

International Journal of Learning, Teaching and Educational Research
Vol. 22, No. 7, pp. 411-433, July 2023
<https://doi.org/10.26803/ijlter.22.7.22>
Received May 4, 2023; Revised Jul 19, 2023; Accepted Jul 22, 2023

Innovation in Early Reading Instruction: The Development of e-Learning Materials in Mother Tongue

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Abstract. Mother Tongue-Based-Multilingual Education has been shown to improve the academic performance of early-grade learners. However, challenges such as inaccessibility and lack of contextualized materials in the mother tongue (MT) have hindered students' full engagement in learning. To address this, a quasi-experimental study was conducted with struggling first-grade learners (n=60) to investigate the effectiveness of researcher-developed e-learning materials for early reading in MT. Instruments used in this study included a researcher-created storyboard for video creation, with its dialogue and storyline; the test questionnaires, adapted from the MT-based Curriculum Guide of the Department of Education in the Philippines, for measuring participants'

reading performance in phonic and word recognition. The pre-test and post-test data were analyzed using mean, standard deviation, and a t-test at a 5% significance level. Qualitative data extracted through interviews were analyzed thematically, while a four-point Likert scale was used to interpret the overall rating of the e-learning materials. The content and ICT experts measured the e-learning materials' validity and effectiveness. The results illustrated e-learning materials like video stories and PowerPoint presentations, developed using the ADDIE (Analysis, Design, Development, Implementation, and Evaluation) model, improved learners' letter-sound and word-blending abilities. Experts rated the materials excellent for technical standards, content quality, and effectiveness. The e-learning materials as a pedagogical intervention in early reading are innovative, interactive, and engaging and can potentially enhance early graders' reading performance. Future research can explore design or layout modification of the materials creatively to enhance learner engagement in early-grade MT instruction.

Keywords: Mother Tongue-Based-Multilingual Education instruction; e-learning materials; early grade learners; reading performance

1. Introduction

Mother tongue (MT) education is a well-established practice in Asian countries and has been found to have a positive impact on the academic performance and self-esteem of grade school learners. In 2012, the Philippines adopted the Mother Tongue-Based Multilingual Education (MTB-MLE) program under the K-12 Basic Education Program. The program is aimed to use the learner's first language as the primary medium of instruction in the early years of education to improve learning outcomes and preserve cultural diversity. The Department of Education (DepEd) has confirmed that language is vital and integral to learning. The MTB-MLE program is integrated into the primary education curriculum, starting from kindergarten up to grade three level, to prioritize the acquisition of the native languages present in different localities (Dagalea, Peralta, & Abocejo, 2022). This paper examines the impact of the MTB-MLE program in the Philippines at the grade one level and investigates the effectiveness of e-learning materials for early reading in MT.

Studies suggest that mother tongue-based (MTB) instruction can lead to higher academic achievement because children learn a familiar language (Tofaris & Thornton, 2018; UNESCO Bangkok, 2008;). Although no conclusive evidence links poor education quality to a lack of MT instruction, research indicates that MT instruction can improve education quality (UNESCO, 2008) and that MTB prepares graduates for lifelong learning and career development (Apolonio, 2022). Williams et al. (2014) argued that teaching in children's MT lays the foundation for developing literacy skills and learning additional languages such as Filipino and English. Several local studies have examined the impact of MT-based multilingual education on student performance. Ricablanca (2014) found positive effects on students' academic performance, while Namanya (2017) found that MT instruction could improve English proficiency. These findings suggest that MT instruction can positively impact academic achievement and language

learning outcomes. Children's potential is often wasted without MT, resulting in educational failure and a lack of development (Mackenzie & Walker, 2015).

Although mother tongue-based education has positive educational impacts, its implementation faces challenges regarding the accessibility of instructional materials and teacher training (Eslit, 2017; Lartec et al., 2014;). Insufficient localized and context-based materials can hinder students' engagement with their lessons, despite the benefits of using MT. Funding for MTB-MLE training and material development is scarce, and teachers may have to bear the costs (Eslit, 2017).

Mackenzie and Walker (2015) agree that the challenges of implementing effective bilingual education for linguistic minorities stem from a shortage of reading and instructional materials in their local or first language (L1). The availability of appropriate instructional materials is often identified as a constraint in developing a localized curriculum (Lone & Efstratopoulou, 2022). This problem was also underscored in other countries such as Papua New Guinea, India, and Africa, resulting in low retention rates, poor reading and writing skills, and a negative impact on teaching practice and literacy development.

