EFFECTIVENESS OF CONTEXTUALIZED LEARNING MATERIALS UTILIZING RADIO-BASED INSTRUCTION FOR BLAAN KINDERGARTEN LEARNERS

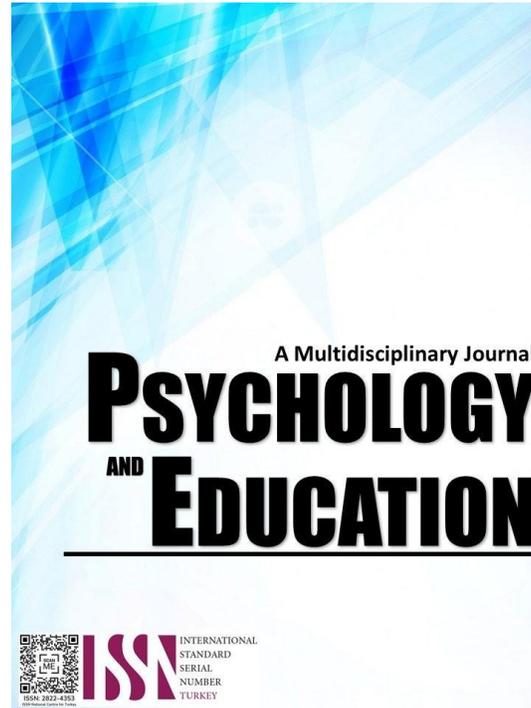# Effectiveness of Contextualized Learning Materials Utilizing Radio-Based Instruction for Blaan Kindergarten Learners

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Abstract

This study employed a single pre-test and post-test design, utilizing purposive sampling to select 26 Blaan Kindergarten learners (15 boys and 11 girls) from Libi Integrated School, Malapatan II District, Division of Sarangani. The sampling technique used experimental single group post-test and pre-test design. The pre-test scores revealed fair performance level while the post-test scores revealed satisfactory, emphasizing the need for targeted interventions. Additionally, by addressing the educational needs of a homogenous group, the study explored how Contextualized RBI catered to the unique cultural and linguistic challenges of Blaan learners. The focused approach ensured practicality and relevance, yielding insights into the effectiveness of RBI as a culturally responsive and linguistically appropriate method for improving academic performance in diverse educational contexts. Based on the data collected, it was concluded that most Blaan Kindergarten learners had fair pre-test scores before the use of contextualized learning materials with RBI, and a significant number achieved satisfactory post-test scores, demonstrating marked improvement. These findings highlighted the effectiveness of RBI in enhancing educational outcomes and addressing the unique learning needs of culturally diverse groups.

Keywords: *educational management, radio-based instruction, contextualized learning materials, Blaan kindergarten learners, experimental, Philippines*

Introduction

The use of contextualized learning materials has gained significant attention as a vital tool for addressing the unique needs of Indigenous learners. However, implementing these materials, particularly through radio-based instruction, faces notable challenges. In many developing countries, Indigenous communities struggle with limited access to the necessary technological infrastructure, which hinders the consistent delivery of engaging educational content. Moreover, language barriers and cultural misalignments often reduce the effectiveness of these materials in improving the educational outcomes of Indigenous learners. These global issues underscore the need for more culturally responsive and accessible education strategies to reach indigenous populations effectively (Escueta et al., 2020).

Nationally, the Philippines has made commendable efforts to promote the inclusion of indigenous learners by contextualizing educational materials. Nevertheless, in remote areas where radio-based instruction is one of the primary accessible learning methods, several challenges persist. The alignment of these materials with the cultural context of Indigenous groups, such as the Blaan, remains a significant concern, as it is crucial for effective educational engagement and understanding. Teachers in these areas often lack the necessary training and resources to develop content that accurately reflects the learners' cultural backgrounds. Furthermore, technical issues such as unreliable radio signals and limited government support continue to hamper the effectiveness of these initiatives, making it difficult to bridge the educational gap for Indigenous students (Valdez & Suarez, 2021).

Locally, in Libi Integrated School, located in Malapatan, Sarangani Province, the use of contextualized learning materials for Blaan kindergarten learners through radio-based instruction has encountered several obstacles. Specifically, the Blaan community's distinct dialect and cultural practices are often underrepresented in educational materials, creating a disconnect between the lessons and the learners. Additionally, challenges such as poor radio reception in the region and the lack of teacher training on culturally sensitive pedagogical approaches have hindered the success of these programs. These difficulties, coupled with the limited resources available to educators and families, exacerbate the challenge of improving learning outcomes for Blaan learners (Basilio et al., 2022).

Moreover, contextualized learning materials, particularly through radio-based instruction, are paramount for the educational development of Blaan learners; yet, a significant research gap exists in understanding their effectiveness for this Indigenous community. While remote learning strategies have gained attention, they often overlook the unique cultural and linguistic contexts of Indigenous groups, such as the Blaan, leaving a critical void in providing equitable and relevant education. Contextualized materials that integrate the Blaan language, traditions, and community experiences foster stronger engagement, motivation, and knowledge retention among learners by creating culturally resonant content. Radio-based instruction serves as an accessible platform in remote areas where conventional educational resources are scarce, enhancing literacy and numeracy skills while also preserving the Blaan cultural identity through education. By addressing this gap, the study aimed to explore the potential of radio-based instruction as a culturally responsive approach to empower Blaan learners and contribute to more inclusive educational policies and practices (Agustin & Manalo, 2020).

Hence, the urgency of this study lay in the need to address educational disparities in remote and underprivileged communities, particularly among the Blaan. With limited access to traditional educational resources, evaluating the effectiveness of radio-based, contextually relevant learning materials was essential for enhancing learning outcomes and engagement. By focusing on culturally tailored content, this research aimed to bridge educational access and quality gaps, specifically in early childhood education.

Understanding the impact of this approach informed broader strategies to ensure marginalized communities received effective instruction, even with limited resources and infrastructure (Batugal & Tindowen, 2020).

Literature Review

Blaan Learners

The Blaan are indigenous people in the Philippines who mainly reside in South Cotabato, Sarangani, and Davao del Sur in Mindanao. Their culture is rich with traditions, including unique weaving, spiritual practices, and oral histories passed down through generations. For Blaan learners, their educational experience is deeply influenced by these cultural aspects, which shape their worldview and approach to learning. Many Blaan children grow up speaking their native language, Blaan, which has become a source of pride for them (Guerrettaz et al., 2021; Herman et al., 2021; Chang et al., 2020).

On the other hand, the language barrier poses a significant difficulty when they enter formal education, as instruction is predominantly in Filipino or English. This language transition often creates a gap in understanding, hindering their ability to engage with the curriculum. Bilingual learners may struggle to express themselves or grasp complex concepts in these new languages, leading to lower academic performance and alienation in the classroom (Constantino-Lane, 2019; Linde, 2020; Tomarong & Rañoa, 2024).

Further, access to education is another pressing issue for Blaan learners. Many Blaan communities are in remote and mountainous areas, far from schools and educational facilities. Children often struggle to attend school regularly due to a lack of transportation and inadequate road infrastructure. Sometimes, the distance is so great that children must walk for hours daily to reach the nearest school. This affects attendance and contributes to higher dropout rates, particularly in secondary education. Economic factors also play a significant role in Blaan learners' educational challenges. Subsistence farming and other forms of physical labor are the primary sources of income for many impoverished families (Ablir, 2022; Phramana et al., 2020; Teves, 2024).

In addition, Blaan learners must also contend with the issue of cultural preservation. Many indigenous peoples around the world, including the Blaan, face pressure to assimilate into mainstream society, often at the expense of their cultural identity. In schools, Blaan learners are exposed to a curriculum that may not reflect their history, traditions, or way of life. This lack of cultural representation can make education irrelevant to their experiences, leading to disengagement (Anele et al., 2019; Prahmana et al., 2021; Soria & Naparan, 2022).

In light of this, the challenge of balancing formal education with cultural preservation is significant for Blaan learners. Traditional knowledge, such as farming techniques, herbal medicine, and spiritual practices, is often passed down informally from elders to the younger generation. These forms of learning are highly valued in Blaan society but are rarely recognized or included in the formal education system. Blaan learners may feel torn between the desire to succeed in school and the need to honor their cultural heritage, leading to an internal conflict that can affect their motivation to learn (Ablir, 2022; Phramana et al., 2020; Teves, 2024).

However, there are efforts to make education more inclusive for Blaan learners. Programs that promote mother tongue-based multilingual education (MTB-MLE) have been introduced in some schools in the Philippines. By bridging the gap between the learners' mother tongue and the national languages, these initiatives enable Blaan children to get an early education in their mother tongue. This approach has been shown to improve comprehension and retention, as children can better grasp new concepts in a language they understand. There are also initiatives to integrate indigenous knowledge and cultural practices into the formal curriculum (Constantino-Lane, 2019; Linde, 2020; Tomarong & Rañoa, 2024).

Indeed, another positive development is the involvement of community leaders and elders in the education of Blaan learners. Elders' involvement in educational institutions can help bridge the gap between traditional and formal education, and they are essential to the preservation and sharing of cultural knowledge. In some areas, elders are invited to share their stories, skills, and wisdom with students, creating a more holistic approach to education that values academic and cultural learning. Despite these efforts, challenges remain (Lee et al., 2019; Budiman et al., 2021; Djou et al., 2022).

