translate man sab tu manobo iyan da kan"</i></p>	<p>"The lessons I learned from this topic show that it's not hard to understand because it was translated into Manobo. That's all."</p>
<p><i>"Para kanay so kan na feel ko to sie ni no lection mahadat yag buy sin lection piro magjuw so madat ko andin na sa butan tas mahadat mojaw iyan da"</i></p>	<p>"For me, the lesson was hard to learn, but with the aid of the Manobo translation, I now find it easy to understand."</p>

A study conducted by Besana-Gutierrez and Eslao (2017) examined the factors affecting the academic performance of Manobo students in English. The study found that students felt embarrassed to speak in English due to their limited proficiency, leading to shyness and lack of confidence in asking questions and clarifications in class. The study further emphasized that students preferred to seek help from their friends or peers who shared the same language background instead of their teachers. This highlights the importance of creating a supportive environment that fosters the confidence of Manobo students in seeking help and raising questions. Moreover, research conducted by Abakan (2019) on the Shyness Scale of Turkish EFL learners revealed that shyness negatively impacted language learning and academic success. Similarly, another study conducted by Ghorban Dordi and Davari (2018) indicated that shyness can hinder the willingness of Iranian EFL students to participate in class, leading to lower levels of engagement and achievement. Thus, in this study, the researcher found that most comments from Grade 8 students indicated difficulty in comprehending science concept that were written in English. Table 7 presented student comments on the Simplified Learning Workbook in Science with Manobo translation, highlighting the positive impact of translation on their learning experience. Many students expressed that the workbook was easy to understand because it had been translated into Manobo, which allowed them to grasp concepts more effectively than when presented in English. Comments reflected a common sentiment that prior to the translation, they had struggled to comprehend the material, but afterward, they felt confident and learned significantly from the lessons. Students noted that having the content in their native language not only facilitated understanding but also made answering questions easier.

5 CONCLUSIONS AND RECOMMENDATION

The implementation of the Simplified Learning Workbook in Science with Manobo Translation led to a significant increase in mean test scores, from 8.81 to 14.57, demonstrating that students greatly improved their understanding of the concept of force. This indicated that tailored educational materials could effectively address learning gaps among Indigenous learners, especially when designed with cultural relevance. Bilingual translation has been advocated as a preferred technique to achieve equivalence in meaning. In this technique two versions of the instrument should be prepared in source and target languages then both of them should be administered to bilingual participants (Brislin, 1970). The integration of Manobo translations not only enhanced comprehension but also fostered a deeper connection to the material, emphasizing the importance of culturally responsive teaching. Research showed that using native languages in education improved learning outcomes by helping students relate new concepts to their existing knowledge. The results also revealed a strong positive correlation of 0.783 between pretest and posttest scores, confirming that students built upon their foundational understanding with the workbook's assistance. Additionally, statistical analysis indicated a significant difference in scores before and after using the workbook, validating its effectiveness. While some students excelled, others faced challenges, as reflected in the increased variability of posttest scores. This disparity highlighted the need for differentiated learning strategies to accommodate the diverse needs of learners in the classroom, ensuring that all students received the support necessary for academic success. Faupel-Badger et al. (2022) emphasizes the importance of developing educational approaches that leverage translational science to create more effective learning environments. They highlight how educational initiatives can benefit from integrating local languages and cultural contexts, which aligns with the goals of this study. Furthermore, studies have indicated that using native languages in education not only improves academic

performance but also fosters a sense of identity and belonging among Indigenous learners, reinforcing their connection to both their culture and the curriculum. The integration of native language support is crucial, as previous research has shown that translation can significantly enhance comprehension and learning outcomes for indigenous students, allowing them to connect new scientific concepts with their existing knowledge base in their mother tongue.

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