Another alarming concern within the MTB-MLE implementation is informed by the Philippines National Achievement Test (NAT) result in 2012, showing the overall national performance of Grade Three learners at 56.98%, with English and reading comprehension at 54.42%. Poor reading performance, particularly in the early years, can lead to difficulty acquiring advanced skills, struggles in other subjects, dropout, and poor test results (Cimmiyotti, 2013; Mwoma, 2017).

The use of ICT in teaching reading has gained popularity in L2 situations. Studies have shown that teaching reading using ICT, such as e-learning websites and WebQuest-based, can activate students' prior knowledge, improve their reading skills and attitudes, and integrate reading with other language skills (Adi Ana & Nitiasih, 2013; Tuan, 2011). In addition, using ICT tools such as Internet applications, video technology, and various computer attachments and software programs has resulted in many positive changes in the educational landscape (Reid, 2002). Nair and Hindle (2013) show that an ICT-enabled education plays a catalyst role in promoting inclusive growth and human development for all. While ICT is increasingly being incorporated into teaching methods (Reid, 2002), there are limited studies that explore its impact on reading instruction in MT education in the Philippines. This study aims to address this gap by investigating the effectiveness of using ICT or e-learning materials for teaching reading in MTB.

1.1 Study's Objectives and Significance

This study aimed to determine the influence of the e-learning materials on teaching reading in the MT among Grade One pupils, and in particular, aimed in particular, at the following:

- (1) Determine the pretest scores of the control and experimental groups before intervention;

- (2) Establish the salient features of the e-learning materials according to Analysis, Design, Development, Implementation, and Evaluation by the teachers and the learners;
- (3) Determine the post-test scores of the control and experimental groups after the intervention;
- (4) Verify significant difference between the pre-test scores and post-test scores when grouped before intervention and after intervention; and
- (5) Establish the impact of using e-learning materials on Grade 1 learners' minimum learning competency in reading.

The null hypothesis proposes no significant difference in pretest scores between the control group, taught using traditional methods, and the experimental group, taught using e-learning materials. The alternative hypothesis, on the other hand, suggests a significant difference in post-test scores between the two groups after the intervention. In testing these hypotheses, insights can be gained on the effectiveness of e-learning materials in teaching reading in MT among grade one pupils.

This study is significant for various stakeholders, emphasizing the importance of developing reading skills in the L1 and the benefits of ICT integration through E-learning materials in MTB-MLE. It aims to address the scarcity of instructional materials and increase reading performance among first-grade *Sinughuanong Bisaya* [Sebuano] speakers. The study's focus on e-learning materials provides a new avenue of research for investigating transferable reading skills from MT to English and other critical issues in the MTB-MLE program.

2. Literature Review

2.1 Theoretical Framework

This study was anchored in three theories. The first is Bruner's Social Interaction theory (Bruner, 1982; Smidt, 2013) which highlights the importance of using MT as a language of instruction, a theory relevant to the current study. Children acquire their MT through conversation and interaction with adults. This sheds light on the challenges learners face when the language of instruction in schools, usually English, differs from their home language.

The second theory describes Edgar Dale's Cone of Experience, which supports technology use in classroom instruction through audiovisual materials that provide vivid and memorable experiences for learners (Schifter, 2016). Dale's theory has been widely used in education in our understanding of learning and why student learning occurs as an application of the Cone of Experience. (Davis & Summers, 2015). It has been used to design effective learning experiences and serves as a useful framework for curriculum development, instructional materials design, and selecting teaching methods that promote active and experiential learning.

Unfortunately, the prevailing dilemma in implementing MTB-MLE is the scarcity of learning resources, not only books but also ICT-based materials (Cabansag, 2016; Cansino, 2023). This is brought about by the limited funding given to

schools. Hence, this concept stresses the need to develop MT-based learning and reading materials. Jeanne Chall's Theory of Reading Development (1983, as cited in Resnick & Weaver, 2013), the third theory, presents a reading model that distinguishes between the quality of reading, the complexity of the books that can be read, and the applications of reading at various stages of development. Chall identifies six stages: prereading; initial reading or decoding; confirmation, fluency, and ungluing from print; reading for learning the new; multiple viewpoints; and constructing and reconstructing a worldview.