Consequently, the Blaan community continues to face marginalization in broader Philippine society, which is reflected in the educational system. Discrimination and prejudice against Indigenous peoples persist, both in and out of the classroom, which can affect Blaan learners' self-esteem and sense of belonging. Schools may not always provide a supportive environment for Indigenous students, and the lack of trained teachers who understand the cultural context of Blaan learners can further exacerbate this problem (Anele et al., 2019; Prahmana et al., 2021; Soria & Naparan, 2022).

Moreover, the lack of resources in schools serving Blaan communities is a significant issue. Many schools in rural areas are underfunded and understaffed, with limited access to textbooks, teaching materials, and other educational resources. This lack of support infrastructure makes it challenging for Blaan learners to receive a quality education, even when they can attend school regularly. For Blaan girls, the situation can be even more challenging. Gender roles in some Blaan communities place additional expectations on girls to help with household chores or care for younger siblings, which can limit their opportunities to pursue education. Furthermore, early marriage is still a common practice in some areas, which can cut short a girl's educational journey. Addressing these gender-specific challenges is crucial to ensuring that Blaan girls have equal access to education and the opportunity to fulfill their potential (Ablir,

2022; Phramana et al., 2020; Teves, 2024).

Hence, Blaan learners face unique challenges in accessing and succeeding in education. These challenges are rooted in language barriers, economic hardship, geographic isolation, and the tension between cultural preservation and assimilation. However, promising initiatives are also aimed at making education more inclusive and culturally relevant for Blaan learners. There is optimism that Blaan students may succeed academically while preserving their cultural identity by addressing these issues and expanding on these activities, ensuring that their legacy is preserved for future generations (Anele et al., 2019; Prahmana et al., 2021; Soria &Naparan, 2022).

The Significance of Radio-Based Instruction

Due to the necessity of switching to virtual learning to stop the spread of the COVID-19 virus, the pandemic presents a serious threat to education worldwide. The issue is that some students reside in rural areas, even though learning in a globalized society should ideally be done online. Diverse physical features, including mountains, lowlands, highlands, and valleys, as well as specific remote locations, make it difficult to connect to the Internet; virtual instruction is one of the more difficult methods (Ablir, 2022; Phramana et al., 2020; Teves, 2024).

For this reason, a flexible and resilient education system is what society needs today, as it faces an unpredictable future. One way is the use of technology, for it offers modern educational tools for learning. Previous research indicates that the integration of instructional technology benefits learners and provides a learning platform, enabling them to take ownership and practice knowledge renewal independently. Similarly, the American Psychological Association has encouraged teachers to consider implementing appropriate technological and instructional practices to facilitate student-centered learning (Lorenzo & Garin, 2023; Zhang et al., 2020; Maraya, 2023).

Accordingly, numerous research studies have found that audio tools like radio positively impact learning and improve students' language and communication skills. Another study suggested that individuals in learning conditions such as print-based correspondence education, broadcast TV, or radio performed better than those receiving face-to-face instruction, such as in-person lectures and group meetings (Maños-Pradilla et al., 2022; Alfonso et al., 2022; Tabasondra, 2023).

Uniquely, radio can provide messages that contribute to audience relaxation and educate them. The arrangement scholars call entertainment education, or edutainment, refers to a program where a station intentionally incorporates educational content into entertainment messages. Additionally, radio has a proven track record of enhancing students' learning and has the potential to be a highly accessible medium for delivering education (Anele et al., 2019; Prahmana et al., 2021; Soria & Naparan, 2022).

In fact, according to the United States Agency for International Development, over the past few years, using radio for instructional purposes has created awareness and understanding in developing countries. It has been among the most widely used methods due to its accurate measurement. Additionally, the Ministry of Education's Strategic Plan 2008-2017 stated that the interactive radio instruction program is designed to be part of a comprehensive, multi-channel learning system at the primary level (Raza, 2022; Quilab & Maata, 2021; Olugbenga, 2021).

Meanwhile, the Philippine government is still dealing with the impacts of the COVID-19 pandemic, and President Rodrigo Duterte's administration is utilizing the Department of Education to develop new teaching methods. Among these is what the Department of Education (DepEd) provided as self-learning delivery modalities, which include Radio-Based Instruction (RBI)as a response to the disruption of classes brought about by COVID-19 and to continue to provide quality education among Filipino learners despite the global pandemic that everyone's experience (DepEd, 2020; Dietrich et al., 2021; Im, 2023).

Furthermore, in the context of DepEd, schools can adopt various modalities, depending on the health restrictions and the context of the learners in the school or locality. One of the four learning modalities is TV/Radio-Based Instruction, which utilizes SLMs converted to video lessons for Television-Based Instruction and SLMs converted to radio scripts for Radio-Based Instruction. The distance learning modality is most viable for independent learners and those supported by periodic supervision from parents or guardians (Constantino-Lane, 2019; Linde, 2020; Tomarong & Rañoa, 2024).

In addition to the responsibilities of parents and teachers, technology has become essential to achieving effective teaching and learning throughout the pandemic. Therefore, providing technology support and resources to learners is an excellent challenge for education officials and advocates in truly addressing the existing learning gaps for the holistic development of every Filipino learner today and beyond. Additionally, the development of the radio component of interactive radio instruction, which includes various multimedia inputs, has adapted to emerging technologies (Edwards et al., 2019; Chatterjee et al., 2020; Cabigao, 2020).

Consequently, radio's relative cost-effectiveness can ensure that access to education, both in formal and informal settings, is maintained even when there is a shortage of trained and experienced instructors because of financial or other restrictions. However, in rural areas, especially in regular and frequent face-to-face classes, organizing them can be challenging due to a lack of teachers and the frequently low attendance of students in higher-level classes. Therefore, educational radio broadcasts can again be utilized to provide continuity during long periods when teachers and students cannot meet, with the advantage of employing the best radio teachers (Damani & Mitchell, 2020; Potane, 2022; Oumarou, 2024).

In a recently conducted online survey, the Department of Education (DepEd) generated more than 700,000 responses nationwide from students, teachers, and parents. The radio proved to be the largest and most widely preferred learning option, especially in areas where adequate learning instructions are hindered by slow internet connectivity. Additionally, in more than 12 years of existence, radio-based instruction has been instrumental to the success of more than 3,000 learners, including out-of-school youth and adults, Persons Deprived of Liberty (PDLs), single parents, rebel returnees, Persons with Disabilities (PWDs), working students, farmers, and Indigenous Peoples (IPs) (Arbutante, 2020; Damani & Mitchell, 2020; Awofadeju & Akintayo, 2023).

Meanwhile, instructional materials are the key to teachers' and students' performance. However, teachers employed different strategies to mitigate the challenges of accessing and utilizing quality instructional materials, such as borrowing books due to the shortage of essential teaching and learning materials. Therefore, it is advisable that the government set aside sufficient funds to increase the availability of educational resources, as they are crucial in helping educators and students avoid lessons that are overly focused on rote learning and recitation (Bukoye, 2019; Imbong, 2021; Ajisafe, 2021).

On the contrary, many parents and educators hold negative attitudes towards interactive devices for learning purposes compared to real-world learning opportunities. Conversely, it has been noted that the impact of interactive devices on children's cognition cannot keep pace with rapid technological advancements. Furthermore, most teachers neither use technology as an instructional delivery system nor integrate it into their curriculum; however, technology instruction effectively enhances educational opportunities (Lorenzo & Garin, 2023; Zhang et al., 2020; Maraya, 2023).

Additionally, researchers have demonstrated that instructional media transmit messages from a teaching and learning perspective, deliver content to learners, and facilitate effective instruction. Similarly, they are vital in the teaching-learning process, as they enhance the ability to read and write correctly, encouraging students to participate in learning and actively recall vocabulary. In turn, contributes to a more meaningful and significant learning experience (Phramana et al., 2021; Ablir, 2022; Teves, 2024).

A recent study found that some 826 million students (50%) were kept out of classrooms due to the pandemic and could not access a computer at home. Around 706 million live in areas not covered by mobile networks. In response, many countries had to quickly find practical solutions and alternatives in a complex online learning situation. Therefore, many countries turned to online-based distance education to ensure that learning continued (UNESCO, 2020; Potawan & Basmayor, 2023; Fontanos et al., 2020).

Moreover, another study identified that instructional media are vital in the teaching and learning, enhancing the ability to read and write correctly, influencing active participation, and improving the ability to remember vocabulary. It is therefore recommended that school administration should ensure a good supply of various media resources and teachers training on how to use media resources effectively and increase those media that are perceived as inadequate since both pupils and teachers recognize instructional media to be vital in the learning-teaching process (Gill et al., 2024; Bugaoisan, 2021; Kwon et al., 2024).

In addition, most research concluded that using traditional teaching methods with integrating technology instruction programs significantly outperformed those students taught without exposure to the programs. Similarly, it argued that teaching using various instructional materials improved learners' performance in various learning activities, including the ability to write dictated words. Therefore, it is open to question whether instructional media play a vital role in learning any subject matter because academic achievement and instructional media seem inseparable (Fugate, 2019; Huang et al., 2020; Obiyemi et al., 2022).