The grade one pupils are at the initial reading, writing, and decoding stage (Stage 1), where children aged 6 to 7 learn the relationship between letters and sounds and how print corresponds to spoken words. Children at this stage can read simple texts containing high-frequency and phonically regular words and use decoding skills to read unfamiliar words. Their writing skills progress from scribbling to controlled scribbling and non-phonetic letter strings, and they are encouraged to write about familiar words and use invented spellings to promote beginning writing. (The Literacy Bug, 2018; Westberg, McShane, & Smith, 2006;).

The fourth is based on Mishra and Koehler's (2006, as cited in Mishra, 2019) Technological Pedagogical Content Knowledge (TPACK) Model, a framework for integrating technology in education and structuring classrooms for optimal learning experiences. The model guided the use of e-learning materials in teaching MT reading through a storytelling strategy in presenting the lesson about *Kaka*, which was aligned with the Pedagogical Content Knowledge. Integrating a video story to present the topic of *Kaka* reflects Technological Content Knowledge while combining the video story as technology and the storytelling as strategy shows Technological Pedagogical Knowledge.

2.2 Mother Tongue-based - Multilingual Education

As defined by the Department of Education (DepEd) in the Philippines, MTB-MLE is an educational approach that uses the learner's MT and additional languages in the classroom, resulting in stronger literacy abilities and knowledge transfer. Through Department Order 74. S, 2009, Mother Tongue-Based Multilingual Education (MTB-MLE) was institutionalized and adopted in 2012 (Cansino, 2023) and has been implemented in two modules: subject area and medium of instruction (MOI). As a subject, it focuses on developing listening, speaking, reading, and writing from Grades 1 to 3 in MT. As an MOI, MT is used in all learning areas from kindergarten to Grade 3, except in teaching Filipino and English subjects. This approach promotes inclusion in education and improves the quality of education by building on learners' and teachers' knowledge and experience (DepEd, 2018).

According to UNESCO, MT instruction in the early years is essential to quality education as it allows young learners to express themselves freely, articulate their thoughts, and add new concepts to their existing knowledge (MacKenzie, 2009). Using MT positively affects cognitive development and other academic areas, and pupils who have learned to read and write in their first language acquire competencies more quickly (DepEd Order No. 74, s. 2009). Furthermore, appropriate language in education enables teachers to instruct on the language a

child speaks most at home and understands well enough to learn academic content through MT, thereby promoting effective learning (Ricablanca, 2014) and while MT instruction promotes inclusivity and improves the quality of education.

2.3 ICT Use: Strategy to Improve Reading Performance

Technology has become integral to teaching and learning, integrating ICT tools into the curriculum and impacting student learning (Reid, 2002). Bolstad (2004) identified various ICT resources such as digital cameras, computer hardware, and the Internet. Using ICT as a dynamic learning method provides more benefits than traditional blackboard and chalk learning (Kaur, 2023). When teachers are digitally literate, using ICT tools for communication, creation, dissemination, and information storage can positively impact student learning. Various educational tools, including interactive exercises and games, can promote student learning motivation (Gee, 2003; Mayer, 2011), while animations or cartoons can improve students' reading fluency (Anestin, 2015). Storytelling or video story is an effective strategy for enhancing communication and reading skills (Miller & Pennycuff, 2008). Children are drawn to cartoons due to their captivating visuals, characters, and educational content (Baran & Davis, 2009; Habib & Soliman, 2015). Using technology in reading instruction is crucial for all students, as it can increase motivation and improve learning outcomes, particularly in the digital age.

3. Methodology

3.1 Design

The study utilized a quasi-experimental design (QED), incorporating a matching-only pretest-post-test control group design. Quasi-experimental research designs, as the name suggests, use nonexperimental (or non-researcher-induced) variation in the main independent variable of interest, essentially mimicking experimental conditions in which some subjects are exposed to treatment, and others are not (Gopalan, Rosinger, & Ahn, 2020). Matching participants in the control and experimental groups based on their reading performance was to minimize extraneous variables and ensure internal reliability. The experimental group received e-learning materials, while the control group received traditional teaching methods.

3.2 Locale and the Participants

The study was conducted in a public elementary school in Northern Mindanao that implements the MTB-MLE program, with the school's computer room and smartboard. The school was selected based on its reputation as a top-performing school in the area based on the early grade reading assessment (EGRA) results, with high-performing grade one learners but also non-readers and frustrated readers.

Through purposive sampling, the study selected 60 first-grade non-reader or struggling learners (two sections with 30 each). The teachers observed that the learners had a limited understanding of English, their L2, compared to students in other classes who were more advanced in literacy skills which could be due to

exposure to a literacy-rich environment at home. Selecting participants was based on pretest scores to ensure similar characteristics between the control and experimental groups. The study focused on first graders as this is when formal reading instruction begins, and the MTB-MLE curriculum introduces MT as a subject (Kalb & van Ours, 2013; Leahyl & Fitzpatrick, 2017; The Literacy Bug 2018;). Many of the chosen pupils struggled with following instructions and expressing themselves in English, making the use of MT as a medium of instruction (MOI) necessary.

3.3. Instruments

This study used several instruments, such as computers, and a smart board, as ICT tools used by the researcher's video story, and descriptions of the dialogue and storyline. Another instrument was the pretest and post-test questionnaires adapted from Learning Material for Grade 1 MTB-MLE to measure participants' reading performance in phonic and word recognition and determine the effectiveness of the e-learning materials. A rubric adapted from Paloma (2012) was used to measure the validity and effectiveness of the e-learning materials in terms of content and technical aspects. Interview questions were also used to assess learners' perceptions of the e-learning materials.

3.4. Procedure and Data Gathering

The ADDIE Model, a popular instructional design framework used in education and training (Rizal, Rusdiana, Setiawan, & Siahaan, 2021), provided the framework for the data gathering. ADDIE stands for Analysis, Design, Development, Implementation, and Evaluation.

Phase 1: Analysis. This stage involved needs analysis, target audience analysis, and topic and content analysis. This study was motivated by teachers' concerns about the lack of appropriate reading and learning materials in mother tongue-based education which can contribute to educational failure and high dropout rates, particularly among early-grade learners (Ricablanca, 2014). Primary-level teachers selected sections where most learners were non-readers or frustrated readers, using the Early Grade Reading Assessment (EGRA). A pre-test was conducted for word recognition skills based on the letter and sound of Kk and the blending of letters to form syllables and words. The sound /k/ is unique and can pose challenges for young readers regarding tongue placement (The Center for Speech and Language Development (2018).

Phase 2: Design. The study's learning competencies (noting details in grade-level narrative texts and blending letters to form words) were based on the Grade One MT Curriculum (2016) and Teacher's Guide. The topic and content focused on the letter and sound of /Kk/, identified as difficult to recognize due to its low frequency of use in MT conversations (Imperial, Ya-On, & Ureta, 2019).

Phase 3: Development. Materials were created using Adobe Photoshop, Flash, and Sony Vegas for image creation, animation, and video production, with the storyboard utilizing graphics related to the story of *Kaka*. Then a PPT presentation was made using Microsoft programs, and both materials were presented on consecutive days.

Phase 4: Implementation. Offline delivery of the e-learning materials to grade one learners was facilitated using a laptop, projector, speaker, and white screen. The first material included a video story, differentiated activities, and a question-and-answer session. The material incorporated a modelling activity, oral and group reading, and letter-blending exercises.

Phase 5: Evaluation. Grade One learners evaluated the video story through interviews conducted by the teacher and underwent post-test.

The pretest was administered individually to selected learners in a computer laboratory setting, and consisted of two parts with five items each. The first part had photos of animals and objects beginning with the letter k, and below each photo was a word with a missing initial letter. The second part had photos with missing initial syllables. The teacher asked “*Unsa ang una nga silaba sa pulong nga kahoy?* [What is the beginning syllable for the word *Kahoy* (tree)?]”. Pupils were asked to choose the correct syllable from three options and write it to complete the photo’s name. The post-test was administered to check learners’ word recognition skills, such as identifying the letter-sound correspondence of the letter /Kk/ and the beginning syllable *ka*.

3.5. Coding & Statistical Treatment

ICT and content experts evaluated the MT e-learning materials based on the technical aspects and the contents, respectively. Pre-test and post-test data were analyzed using mean, standard deviation, and t-test at a 5% significance level. A t-test is a statistical test used to determine if there is a significant difference between the means of two groups. It is commonly used when comparing the means of a continuous variable (e.g., test scores, comprehension test). A paired t-test or dependent t-test was used to determine the pre-and post-test scores of the two groups (controlled and experimental) (Magwilang, 2016). Qualitative data were analyzed thematically with confidentiality through interviews and observations. Moreover, a four-point Likert scale assessed the overall raters’ satisfaction with the e-learning materials. The scale was arranged in sequential order as follows: 4.00-3.25 (Excellent), 3.24-2.50 (Very Satisfactory), 2.49-1.75 (Satisfactory), and 1.74-1.00 (Needs Improvement), with an interval of 0.74 or 0.75, indicating a consistent interval size between the response options. The ICT experts’ ratings were based on four items: content accuracy, information sequence, spelling and grammar, and effectiveness. Meanwhile, the content experts assessed the e-learning materials based on three items: objective and content, design and layout, and strategies.