However, most educational opportunities are concentrated in urban and suburban regions, and children in rural areas often have access to instructors who lack proper training and abruptly quit their jobs. Thus, International organizations started paying particular attention to documenting education responses in crises and emergencies. According to UNESCO's Education 2030 luncheon Declaration and Framework for Action, nations should establish equivalency and bridging programs that are acknowledged and accredited by the state to ensure flexible learning in both formal and informal settings, including emergencies, and offer alternative forms of education and learning for children and adolescents who are not enrolled in educational institutions (Sanusi & Oyegoke, 2024; Cervantes, 2023; Sarker et al.,2019).

Currently, research indicates that instructional technology is a valuable tool not only in schools but also in agriculture, particularly for farmers in rural and underserved areas. Through platforms such as interactive radio, mobile apps, and social media, farmers can access timely information to enhance their practices. These tools help spread modern techniques in crop management, pest control, and climate-smart farming, boosting productivity and sustainability. They also promote eco-friendly methods by providing educational content aligned with environmental conservation (Komodromos, 2021; Improgo et al., 2023; Nenghwanya, 2020). Accordingly, there is a need for sustainable, considerate, and flexible stakeholder collaboration, including governments, implementing partners, teachers, parents, and students.

According to them, practical cooperation required constant dedication and adaptability from all parties, both during and after the crisis, and the capacity to change course in response to shifting circumstances and successfully broaden the multi-stakeholder network. Further, it is firm that the primary objective in this circumstance is not to recreate a robust education ecosystem but rather to provide temporary access to reliably available instruction during an emergency or crisis. Thus, this change is inevitable as the current COVID-19 situation demands it for the safety of students and the teaching staff (Hodges et al., 2020; Czerniewicz, 2020; Osorio et al., 2019).

As a result, instructional designers may assist educators in determining how to effectively integrate technology into their lessons and maximize the benefits of distance learning. There is a potential for the digital learning environment to enhance capacity, creativity, collaboration, autonomy, and personalization. It enhances learning-focused interaction and creative thinking abilities. Additionally, technology can easily transform traditional lecture-based pedagogy into a modern digital learning environment (Sanusi & Oyegoke, 2024; Cervantes, 2023; Sarker et al., 2019).

Similarly, when discussing the role of radio in classroom-based language-related learning, it was argued that the absence of visual imagery on the radio inspires students to construct complex stories using just words. Therefore, without distracting visuals, a medium such as radio can help pupils think more intently about words. It is also important to remember that, despite the apparent emphasis on radio usage for language-related learning and arithmetic, there are examples of radio use in other subject areas (Bukoye, 2019; Imbong, 2021; Ajisafe, 2021).

To effectively utilize the advantages of technology in education, it should be included in curriculum creation at every stage, including input, process, and delivery modalities. Continuous reform and transformation are essential for teaching-learning, particularly through modern technology, to ensure a better educational experience. Therefore, leveraging technology is an essential part of every learning mode (Aquino, 2024; Islam et al., 2022; Magnaong et al., 2023).

In particular, previous research by the author revealed that learners tend to have a strong bond with ICT. Today's children are exposed to technological tools from a tender age worldwide. Therefore, since radio's debut, its ability to educate students without or with restricted access to teachers has been acknowledged. Additionally, it is emphasized that audio information, particularly when broadcast on the radio, helps families and community members better understand what their children are learning. If their children are illiterate, they might not otherwise comprehend what they are learning (Edwards et al., 2019; Chatterjee et al., 2020; Cabigao, 2020).

Contextualized Learning Materials

Contextualized instructional materials or supplementary learning resources, made possible through the use of technology, enable learners to develop the competencies essential for education and learning. The ideal people to create these extra learning resources are teachers. They are ideally suited to create a collection of instructional resources that help students grasp learning abilities (Jimenez, 2020; Sambayon et al., 2023; Manlapaz et al., 2022).

In the Philippines, former President Benigno S. Aquino III said, "We should become tri-lingual as a country. Learn English well and connect to the world. Learn Filipino well and connect to our country. Retain your dialect and connect to your heritage." Additionally, Former DepEd Secretary Armin Luistro stated that using the language spoken at home in the early grades helps improve pupils' language and cognitive development while also building their sociocultural awareness. Furthermore, Local and International studies have cited that using the mother tongue during learners' early years of schooling may produce better and faster results and can easily facilitate the learning of a second and third language (Saryati & Yulia, 2019; Dewi & Primayana, 2019; Buhungo et al., 2023).

Accordingly, the Philippine Constitution of 1987 states that in Kindergarten, learners learn the alphabet, numbers, shapes, and colors through games, songs, and dances in their mother tongue, and they learn best through their first language. Therefore, the learning environment should maintain connections between communities to promote patriotism among learners, enabling them to recognize the information about their community, including its history, culture, and traditions. In addition, the learner's mother tongue shall be the primary medium of teaching and learning (Chen et al., 2022; Oumarou, 2024; Hyun et al., 2020).

In connection with this, an instructional approach has been designed to connect basic skills and work-related content by focusing directly on concrete applications in a specific context. Anchored to the curriculum and local information, the process of relating content involves localization, utilizing materials available in a particular community. On the other hand, indigenization is a way of enhancing learning competencies about the biogeographical, historical, and sociocultural context of the learner's community, guided by the standards and principles adhered to in the curriculum (Ilyas & Liu, 2020; Kristidhika et al., 2020; Nurlinda et al., 2024).

Accordingly, it was stated that the meaningful lessons brought about by understanding concepts, delivered in the mother tongue, empowered pupils to develop self-confidence and more actively participate in classwork, not only on a personal level but also on a broader scale. Thus, to address the problems related to learner diversity, using contextualized data in teaching is an effective strategy for both teaching and learning. Additionally, research has shown that contextualizing lessons benefits students' learning and makes it more relatable (Ulandari et al., 2019; Lin et al., 2020; Siagan et al., 2019).

Moreover, creating contextualized, localized, and genuine teaching materials can help students achieve better academic results. He also emphasized that learning occurs through social practices, and these social practices shape learners' constructions of their learning outcomes, both within and outside of school settings. Additionally, contextualized learning materials are helpful because they make learning relevant, engage and motivate hard-to-reach pupils, increase their confidence and enthusiasm, and enhance their interest in long-term goals and education (Peranginangin et al., 2019; Funa & Talaue, 2021; Sailer et al., 2021).

On the other hand, establishing an integrated system of education relevant to the needs of the people and society is one of the aims of the society, as stated in the 1987 Philippine Constitution. The learning environment should foster connections between communities to promote patriotism among learners. Learners should be familiar with all the information about the community they belong to, including

its history, culture, and traditions. Contextualized teaching and learning resources are also a potential collection of tactics and methods that actively engage students to encourage and enhance learning and skill development. Additionally, learning can improve learners' outcomes and academic achievement (Chen et al., 2022; Olugbenga, 2021; Hyun et al., 2020).

As stated in Republic Act 10533 or the Enhanced Basic Education Act of 2013, the DepEd should cling to the accompanying norms and standards in building up the improved fundamental training educational programs: the educational modules might be culture-sensitive, the educational modules might be contextualized and global, the educational modules might utilize academic methodologies that are constructivist, inquiry-based, reflective, collaborative and integrative, and the educational modules might hold fast to the standards and structure of Mother Tongue-Based Multilingual Education (MTB-MLE) which begins from where the learners are and from what they knew continuing from the known to the obscure; instructional materials and fit teachers to actualize the MTB-MLE educational programs should be accessible (Lee et al., 2019; Budiman et al., 2021; Djou et al., 2022).

Furthermore, the DepEd Order No. 32 s. 2015 entitled "Adopting the Indigenous Peoples Education Curriculum Framework," the school should perceive the privilege of Indigenous People groups to fundamental instruction that is culturally rooted and responsive; the IPEd Curriculum Framework looks to give guidance to schools and other training programs, both public and private, as they draw in with indigenous groups in localizing, indigenizing, and enhancing the K to 12 Curriculum in light of their respective educational and social settings (Lestari et al., 2021; Us Saqlain et al., 2020; Ghonivita et al., 2021).

Similarly, to allow Indigenous Mexican teenagers to learn science in a way that supports their right to an education aligned with their own culture and values, a suggested contextualization process based on seven precisely defined contextualization principles has been developed. The contextualization principles are derived from Nahua students' social perception, socialization, and social stories, along these lines supporting Indigenous students in exploring the contrasts between their way of life and the way of life and dialect of school while learning complex scientific ideas (Nur et al., 2020; Sari et al., 2023; Mardatillah et al.,2023).

Indeed, learning materials encompass a spectrum of educational resources that teachers use to achieve their learning goals and objectives. Accordingly, students become more interested and motivated when there is something to use in learning, and learning materials should be tailored to suit their level of comprehension, aligning with the level of development of the learning. Moreover, Several considerations are taken into account when creating learning materials, including linkage with learning outcomes, content, appropriateness, accessibility, storage, and prioritization in the resource environment (Guerrettaz et al., 2021; Herman et al., 2021; Chang et al., 2020).

Moreover, it is also an aid used by teachers to facilitate lessons effectively. It enables teachers to express the intended concepts. The teaching-learning process becomes more engaging when pupils use reasonably sized learning materials that are easily accessible to them. Creating learning materials means that the teacher does not have to depend on other organizations or people. It is a more effective way to discover new information, ensuring that learning materials are relevant to the pupils' needs (Tai et al., 2022; Zamzam et al., 2024; Flores et al., 2022).