4. Results and Discussions

4.1 Pretest Scores of the Control and Experimental Groups Before Intervention

The pretest was administered individually to selected non-reader grade one learners who had to name the picture and write the missing initial letter. In addition, they chose the correct syllable from three options and wrote it to complete the name shown in the photo. Scores are revealed below.

Table 1. Pretest Mean Scores of the Control and Experimental Groups before Intervention

Compared Groups	N	Minimum	Maximum	\bar{x}	SD
pretest control	30	3	10	7.90	1.918
pretest experimental	30	4	10	7.97	1.938

The table indicates similar pretest mean scores for both groups, with most pupils achieving a passing score. The standard deviation for both groups indicates a very slight or negligible deviation in scores. As observed during pretest administration, some grade one pupils struggled with word recognition during the pre-test, particularly with the grapheme Kk and blending letters to form syllables and words, often guessing or writing inappropriate letters for target words with missing beginning letters or sounds. For example, for the target word *kandila* [candle], the pupil wrote /b/ for the missing initial letter /k/, making the word *bandila* [flag] instead of *kandila*. In the second part of the pretest, the target word *kahoy* [tree] has a missing initial syllable, /ka/, and learners resorted to guessing from the three choices (la, ka, sa), making the word *sahoy* instead of *kahoy*. According to international researchers, phonics, a widely acknowledged useful strategy for early literacy, could potentially address these difficulties (Ehri, 2020; Yap & Chin, 2020).

4.2 Salient Features of the e-Learning Materials

4.2.1 Analysis Stage

The e-learning materials focused on the challenging concept of the letter and sound of /Kk/ for early readers, identified as a difficulty for non-readers and frustrated readers in the study (Imperial et al., 2019). The sound /k/ is produced by releasing air from the mouth and can be challenging for early-grade learners because they may have difficulty placing their tongues correctly at the back of their mouths. The pretest revealed that despite achieving a passing score overall, many pupils struggled with the letter-sound association and blending letters to form syllables and words.

4.2.2. Design Stage

E-learning materials were developed based on K-12 Curriculum and Teacher's Guide. Learning objectives were determined based on the Grade One MT Curriculum Guide (2016).

Table 2. Mapping of Learning Competencies to the Learning Objectives

Domain	Learning Competencies
Listening Comprehension	Noting important details in grade-level narrative text, listened to
Phonics and Word Recognition Domain	Blending specific letters to form syllables and words
Learning Objectives from Teacher's Guide	<ol style="list-style-type: none"> 1. Note details in a story listened to 2. Confirm predictions after listening to a story 3. Respond to the story through the different engagement activities <ol style="list-style-type: none"> a. Act out a portion of the story; b. Draw the spider;

	<ul style="list-style-type: none"> c. Make a character list; and d. Tell the ending of the story 4. Identify specific letters in the alphabet, both upper and lower case of the letter /Kk/ 5. Pronounce the words that start with the letter Kk clearly 6. Show the relationship between sounds and written symbols
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Designed to be interactive and engaging, the grade one e-learning materials were created through video production and storytelling about *Kaka* [spider]. Learning competencies included noting story details, confirming predictions, and responding to the story. The second topic focused on the letter /Kk/, with learning competencies including identifying upper- and lower-case letters, pronouncing words starting with /Kk/, and understanding the relationship between sounds and written symbols. Lessons followed an inductive sequence, beginning with a video story about *Kaka* [spider] and oral comprehension questions that learners answered. The PPT presentation started with the letter sound, and then pupils blended letters to create syllables and produce each sound, combining the sounds together to form a word. The delivery strategy involved projected media such as a laptop, projector, speaker, and white screen. For the evaluation strategy, the materials used a pencil and paper test.

4.2.3. Development Stage

At the development stage, e-learning materials were created, including a video story, PPT presentation, and lesson guide for class activity. The learning objectives of the materials were aligned with the learning competencies taken from the MT Curriculum Guide for Grade One (2016).