On the other hand, it can increase the internal motivation of the pupils to learn and sustain their interest. Learning materials should introduce variety and encourage the pupils' thinking skills to work out solutions from different perspectives. The perception of different things is based on visual (40%), auditory (25%), tactile (17%), gustatory (3%), and olfactory (15%) senses. Moreover, she mentioned that learning materials can be used to facilitate learning and make the teaching-learning process effective and impressive. Teachers can utilize it to enhance the effectiveness of their lessons through improved communication and classroom interaction, ultimately achieving their instructional objectives (Govender & Mudzamari, 2022; Ridha et al., 2020; Alhamuddin et al., 2023).

Additionally, learning materials served as an alternative means of communication that teachers used to convey instructional information to students. In developing learning materials, it should not only extend the range of senses that pupils use to learn but also expand the range of materials used to convey information through those senses. Learning materials, therefore, constitute the exchange of media through which information is facilitated between the teacher and the pupils. Learning materials can change the way that students are taught by making learning more individualized, interactive, and self-directed (Nazeer et al., 2023; Suryawati et al., 2020; Maulana et al., 2022).

Based on the collected literature of the study, it is clear that utilizing Radio-Based Instruction for teaching and learning confirms its potential to expand access and increase fairness in both formal and non-formal educational settings while maintaining an emphasis on quality improvement through a development strategy. It serves as a tool for enhancing the quality of interaction and learning that occurs within them. It also works to integrate the elements of teaching and learning by building on resources that are already available, such as teachers, local songs, games, and activities, as well as other students, community members, and locally available materials, in particular ways that have been associated with good teaching and learning practices.

Furthermore, radio-based instruction, which utilizes contextualized teaching and learning materials, can provide learners with learning opportunities by engaging their thinking processes. It is because the context of their everyday lives is related to the topic being discussed, aligning with the given curriculum. Although it can be laborious for the teacher, as they must have extra preparation for the lesson to be executed, it can also benefit them, as the topics are integrated with what they already know.

Meanwhile, the construction and validation of contextualized learning materials for Blaan kindergarten learners using radio-based instruction involves several key steps. After a needs assessment to determine educational needs and cultural insights, interesting material that complies with curricular standards is created. To guarantee efficacy and cultural relevance, changes are made based on expert assessments following a pilot test and feedback gathering.

Moreover, the evaluation of contextualized learning materials for Blaan kindergarten learners includes pretests and post-tests to assess learning outcomes. Clear learning objectives guide the design of assessments, which are administered in a comfortable setting with instructions emphasizing their purpose as baseline measures. After the pretest, learners engage with the materials through radio-based instruction, followed by the post-test to measure knowledge gains. Results are scored and analyzed for significance, with findings shared with educators and the Blaan community to highlight improvements and strengthen support for the initiative.

In addition, the study's results on contextualized learning materials for Blaan kindergarten learners are supported by recent literature that emphasizes the effectiveness of culturally relevant pedagogy. Research shows that integrating local culture and language enhances engagement and learning outcomes for Indigenous students. Additionally, the success of radio-based instruction in reaching remote communities highlights its role in providing accessible education. This study underscores the importance of culturally responsive teaching and familiar instructional methods in promoting educational equity for Blaan learners.

In a changing and challenging world, innovations have also increased in demand, specifically to continuously improve education and cater to the needs of learners worldwide. In the current situation, the new normal presents a challenge for all, including teachers, students, and parents. While this continues to overwhelm many countries around the world, a transformative learning environment has become a significant challenge for the global educational community. Today, many schools inform us that utilizing the Mother Tongue in contextualizing modules is operational, especially in the K to 12 curriculum used by pupils in grades K to 3.

Hence, this might be one of the answers to the most desired changes in the educational system. Overall, to improve quality education as a fundamental means of generating the basic interactions of teaching and learning, radio-based instruction needs to be continuously introduced as a means of fostering these fundamental interactions, designed to bring together existing local structures into a meaningful system of interactive learning experiences.

Effectiveness of Contextualized Learning Materials

Contextualized learning has been recognized as an essential pedagogical approach that aligns educational content with the learners' cultural and community experiences. The integration of local knowledge and practices into learning materials helps make education more relevant and meaningful, especially for students from diverse backgrounds. Contextualized learning emphasizes the importance of real-world applications in teaching, making lessons more engaging and easier for students to grasp. This method not only enhances cognitive growth but also strengthens the bond between the student and the subject matter (Magliaro et al., 2020).

Furthermore, research has shown that contextualized learning is particularly effective in addressing the needs of indigenous and marginalized learners, who often face cultural disconnects in conventional curricula. For example, the study revealed that students in rural areas perform better when lessons are tied to their local environment, language, and daily experiences. Contextualized learning materials help to bridge the gap between the classroom and the learners' world outside, thereby making the learning process more accessible and relatable. Consequently, this method plays a vital role in fostering inclusivity and equity in education, particularly in multicultural and multilingual settings (Villar et al., 2021).

Next, it is essential to emphasize the distinct advantages of contextualized learning for Indigenous learners, particularly those from remote and underserved communities. Indigenous learners often face educational challenges due to linguistic and cultural barriers in traditional school systems. Contextualized learning materials, which incorporate their languages, traditions, and lived experiences, offer a way to overcome these obstacles. Integrating indigenous knowledge systems into the curriculum can significantly improve learners' engagement, motivation, and academic achievement. For example, when lessons are presented in a learner's native language and reflect their cultural values, students are more likely to participate actively in class and retain information (Agustin & Manalo, 2020).

Moreover, the use of contextualized learning materials also contributes to the preservation of indigenous cultures, which are often threatened by the dominance of mainstream educational practices. Contextualized education not only enhances learners' academic performance but also empowers them by validating their cultural identity within the educational system. It is essential to preserve and protect indigenous knowledge and traditions. By embedding local customs and community knowledge into lessons, contextualized learning supports both the academic and cultural development of Indigenous learners, making education more holistic and inclusive (Reyes & Cruz, 2021).

In addition to contextualized learning, radio-based instruction has emerged as an effective tool for delivering educational content, especially in remote areas where access to formal schooling is limited. During the COVID-19 pandemic, many countries turned to radio as a medium for continuing education, given its broad reach and cost-effectiveness. Radio-based instruction enables educators to broadcast lessons to large groups of students, including those in remote areas, thereby providing a vital lifeline for education during times of crisis. This teaching strategy can be particularly beneficial when combined with contextualized learning materials that take

into account students' language and cultural backgrounds (Valdez & Suarez, 2021).

For indigenous learners, radio-based instruction has the potential to overcome geographical and infrastructural barriers that hinder access to education. Radio can deliver lessons to communities where internet access and educational resources are scarce. By incorporating contextualized learning into radio-based instruction, educators can make education more accessible to Indigenous learners, such as the Blaan community in the Philippines. Incorporating cultural components into radio shows ensures that the information is relevant to the cultural context of the listeners while also helping to sustain engagement (Escueta et al., 2020).

However, the benefits of contextualized learning and radio-based instruction are clear, and several challenges persist in their implementation. One of the primary issues is the lack of teacher training in developing and delivering contextualized learning materials. Many educators, particularly in rural and underserved areas, have limited exposure to culturally responsive pedagogy and may struggle to adapt standard curricula to the needs of their students. Programs for teacher professional development that equip educators with the knowledge to design and implement contextualized learning resources are desperately needed. Without adequate training, even the best-designed materials may fail to have the desired impact on learners (Batugal & Tindowen, 2020).

Moreover, logistical challenges such as poor infrastructure and limited access to technological resources also impede the effectiveness of contextualized learning, especially when delivered through radio. In regions like Sarangani Province, where radio-based instruction is a key method for reaching indigenous learners, issues such as poor signal reception and the lack of radio equipment can limit the accessibility of lessons. These barriers highlight the importance of government and community support in providing the necessary resources for successful implementation. Without addressing these systemic challenges, the full potential of contextualized learning materials cannot be realized (Basilio et al., 2022).

The Role of Contextualized Learning in Early Childhood Education

Contextualized learning is crucial in early childhood education, particularly for Indigenous communities. Early childhood is a critical period for social and cognitive development, and incorporating culturally appropriate teaching methods into a child's education can have a lasting impact. Studies show that children who experience contextualized learning build stronger skills in reading and math while also feeling more connected to their culture. It is essential for Indigenous students, who may feel disconnected in traditional school settings. Contextualized learning materials create a welcoming environment, making learning more engaging and meaningful (Maulana & Arli, 2022).

Research also shows that early exposure to contextualized learning improves long-term academic success. Children who learn with culturally relevant materials tend to do better in school and are more likely to stay in school. It highlights the need to incorporate contextualized learning in early education for marginalized groups, such as the Blaan. By making early education more culturally meaningful, students gain better academic skills while also helping to preserve their cultural traditions (Nazeer et al., 2023).

However, there are still gaps in research on how contextualized learning affects young indigenous learners. While previous studies have shown its benefits, there is limited data on how these learning materials influence student engagement and academic performance, particularly through alternative methods such as radio-based instruction in geographically isolated or resource-limited settings. Further research is needed to bridge this gap and demonstrate the effectiveness of culturally relevant, community-rooted teaching strategies in early childhood education among Indigenous populations.