A 2-minute video story about *Kaka* was created, following researchers' guides to video length which considered children having a short attention span (Brame, 2015; Brame & Perez, 2016). Using various software, the researcher created a video containing localized, colorful images with clear audio and subtitles. An animator sketched the images using Adobe Photoshop and animated them using Adobe Flash, with audio recorded by a radio broadcaster. The cartoon-like characters were designed to positively influence children's learning and socializing skills (Habib & Soliman, 2015) as children learn from cartoons and often act out what they have learned, influencing their socializing skills (Baran & Davis, 2009).

The researchers created a PPT presentation for the letter and sound of Kk, with word-breaking and word-making activities for early readers, and using big graphics and a conventional font style. The video story (Figures 1 & 2) and PPT presentation were learner-centered and incorporated ICT-based features.



Figures 1 & 2. Screenshots of the e-material

4.2.4 Implementation

On the first day of the lesson guide's implementation, the teacher started by unlocking a difficult word in the video story through picture analysis. The students were asked to identify the animal in the picture, and they answered with *alilawa* and *damang* (MT words for spider). The teacher then asked if they knew another animal's name in *Binisaya* [Sebuano], but when nobody answered, the teacher said, "*Kini nga mananap atuang ginatawag usab nga Kaka. [This is also called Kaka!]*". The class repeated the name of the animal twice. The teacher asked them to describe the animal in the picture and set the intention of why the pupils should watch the video by posing, "*Unsa kaha ang nahitabo sa mga kaka? [What happened to the spiders?]*". After the unlocking activity, the video story (e-learning material 1) was presented to the class twice. As the video started playing, the class was

captivated and exclaimed, “Wow!” The e-learning material caught their interest, and when asked if they wanted to watch it again, they unanimously answered, “Yes, Sir!”

On the second day, the class reviewed the previous lesson and was introduced to a PPT presentation to develop the learners’ word recognition skills on blending sounds with word-breaking and word-making activities and with large-sized images and a familiar font style. The next day, the class practiced writing and tracing the letter /Kk/ and connecting syllables to form words. The final day involved drill reading, identifying pictures beginning with the letter K, arranging words to form phrases, and practicing reading whole sentences. The activities were designed to enhance the learners’ reading skills and improve their ability to form words and phrases.

The teacher presented the video offline using a laptop, projector, speaker, and white screen, facilitated comprehension questions, and grouped the students for differentiated instruction with various tasks such as acting, drawing, making character lists, and predicting the story’s end. The post-activity involved discussing the importance of taking care of animals and the environment, and the students demonstrated their understanding by noting important details and learning important values such as caring for animals and the environment.

4.2.5 Evaluation

4.2.5.1. ICT and Content Experts’ Ratings

Two teams of experts, ICT and Content, evaluated the materials using a rubric adapted from Paloma (2012), shown in Table 3.

Table 3. Ratings of the ICT Experts and Content Experts

Category	ICT Experts		Mean		
	MT1	MT2	Category	MT1	MT2
I. Content-Accuracy	4.00	4.00	I. Objective & Content	4.00	4.00
II. Information Sequence	4.00	4.00	II. Design & Layout	3.60	4.00
III. Spelling and Grammar	4.00	4.00	III. Strategies	3.58	3.92
IV. Effectiveness	4.00	4.00			
Overall Mean	4.00	4.00	Overall Mean	3.73	3.97
Description	Excellent	Excellent	Description	Excellent	Excellent

The ICT experts rated materials 1 and 2 with an average rating of 4.00, indicating excellent technical quality. The materials were accurate and logically organized, free of spelling and grammar errors, and effectively incorporated necessary elements such as text, images, sound, and animation to enable a sound understanding of the subject matter. The Content experts rated the e-learning

materials with high ratings of 3.73 and 3.97, indicating excellent quality and suitability for grade one learners.

The materials effectively met the learning objectives of the Basic Education Curriculum, with engaging activities that connect to the real world. The content was clear, concise, and error-free, while the multimedia presentation was well-structured and easy to follow, utilizing various elements such as text and images with sound and animation to enhance learning. The materials are well-designed and organized, with effective, creative, engaging lesson strategies that capture student interest and foster a participative learning environment. Overall, the evaluation of the e-learning materials demonstrated their excellent quality, highlighting their potential to support student learning and promote the development of critical thinking skills.

4.2.5.2. Learners' Perceptions

The grade one pupils had a positive and engaging experience with e-learning material 1, which included a video story featuring children playing in a *barrio* or community. They were attentive and could relate to the situation, learning valuable lessons about animal and environmental care while enjoying the content in their MT. The PowerPoint (PPT) presentation with colorful pictures facilitated their active participation and learning. The e-learning material effectively engaged and taught the students through relatable content, visual aids, and the use of their MT.

After the 4-day lesson, a focus group discussion (FGD) was conducted, and the learners recalled the video story they watched about *Kaka* and elaborated that the animal is also known as *mga lawa*, *alilawa*, or spider, showing that the materials increase learners' understanding of the lesson. One of the learners shared that a spider: "*kay nagpuyo sa mga kahoy* [lives in trees]." Another also said that the animal "*kay mudako og makita sa supot* [grows big and can be seen from its web]." Such statements illustrate that children could connect their prior knowledge to the lesson. Moreover, they also mentioned that they learned many things that start with the letter Kk and the sound /k/, for example, "*Kris, Karla, bakaw, kanding, kalabasa, kutsilyo*" among others. This demonstrates that the e-learning materials used in the classroom help improve learners' word recognition skills.

During the focus group discussion (FGD), three main themes emerged. The first is related to the lesson sequence in the e-learning materials. Participants found the sequence of events in the video clear and easy to follow. Moreover, they could accurately recount story details in order, indicating that the materials effectively presented the sequence. The second theme that emerged is the content of the e-learning materials. Participants displayed a good recall of the video story's details and improved their word recognition skills by identifying target letter words. The third theme was related to the effectiveness of the e-learning materials. The participants gave positive feedback, finding the colorful images and multimedia elements engaging, and describing the materials as *nindot* [good] or *ayos* [nice]. It was found that the materials effectively captured their interest and attention, leading to a positive learning experience.

4.3 Results of the Post-test after Intervention

After using e-learning materials as an intervention tool, the participants completed a post-test, and the results are shown below.

Table 4. Post-test Mean Scores of the Control and Experimental Groups after Intervention

Compared Groups	N	Minimum	Maximum	\bar{x}	SD
Post-test controlled	30	7	10	9.53	1.008
Post-test experimental	30	6	10	9.50	0.974

The table shows a small difference in the mean scores of both groups after the intervention. The study confirmed the null hypothesis showing no significant difference in the reading proficiency of both control and experimental groups. However, the experimental group's posttest mean was higher than the control group, indicating an increased performance in word recognition (such as identifying the letter-sound correspondence of the letter /Kk/), listening, and comprehension skills using mother tongue-based e-learning materials in teaching. The learners could identify the initial sound /k/ in the word *kanding* [goat] and complete the missing beginning letter. Additionally, they confidently selected the missing beginning syllable "ka" from the given options (la, ka, sa) to complete the word *kahoy* [tree]. Most pupils in both groups achieved scores above the passing rate of 6, demonstrating improved reading skills. This illustrates the potential of using MTB e-learning materials in enhancing early reading skills of grade one learners to improve their letter-sound correspondence and syllable and word blending abilities, although some initial difficulties were observed with word recognition.

4.4 Test Scores

The table below shows the control and experimental groups' pretest and post-test mean scores before intervention. Although the experimental group showed a higher mean than the control group in the pre-test, still the result shows no significant difference. With a computed p-value of 0.894, which is greater than the significance level of 0.05, this means that there is not enough evidence to reject the null hypothesis, indicating that both groups had similar pre-test performances. In the post-test, however, using e-learning materials improved the reading performance of the experimental group, with a mean score of 9.50 compared to the pretest's mean score of 7.97. Furthermore, based on the p-values (0.134 for the pre-test and 0.130 for the post-test), the observed differences between the groups are not statistically significant at the commonly used significance level of 0.05. Results show that since the p-values are greater than 0.05, it suggests that the observed differences between the control and experimental groups during both the pre-test and post-test are likely due to chance.

The study found that e-learning materials were as effective as traditional teaching methods in teaching beginning reading skills. This aligns with the MT Curriculum Guide (Medilo, 2016) for Grade 1 and Chall's (1983) Theory of Reading Development, emphasizing the importance of phonological awareness, letter-sound knowledge, and the ability for phoneme and syllable manipulation.

Table 5. Differences in Test Scores

Compared Groups		\bar{x}	Sd	t-value	p-value	Remark
Pre-test	Control	7.90	1.918	-0.134	0.894	Not Significant
	Experimental	7.97	1.938			
Post-test	Control	9.53	1.008	0.130	0.897	Not Significant
	Experimental	9.50	0.974			

*p> .05

Our study examined integrating e-learning materials in teaching early reading skills in the Mother Tongue. Learners participating in the intervention reported several benefits, including improved word recognition and listening comprehension skills. Incorporating colorful pictures, moving images, and talking comic characters within the e-learning materials created an engaging learning environment. While our results did not show a statistically significant difference between the e-learning intervention and the traditional method, it is important to consider the practical significance and potential advantages of e-learning.