On the other hand, Vygotsky's sociocultural theory (1978) supports this study by emphasizing the importance of cultural tools in the learning process. Learning is most effective when it is connected to a student's cultural and social environment. Contextualized materials help bridge the gap between what students already know and new academic ideas. In radio-based instruction, culturally adapted lessons connect traditional knowledge with modern education, making learning more accessible and engaging for Indigenous students.

This study aims to address the research gap by exploring how contextualized learning materials and radio-based instruction impact engagement and academic performance among Blaan kindergarten students. By highlighting the value of culturally relevant teaching through radio, this research underscores the importance of inclusive, equitable, and effective early education strategies for Indigenous learners in remote and underserved communities.

Methodology

Research Design

This study utilized a matched single-group design with repeated measures, specifically a pretest-posttest approach, to assess the effectiveness of contextualized learning materials on the academic performance of Blaan Kindergarten learners. This design, as described by Byiers et al. (2021), is particularly effective when working with a single section of students, especially when the number of respondents is fewer than one hundred. The focus on a single group allows for a controlled evaluation of the intervention's effectiveness without the complications that might arise from comparing multiple groups.

The experimental single pretest and post-test design is a research approach in which subjects are assigned to either a control or

experimental group, and measurements of the dependent variable are taken before and after an intervention. The pretest served as a baseline measurement, establishing the initial level of the variable, and the post-test was used to assess any changes resulting from the intervention. The researcher gained insight into the effectiveness of the intervention by comparing the pretest and post-test results of the two groups to see how the intervention affected the dependent variable.

In this study, the process began with administering a pretest to measure the learners' initial academic performance in their Mother Tongue before they were exposed to the contextualized learning materials. This pretest serves as a baseline, providing valuable data on the learners' proficiency levels prior to the intervention. Following the pretest, the respondents engaged with the contextualized learning materials, which were designed to make learning more relevant and engaging for them.

Once the learners completed the activities involving the contextualized materials, a post-test was conducted to evaluate any changes in their academic performance. This post-test enabled the researcher to assess the effectiveness of the intervention by comparing the scores from the pretest and post-test. The matched single-group design is beneficial in this context because it simplifies the evaluation process, allowing for direct attribution of any observed changes in performance to the contextualized learning activities.

Respondents

The researcher conducted the study at the community-based Libi Integrated School, one of the schools of Malapatan II District, Division of Sarangani. A school principal headed Libi Integrated School, which has 26 teachers, including a community-based teacher. The community-based school was located in Sitio Slawag, Libi, Malapatan, Sarangani Province. It is a far-flung, mountainous area with a high surface elevation surrounded by forests and nearby hills, which can be easily reached by walking but is hardly accessible by land transportation. Additionally, the majority of residents in the surrounding sitios are members of the Blaan indigenous group, whose cultural and linguistic background has significantly influenced the design of this study's instructional approach. Currently, the community-based school has a single kindergarten class comprising 26 pupils, which is taught by a single permanent teacher. Given the school's remote location and its predominantly Blaan population, it provided a meaningful and relevant setting for implementing contextualized learning materials through Radio-Based Instruction (RBI) aimed at improving educational access and outcomes among Indigenous learners.

Instrument

Table 1 shows the item analysis results, focusing on the difficulty and discrimination indices of each test item. The difficulty index indicates how easy or hard an item is, while the discrimination index measures how well it distinguishes between high- and low-performing pupils. In interpreting the results, both factors were considered to ensure that each item accurately reflects learners' understanding. Items that were neither too easy nor too difficult and that effectively identified differences between fast and slow learners were retained. This approach helped ensure the reliability and validity of the assessment tool.

Table 1. *Index of Discrimination and Difficulty of Test Item*

x of Discrimination	*Item Evaluation*
0.19 and below	Poor
0.20 – 0.29	Marginal
0.30 – 0.39	Good
0.40 and above	Very Good
Index of Difficulty	*Item Evaluation*
0.00 – 0.20	Very Difficult
0.21 – 0.40	Difficult
0.41 – 0.60	Moderately Difficult
0.61 – 0.80	Easy
0.81 – 1.00	Very Easy

The learners' answers were analyzed to create a final 30-item test based on the prescribed number of items for Kindergarten. The table for item analysis was prepared, and the indices of difficulty and discrimination for each item were computed. Twenty-seven percent (27%) of the Upper (U) group and Lower (L) groups were taken. Thus, the first five (5) and the last five (5) scores were taken among the seventeen (17) pupils. Items with difficulty indices within 0.20 to 0.80 and discrimination indices of 0.30 to 0.80 were retained.

Moreover, analysis of the data revealed that thirty (30) items were consistent in the evaluation. There were eight items as easy- revise, thirteen items as moderate- retain, nine items as difficult- revise, and seventy items as discard. Some items that require revision were noted. The researcher revisited the learning materials, reviewed the instrument, and purposefully modified the unclear items to align with the learning competencies enumerated in the Table of Specifications (TOS).

Additionally, the National Educational Testing and Research Center's (NETRC) standards were used to assess the students' mastery percentage level. This framework provided a standardized method for interpreting the performance levels, enabling the researcher to categorize the learners' proficiency effectively. By aligning the results with NETRC's mastery levels, the researcher was able to provide a meaningful context for understanding the learners' achievements.

In addition to demonstrating the value of the instructional resources employed, this comparison study provides valuable insights into areas that may require further development or modification in the training methods. By systematically analyzing and comparing different approaches, the study identifies specific strengths and weaknesses, allowing for targeted improvements that can enhance learning outcomes. This methodical approach to data analysis increases the validity of the study's conclusions and supports evidence-based recommendations for refining instructional strategies to better meet learners' needs (Gunter et al., 2020).

Table 2. *Mastery Percentage Level as described by NETRC*

Competency Level (Range of Score in Percent Form)	Performance Level
92% and above	Excellent
83%-91	Satisfactory
75%-82%	Average
51%-74%	Fair
25%-50%	Poor
24% and below	Very Poor

Procedure

The researcher followed a structured approach prior to conducting the study. First, the researcher developed the research questionnaire and sought validation from expert reviewers to ensure its accuracy and relevance. Once the necessary corrections were made, the validated instrument was finalized. The second step involved submitting the research proposal to the Ethics and Review Committee for approval. Following this, the researcher sought approval from the Dean of the Graduate School. Eventually, after securing approval from both the Ethics and Review Committee and the Dean, the researcher obtained permission from the Schools Division Office of the Sarangani Division to proceed with the study.

Moreover, the data collection process commenced with securing permission from the Teacher Leader of Rancho Primary School for the pilot testing. After retrieving the test results, the researcher assessed the gathered data, checked and modified items that learners found difficult to understand, and made them more transparent and comprehensible to facilitate better learning. Following this, the researcher coordinated with the School Principal of Libi Integrated School in Malapatan 2 District. Upon approval, the researcher began conceptualizing a study appropriate for the school setting.

Subsequently, the researcher conducted the experimental pretest among Blaan Kindergarten respondents. The lesson was delivered through radio-based instruction, wherein learners listened to the lessons via radio in their respective homes. The researcher facilitated the study's flow and provided instructions to the respondents. The pretest and post-test questions were presented in Filipino. However, the lesson delivery for the post-test was contextualized into the Blaan language. After retrieving the pretest results, the data were collected and prepared for statistical treatment.

Data Analysis

Statistical methods were applied to evaluate the assessment and confirm that the initial draft of the pretest met the required standards.

Frequency counts were employed to process the data collected in response to sub-problems 1 and 2.

The Wilcoxon signed-rank test was utilized, particularly for small sample sizes, as it is suitable for comparing differences between two groups when the data does not follow a normal distribution. This test was used to compare the means of the two independent groups to address sub-problem 3.

Results and Discussion

This section presents the results based on the data gathered throughout the study. The results are organized and presented in tabular form for clarity, with each table corresponding to a specific research question or problem addressed in the study. After the data are presented, the discussion delves into interpretation and analysis, examining the connections between the findings, the study's goals, and the existing body of literature. This comprehensive approach ensures a clear understanding of the significance and implications of the study's outcomes.

Pre-test scores of Learners in Kindergarten

Table 3 presents the pre-test scores of Blaan Kindergarten learners before the treatment. The pre-test scores of the 26 Blaan Kindergarten learners revealed varying performance levels. Of the 26 respondents, only one pupil (3.85%) scored in the average range, with pupil number 19 scoring 24. The majority, consisting of nineteen pupils (73.07%), were considered fair. These pupils (numbers 2, 3, 4, 5, 6, 7, 17, 18, 20, 21, 22, 24, and 25) scored between 15 and 22, ranging from 22 for pupil 2 down to 15 for pupil 17.

On the other hand, six pupils (23.07%) were classified as poor, with scores ranging from 13 to 16. These pupils (1, 10, 13, 14, 23, and 26) scored 15, 13, 13, 13, 16, and 16, respectively.

The mean score for the 26 pupils was 17.23, or 57.31%, which is considered fair.

Table 3. *Pre-test Scores of Blaan Kindergarten Learners Before the Utilization of Radio-Based Instruction*

Pupils	Scores	Rate (scoretotalnumberofitems)	Description
1	15	50	Poor
2	22	73	Fair
3	18	60	Fair
4	19	63	Fair
5	19	63	Fair
6	21	70	Fair
7	17	57	Fair
8	16	53	Fair
9	16	53	Fair
10	13	43	Poor
11	17	57	Fair
12	18	60	Fair
13	13	43	Poor
14	13	43	Poor
15	19	63	Fair
16	18	60	Fair
17	15	50	Fair
18	16	53	Fair
19	24	80	Average
20	15	50	Fair
21	18	60	Fair
22	20	67	Fair
23	15	50	Poor
24	19	63	Fair
25	16	53	Fair
26	16	53	Poor
Mean	17.23	57.31	Fair

Post-test Scores of Learners in Kindergarten

Table 4 presents the post-test scores of the Blaan Kindergarten learners after the treatment.

It was observed that progress was shown. Moreover, it was found that out of 26 respondents, six (23.07%) pupils were excellent during the post-test. They were pupils 3, 8, 12, 14, 16, and 24, who scored 28, 29, 28, 29, 28, and 29, respectively. Meanwhile, sixteen (61.54%) pupils were satisfactory during the post-test. They were pupils' number 2, 6, 7, 8, 9, 10, 11, 13, 15, 17, 18, 19, 20, 22, 23, 25 and 26, who got the scores of 25, 26, 25, 27, 25, 25, 26, 27, 26, 27, 25, 26, 27, 25, 27 and 25. They fulfilled the prerequisites for passing the exam.

Table 4. *Post-test Scores of Blaan Kindergarten Learners After the Utilization of Radio-Based Instruction*

Pupil	Scores	Rate (scoretotalnumberofitems)	Description
1	22	73	Fair
2	26	83	Satisfactory
3	23	93	Excellent
4	27	77	Average
5	25	77	Average
6	28	87	Satisfactory
7	26	83	Satisfactory
8	23	97	Excellent
9	23	90	Satisfactory
10	25	83	Satisfactory
11	25	83	Satisfactory
12	28	93	Excellent
13	25	87	Satisfactory
14	23	97	Excellent
15	26	90	Satisfactory
16	28	93	Excellent
17	24	87	Satisfactory
18	27	90	Satisfactory
19	29	83	Satisfactory
20	24	87	Satisfactory

21	23	70	Fair
22	27	90	Satisfactory
23	24	83	Satisfactory
24	23	97	Excellent
25	26	90	Satisfactory
26	25	83	Satisfactory
Mean	25.92	86.38	Satisfactory

On the other hand, only two (7.69%) pupils were classified as average during the post-test. These were pupils number 4 and 5, who both scored 23. Additionally, only two (7.69%) pupils were categorized as fair: pupils 1 and 21, who scored 22 and 21, respectively.

Generally, the mean score for the post-test of 26 pupils is 25.92, or 86.38%, which is satisfactory. It indicated a significant improvement in the overall performance of the students, with the majority achieving scores above the passing threshold. The high mean score suggests that most pupils benefited from the instructional intervention, demonstrating a solid understanding of the material. The satisfactory performance highlights the effectiveness of the teaching methods or resources used in the study. These results underscore the potential for continued use and refinement of these instructional strategies to further enhance student learning outcomes.

Significant Difference in the Mean Gain Score of the Respondents after the Utilization of Radio-Based Instruction for Blaan Kindergarten Learners

Table 5 represents the significant difference in the mean gain scores of the respondents after utilizing Radio-Based Instruction for Blaan kindergarten learners, as determined by the Wilcoxon signed-rank test. The data revealed that the learners had a mean total score of 17.23 with a standard deviation of 2.73 in their pre-test and a mean score of 25.92 with a standard deviation of 2.10 in their post-test. The Wilcoxon signed-rank test resulted in a W of 0 with a p-value of 0.00. As a result, the null hypothesis was then rejected. Thus, there was a substantial difference between the Kindergarten students' mean gain scores before and after using radio-based instruction.

Table 5. *Significant Difference in the Mean Gain Score of the Respondents After the Utilization of Radio-Based Instruction for Blaan Kindergarten Learners*

Variable	Mean	Standard Deviation	Df	T+	T-	p-value	Decision a = 0.05	Remarks
Pretest	17.23	2.73	n 26	351	0	0.00	Ho: Reject	Significant
Posttest	25.92	2.10						

Hence, there is a significant difference in the performance of Blaan Kindergarten learners when Contextualized Learning Materials Utilizing Radio-Based Instruction were used. The data implied that the Contextualized Learning Materials Utilizing Radio-Based Instruction, as one of the preferred learning delivery modalities, improved the academic performance of the Blaan Kindergarten learners.

Conclusions

Based on the results of the study, it is concluded that first, majority of Blaan Kindergarten learners demonstrated fair pretest scores prior to the implementation of contextualized learning materials combined with radio-based instruction. Second, a significant number of learners achieved satisfactory posttest scores following this instructional approach. Finally, there is a marked improvement in the learners' overall performance attributed to the use of these contextualized materials, indicating their effectiveness in enhancing educational outcomes.

Based on the study's conclusions, several recommendations are proposed to enhance the educational experience for Blaan Kindergarten learners. The use of contextualized learning materials delivered through Radio-Based Instruction holds global significance, particularly in advancing Sustainable Development Goal (SDG) #4 – Quality Education. By integrating culturally relevant content and accessible delivery methods, such interventions ensure inclusive and equitable quality education for marginalized groups, such as Indigenous learners. This approach promotes social value by affirming cultural identity, reducing educational disparities, and fostering lifelong learning opportunities for all.

For the Department of Education, this study highlights the importance of institutionalizing culturally responsive and inclusive teaching strategies, particularly in Indigenous and remote learning contexts. Teachers should be trained to develop and utilize localized instructional materials that reflect learners' cultural and linguistic backgrounds, thereby enhancing the relevance and engagement of the learning experience. Learners, particularly from indigenous communities, stand to benefit from approaches that affirm their identity and support academic growth. The active participation of local communities in the co-creation and support of such educational programs is encouraged. Lastly, future researchers may explore the long-term impact of RBI and other contextualized strategies, expanding this framework across different grade levels and cultural settings.

References

Ablir, I. (2022). Radio based instruction: A modular distance learning teacher supplementary material. International Journal Research

Publication, 102(1).

Ajisafe, I. O. (2021). Radio as a tool for national development. Asian Journal of Education and Social Studies, 14(3), DOI: 10.9734/AJESS/2021/v14 i330354

Alfonso, S., Cabotaje, J. P., Arzadon, L., Peuto, F., &Roylo, C. M. (2022). Radio-based instruction as an alternative learning: Its effectiveness in teaching-learning amidst pandemic. Psychology and Education: A Multidisciplinary Journal, 4(9), 855-859. DOI:10.5281/zenodo.7159501

Alhamuddin, A., Inten, D. N., Mulyani, D., Suganda, A. D., Juhji, J., Prachagool, V., &Nuangchalerm, P. (2023). Multiple intelligence-based differential learning on critical thinking skills of higher education students. International Journal of Advanced and Applied Sciences, 10(8), 132-139. https://doi.org/10.21833/ijaas.2023.08.015

Awofadeju, P. O., &Akintayo, A. O. (2023). Sustaining the educational sector through radio as a learning tool amongst secondary school students during COVID-19 lockdown. International Journal of Intellectual Discourse, 6(1), 135-143. https://ijidjournal.org/index.php/ijid/article/view/378

Barnett, S. (2019). Application of Vygotsky's social development theory.". Journal of Education and Practice, 10(35), 1-4. DOI: 10.7176/JEP/10-35-01

Budiman, A., Samani, M., &Setyawan, W. H. (2021). The Development of Direct-Contextual Learning: A New Model on Higher Education. International Journal of Higher Education, 10(2), 15-26. DOI:10.5430/ijhe.v10n2p15

Buhungo, T. J., Supartin, S., Arbie, A., Setiawan, D. G. E., Djou, A., &Yunus, M. (2023). Learning tools quality of problem-based learning model in contextual teaching and learning approach on elasticity and hooke's law materials. JurnalPenelitian Pendidikan IPA, 9(3), 1092-1098. DOI: 10.29303/jppipa.v9i3.3127

Bukoye, R. (2019). Utilization of instruction materials as tools for effective academic performance of students: Implications for counselling. Department of Counselling Psychology, Faculty of Education and Arts, P.M.B. 11, Lapai 911001, Niger State, Nigeria; https:// doi.org/10.3390/proceedings2211395

Byiers, B. J., Pennington, B., Rudolph, B. N., & Ford, A. L. (2021). Perspectives on the use of quantitative analysis in single-case experimental research. Journal of Behavioral Education, 30, 444-454. https://doi.org/10.1007/s10864-020-09386-2

Chang, C. Y., Kao, C. H., Hwang, G. J., & Lin, F. H. (2020). From experiencing to critical thinking: A contextual game-based learning approach to improving nursing students' performance in electrocardiogram training. Educational Technology Research and Development, 68, 1225-1245. https://doi.org/10.1007/s11423-019-09723-x

Chen, M. P., Wang, L. C., Zou, D., Lin, S. Y., Xie, H., & Tsai, C. C. (2022). Effects of captions and English proficiency on learning effectiveness, motivation and attitude in augmented-reality-enhanced theme-based contextualized EFL learning. Computer Assisted Language Learning, 35(3), 381-411. https://doi.org/10.1080/09588221.2019.1704787

Costantino-Lane, T. (2019). Kindergarten then and now: Perceptions of ten long term teachers. Early Childhood Education Journal, 47(5), 585-595. https://doi.org/10.1007/s10643-019- 00949-1

Damani, K. & Mitchel, J. (2020). Rapid evidence review: Radio. EdTech Hub, DOI: 10.5281/zenodo.3948149

Davis, A., & Aronoff, N. (2021). Relational cultural theory: The case of Monica. Discovering Theory in Clinical Practice: A Casebook for Clinical Counseling and Social Work Practice, 147-162. DOI: 10.1007/978-3-030-57310-2_11

Devi, K. S. (2019). Constructivist approach to learning based on the concepts of Jean Piaget and Lev Vygotsky an analytical Overview. Journal of Indian Education, 44(4), 5-19. http://ejournals.ncert.gov.in/index.php/jie/article/ view/2553

Dewey, J. (1952). Experience and reflective thinking, learning, school and life, democracy and education. https://doi.org/10.7312/dewe21010-003

Dewi, P. Y. A., & Primayana, K. H. (2019). Effect of learning module with setting contextual teaching and learning to increase the understanding of concepts. International Journal of Education and Learning, 1(1), 19-26. DOI:10.31763/ijele.v1i1.26

Dickinson, D. K. (2021). Beginning literacy with language: Young children learning at home and school. Brookes Publishing

Dietrich, C. B., Polys, N. F., Hearn, C. W., Reid, K., & Sheridan, J. A. G. (2021, July). WIP: Collaborative undergraduate research project to develop a remotely-accessible, open-source, portable, software-defined radio-based antenna range for research, education, and Outreach. In 2021 ASEE Virtual Annual Conference Content Access. DOI: 10.18260/1-2--38073

Djou, A., Buhungo, T. J., Supartin, S., &Arbie, A. (2022). Practicality of learning devices in problem-based learning implementation in contextual teaching and learning approach. JurnalPijarMipa, 17(6), 748-753. DOI:10.29303/ jpm.v17i6.4245

Funa, A., &Talaue, F. (2021). Constructivist learning amid the COVID-19 pandemic: Investigating students' perceptions of biology self-learning modules. International Journal of Learning, Teaching and Educational Research, 20(3), 250-264. https://doi.org/10.26803/ijlter.20.3.15

Ghonivita, Y., Pahamzah, J., Wijayanti, M. A., & Sultan, U. (2021). Improving students' listening skill and vocabulary mastery through contextual teaching and learning. Journal of English Language and Cultural Studies, 4(1), 1-12. DOI:10.48181/jelts.v4i1.10557

Gill, A. A., Alam, M. K., & Khan, M. K. (2024). Effects of agricultural based radio programs on the adoption of innovations by the farmers of Sargodha and Khushab districts. International Research Journal of Social Sciences and Humanities, 3(1), 189-212. Retrieved from https://irjssh.com/index.php/ irjssh/article/view/95

Govender, N., &Mudzamiri, E. (2022). Incorporating indigenous artefacts in developing an integrated indigenous-pedagogical model in high school physics curriculum: views of elders, teachers and learners. Cultural Studies of Science Education, 17(3), 827-850. https://doi.org/10.1007/s11422-021-10076-2

Government of the Philippines.(2020). Department of education.DepEd order no. 012, s. 2020.Adoption of the Basic Education Learning Continuity Plan for School Year 2020-2021 in Light of the COVID-19 Public Health Emergency.

Guerrettaz, A. M., Engman, M. M., & Matsumoto, Y. (2021). Empirically defining language learning and teaching materials in use through sociomaterial perspectives. The Modern Language Journal, 105(S1), 3-20. https://doi.org /10.1111/modl.12691

Hart, B., & Risley, T. R. (2003). The early catastrophe: The 30 million word gap by age 3. American Educator, 27(1),4–9. https://www.aft.org/sites/default/files/periodicals/TheEarlyCatastrophe.pdf.

Herman, B. C., Newton, M. H., &Zeidler, D. L. (2021). Impact of place-based socioscientific issues instruction on students' contextualization of socioscientific orientations. Science Education, 105(4), 585-627. https://doi. org/10.1002/sce.21618

Hudson, C. C., & Whisler, V. R. (2007). Contextual teaching and learning for practitioners. Journal of Systemics, Cybernetics and Informatics, 6(4), 54-58. http://www.iiisci.org/journal/sci/Home.asp

Hyun, C. C., Wijayanti, L. M., Asbari, M., Purwanto, A., Santoso, P. B., Igak, W., & Pramono, R. (2020). Implementation of contextual teaching and learning (CTL) to improve the concept and practice of love for faith-learning integration. International Journal of Control and Automation, 13(1), 365383. DOI:https://dx.doi.org/10.21831/pep.v23i2.28151

Ilyas, I., & Liu, A. N. A. M. (2020). The effect of based e-learning contextual approach on student learning motivation. JurnalPenelitian Pendidikan IPA, 6(2), 184-189. DOI: 10.29303/jppipa.v6i2.425

Im, J. H. (2023).Translanguaging in action: A case study on two Korean students' engagement in translanguaging in radio-based English education. Journal of English Teaching through Movies and Media, 24(4), 41-56. https://doi.org/10.16875/stem.2023.24.4.41

Imbong, R. A. D. (2021). On transistor radios and authoritarianism: The politics of radio-broadcasted distance learning. Techne: Research in Philosophy & Technology, 25(2). DOI: 10.5840/techne2021423137

Islam, A., Wang, L. C., & Hassan, H. (2022). Delivering remote learning using a low-tech solution: Evidence from an RCT during the COVID-19 Pandemic (No. 43). EdTech Hub. https://doi.org/10.53832/edtechhub.0070

Jimenez, E. C. (2020). Contextualized E-learning resource: A tool for stronger academic platform. International Journal of Case Studies in Business, IT, and Education (IJCSBE), 4(2), 110-116. DOI: http://doi.org/10.5281/ zenodo.4018344

Kristidhika, D. C., Cendana, W., Felix-Otuorimuo, I., &Muİˆller, C. (2020). Contextual teaching and learning to improve conceptual understanding of primary students. Teacher in Educational Research, 2(2), 71-78. https://doi.org/10.33292/ter.v2i2.84

Komodromos, M. (2021). Interactive radio, social network sites and development in Africa: A literature review study. Department of Communications, University of Nicosia, Nicosia Cyprus. https://doi.org/10.1108/JEC-06-2020-0111

Kwon, C., Butler, D., Uchidiuno, J. O., Stamper, J., &Ogan, A. (2024, May). Investigating demographics and motivation in engineering education using radio and phone-based educational technologies. In Proceedings of the CHI Conference on Human Factors in Computing Systems (pp. 1-15). https://doi.org/10.1145/3613904.3642221

Lee, O., Llosa, L., Grapin, S., Haas, A., &Goggins, M. (2019). Science and language integration with English learners: A conceptual framework guiding instructional materials development. Science Education, 103(2), 317-337. https://doi.org/10.1002/sce.21498

Lestari, F. P., Ahmadi, F., &Rochmad, R. (2021). The implementation of mathematics comic through contextual teaching and learning to improve critical thinking ability and character. European Journal of Educational Research, 10(1), 497-508. https://www.eu-jer.com/

Lin, C. J., Hwang, G. J., Fu, Q. K., & Cao, Y. H. (2020). Facilitating EFL students' English grammar learning performance and behaviors: A contextual gaming approach. Computers & Education, 152, 103876. https://doi.org/10.1016/ j.compedu.2020.103876

Lorenzo, L. G., & Garin, R. M. (2023). Implementation of radio-based instruction in the province of Tarlac: Basis for improving learning outcomes. PSU Journal of Advanced Studies. http://dx.doi.org/10.46827/ejes.v10i7.4878

Magnaong, M. E. B., Pañares, N. C., &Cabigas, M. E. A. (2023). Normin Learners' performance. In Implementing Distance Learning Delivery Mode. https://doi.org/10.59822/IJEBER.2024.4213

Manlapaz, R., Cabahug, S., & Divina, M. I. (2022). Contextualized based-learning materials: an evaluation to enhance the reading comprehension of the grade 7 students during the COVID-19 pandemic. Psychology and Education: A Multidisciplinary Journal, 6(3), 206-213. https://10.5281/ zenodo.7444558

Maños-Pradilla, M. A., Fernandez, D. L. S., &Tinapay, A. O. (2022). Radio-based instruction in teaching literary criticism. International Journal of Multidisciplinary Research and Publications (IJMRAP), 5(6), 62-67. DOI: 10.11591/edulearn.v18i3.21434

Maraya, F. R. L. (2023). Implementation, utilization, and effects of radio-based instruction towards the academic performance of grade 7 students: Basis for a proposed radio-based education on the go program. European Journal of Education Studies, 10(7). DOI: http://dx.doi.org/10.46827/ejes.v10i7. 4878

Mardatillah, M., Syahid, A., Rustina, R., &Anirah, A. (2023). A learning model of Islamic religious education for instilling religious moderation values in a vocational high school. International Journal of Contemporary Islamic Education, 5(2), 16-31. https://doi.org/10.24239/ijcied.Vol5.Iss2.78

Maulana, A. E., & Arli, D. (2022). Contextualizing lecturer performance indicators to online teaching and learning activities: Insights for application during the COVID-19 pandemic and beyond. Electronic Journal of e-Learning, 20(5), 554-569. https://doi.org/10.34190/ejel.20.5.2644

Nazeer, A., Ali, I., & Ali, W. (2023). An investigation about the perceptions of students and teachers towards the use of communicative language teaching. SBBU Journal of Social Sciences, 1(2), 096-115. DOI:10.5539/ ells.v10n4p40

Nur, A. S., Waluya, S. B., Rochmad, R., &Wardono, W. (2020). Contextual learning with ethnomathematics in enhancing the problem solving based on thinking levels. Journal of Research and Advances in Mathematics Education, 5(3), 331-344. http://journals.ums.ac.id/index.php/jramathedu

Nurlinda, E., Azis, Z., &Nasution, M. D. (2024). Students' mathematical reasoning ability and self-efficacy viewed from the application of problem based learning and contextual teaching and learning models assisted. JMEA: Journal of Mathematics Education and Application, 3(2), 54-61. DOI: https://doi.org/10.30596/jmea.v3i2.20329

Olugbenga, A. J. (2021). Students' attitude and effectiveness of radio educational programmes in Ekiti state during COVID-19 pandemic. Turkish Online Journal of Qualitative Inquiry, 12(10). https://files.eric.ed.gov/fulltext/ EJ1358541.pdf

Osorio, M.F.J., Muñoz, M.C.C., & Bohórquez, I.C.T. (2019). A radio program: A strategy to develop students' speaking and citizenship skills. HOW Journal, 26 (1), 8–33. https://doi.org/10.19183/how.26.1.470

Oumarou, G. (2024). Reforming education via radio lessons for teachers? The promise and problems of distance learning in Cameroon, 1960–1995. Learning, Media and Technology, 49(1), 8-19. https://doi.org/10. 1080/17439884.2023.2244426

Peranginangin, S. A., Saragih, S., &Siagian, P. (2019). Development of learning materials through PBL with Karo culture context to improve students' problem solving ability and self-efficacy. International Electronic Journal of Mathematics Education, 14(2), 265-274. https://doi.org/10.29333/iejme /5713

Potane, J. D. (2022). Design and utilization of television and radio lessons amid COVID-19: Opportunities, challenges and initiatives. International Journal of Social Sciences and Humanities Invention, 9(03), 6862-6873. DOI: 10.18535/ijsshi/v9i03.03

Potawan, A. M., & Basmayor, E. (2023). Challenges to coping mechanism of Arabic language and Islamic values education (ALIVE) teachers in using modular and handheld radio learning modalities. Psychology and Education: A Multidisciplinary Journal, 8(1), 52-60. https://doi.org/10.5281/ zenodo.7807918

Prahmana, R. C. I., Hartanto, D., Kusumaningtyas, D. A., & Ali, R. M. (2021). Community radio-based blended learning model: A promising learning model in remote area during pandemic era. Heliyon, 7(7). DOI: 10.1016/j.heliyon.2021.e07511

Raza, M. (2022). Interactive radio instruction–a legacy of COVID-19 for marginalized adolescent girls of Baluchistan. Journal for Multicultural Education, 16(1), 55-63. https://doi.org/10.1108/JME-01-2022-0003

Richmond, S. (2020). Repurposing Established Radio and Audio Series to Address the COVID-19 Educational Crisis (p.9). Education Development Center. https://docs.edtechhub.org/lib/HFI98LDE

Ridha, S., Putri, E., Kamil, P. A., Utaya, S., Bachri, S., &Handoyo, B. (2020, May). The importance of designing GIS learning material based on spatial thinking. In IOP Conference Series: Earth and Environmental Science (Vol. 485, No. 1, p. 012027). IOP Publishing.

DOI 10.1088/1755-1315/485/1/012027

Robinson, C. D. (2022). A framework for motivating teacher-student relationships. Educational Psychology Review, 34(4), 2061-2094. https://doi.org/10.1007 /s10648-022-09706-0

Sailer, M., Schultz-Pernice, F., & Fischer, F. (2021). Contextual facilitators for learning activities involving technology in higher education: The Cᵇ-model. Computers in Human Behavior, 121, 106794. https://doi.org/10. 1016/j.chb.2021.106794

Sambayon, J., Luceñara, D., Luceñara, C., Bayron, Q., Peñaloga, R., &Larombe, E. (2023). Effectiveness of contextualized learning materials in improving the reading skills and comprehension level of the students. Psychology and Education: A Multidisciplinary Journal, 7(6), 435-445. DOI:10.5281/ zenodo.7702258

Sanusi, B. O., & Oyegoke, N. A. (2024). Adopting radio-based literacy programmes for adult literacy: Prospects and challenges. African Journal of Social and Behavioural Sciences, 14(2). Retrieved from https://journals.aphriapub.com /index.php/AJSBS/article/view/2577

Sari, D. P., Arini, L., &Amaliyah, A. Y. (2023). The influence of contextual teaching and learning (CTL) learning model on students'mathematical problem solving Ability. Jurnal Eduscience, 10(2), 585-594. DOI: https://doi.org/10. 36987/jes.v10i2.4665

Sarker, M.N.I., Wu, M., Cao, Q., Alam, G.M., & Li, D. (2019). Leveraging digital technology for better learning and education: A systematic literature review. International Journal of Information and Education Technology, Vol. 9, No. 7. DOI: 10.18178/ijiet.2019.9.7.1246

Saryati, T., & Yulia, Y. (2019). Contextual teaching and learning approach to supplementary reading materials based on 2013 curriculum. Journal of English Language and Pedagogy, 2(1), 1-7. http://jurnal.ustjogja.ac. id/index.php/ELP

Siagan, M. V., Saragih, S., &Sinaga, B. (2019). Development of learning materials oriented on problem-based learning model to improve students' mathematical problem solving ability and metacognition ability. International Electronic Journal of Mathematics Education, 14(2), 331-340. https://www.iejme.com

Snow, C. E., Burns, M. S., & Griffin, P. (Eds.). (1998). Preventing reading difficulties in young children. National Academies Press. https://doi.org/10.17226/6023

Soria, W. V. N., & Naparan, G. B. (2022). Elementary teachers' challenges and coping strategies in the radio-based instruction and modular distance learning. International Journal of Social Sciences & Educational Studies, 9(2), 240. https://doi.org/10.23918/ijsses.v9i2p240

Suryawati, E., Suzanti, F., Zulfarina, Z., Putriana, A. R., &Febrianti, L. (2020). The implementation of local environmental problem-based learning student worksheets to strengthen environmental literacy. Jurnal Pendidikan IPA Indonesia, 9(2), 169-178. DOI: https://doi.org/10.15294/jpii.v9i2.22892

Tabasondra, E. L. (2023). The effectiveness of one Malungon radio-television/radio-based instruction in the lens of learners in the remote areas of East-Malungon district: A Case Analysis. JPAIR Institutional Research, 21(1), 21-42. DOI: https://doi.org/10.7719/871

Tabors, P. O. (2021). One child, two languages: A guide for early childhood educators of children learning English as a second language (2nd ed.). Brookes Publishing

Tai, T. Y., Chen, H. H. J., & Todd, G. (2022). The impact of a virtual reality app on adolescent EFL learners' vocabulary learning. Computer Assisted Language Learning, 35(4), 892-917. https://doi.org/10.1080/09588221. 2020.1752735

Teves Jr, N. C. (2024). Radio-based Instruction (RBI) Approach to teaching: The lived experiences of teacher-broadcasters in the new normal education setting. Journal of Interdisciplinary Perspectives, 2(5), 1-1. https://doi.org/ 10.5281/zenodo.10887579

Tomarong, J. M., & Rañoa, C. A. (2024). Factors influencing learners discontinuation in the alternative learning system. Asia Pacific Journal of Advanced Education and Technology, 3(2). DOI:https://doi.org/10.54476/ apjaet/78429

Ulandari, L., Amry, Z., &Saragih, S. (2019). Development of learning materials based on realistic mathematics education approach to improve students' mathematical problem solving ability and self-efficacy. International Electronic Journal of Mathematics Education, 14(2), 375-383. https://doi.org/10.29333/iejme/5721

Us Saqlain, N., Shafqat, A., & Hassan, A. (2020). Perception analysis of English language teachers about use of contextualized text for teaching ESP. The Asian ESP Journal, 16(5.1), 275-299. https://doi.org/10.1111/J.1467-9922.2010.00593.X

Valle, N. N., & Valle, L. (2024). Appraisal of the technology and livelihood education-information and communication technology in the new normal. Ho Chi Minh City Open University Journal of Science-Social Sciences, 14(1), 3-11. DOI:10.46223/HCMCOUJS.soci.en.14.1.2769.2024

Yayen, M. & Marensil, M. (2021). Learning thru radio: The effectiveness of radio-based instruction (RBI) to grade 6 pupils and parents

of Barangkas Elementary School. DOI: 10.52589/BJELDP-EATUO5O0

Zamzam, R., Novitasari, D. R., &Suharsiwi, S. (2024). The" E-RAISE Model" exploration of science challenges and cultural values improves learning outcomes. Assyfa Journal of Multidisciplinary Education, 1(1), 27-32. DOI:10.61650/ajme.v1i1.356

Zhang, W., Wang, Y., Yang, L., & Wang, C., (2020). Suspending classes without stopping learning: China's education emergency management policy in the COVID-19 outbreak. Journal of Risk and Financial Management, vol.13, p. 55, pp. 1-6. https://doi.org/10.3390/jrfm13030055

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