The use of educational technology in the classroom has been shown to increase student engagement and enthusiasm, as supported by previous research (Gee, 2003; Mayer, 2011) and aligned with Dale's Cone of Experience. By leveraging interactive exercises and games, educational technologies offer opportunities for enhanced learning experiences and increased motivation among early-grade learners (Alakrash & Razak, 2020). Learners are highly motivated as easy access to technologies provides them with more learner-centered activities and authentic learning materials (Brunnet & Portugal, 2016). The students reported a better learning environment, peer interaction, and participation in learning compared to the traditional classroom. In our study, the e-learning intervention provided such interactive elements, contributing to a more engaging and learner-centered approach.

It is worth noting that individual learner preferences and needs play a significant role in educational outcomes. While the overall results did not demonstrate a significant difference, it is possible that certain learners may have benefited more from the e-learning approach due to factors such as their learning style or prior experience with technology. This highlights the importance of considering individual differences and tailoring instructional methods to meet diverse learner needs.

The findings of this study address the scarcity of learning materials in MT-based education by introducing new instructional methods that provide learners with rich learning experiences. These methods emphasize the potential of audio-visual materials to offer vivid and memorable experiences and promote motivation for learning (Gee, 2004; West, 2017). In teaching reading, e-learning materials have been found to activate prior knowledge, improve comprehension, integrate

reading skills with other language skills, and foster positive attitudes toward ICT-based instruction (Adi Ana & Nitiasih, 2013). Integrating technology as a fundamental part of reading instruction is crucial, especially for students growing up in the digital age (Capodieci et al., 2004). These findings are consistent with previous research by Brown and Augustine (2001), Flecknoe (2010), and Molster (2016), which highlight the innovative pedagogical methods that technology can offer in enhancing learners' reading skills.

While technology can be a valuable tool in education, it should not be viewed as a substitute for effective lesson design and teaching methods. Ertmer and Ottenbreit-Leftwich (2010) argue that educators should clearly understand how technology can support learning in relation to curriculum goals, student learning outcomes, and teaching philosophies. According to Roblyer and Doering (2007), technology can enhance communication between teachers and learners but cannot compensate for inadequate teaching practices. Therefore, technology should enhance, rather than replace, sound pedagogical approaches.

5. Conclusion

The study's aim was to determine the influence of mother tongue-based (MTB) e-learning materials on teaching reading among grade one learners. Although the study confirmed the null hypothesis, indicating no significant difference in reading proficiency between the control and experimental groups, several noteworthy findings emerged. First, the experimental group's post-test mean was higher than the control group's, suggesting improved performance in word recognition, listening, and comprehension skills when utilizing MTB e-learning materials. This highlights the materials' potential to enhance early reading skills, particularly in areas such as letter-sound correspondence and syllable and word blending abilities. However, some initial difficulties were observed with word recognition. Second, the effectiveness of the MTB e-learning materials was supported by feedback from learners, who found them innovative, interactive, and engaging, conforming to Edgar Dale's Cone of Experience and principles of experiential learning. The evaluations conducted by the content and ICT experts confirmed that the e-learning materials met technical standards and provided high-quality, grade-appropriate content.

Beyond the specific outcomes of this study, the integration of MTB e-learning materials addresses the scarcity of learning materials in MTB education in the Philippines. Therefore, by leveraging the benefits of MTB e-learning materials, we can provide quality education and improve learners' reading proficiency, aligning with the statement by UNESCO (2008) that MT instruction can improve education quality. Finally, integrating these materials can contribute to the overall learners' educational development, as these materials enhance reading and literacy skills and promote a more effective, positive, and engaging learning environment for early-grade learners. The findings of this study corroborate earlier studies that MT instruction, laying the foundation for literacy skills, can prepare students for learning additional languages or English as the second language in the Philippines (Williams et al., 2014), improve English proficiency (Namanya, 2017)

academic performance (Ricablanca, 2014) and even prepares learners for lifelong learning and career development (Apolonio, 2022).

6. Recommendation

The researchers strongly recommend integrating e-learning materials in the MT in teaching grade one learners alongside traditional methods. However, there is a need for further improvement of the video story selection and media elements, such as ensuring more focus on letter Kk words and improving the synchronization of the character's voice and mouth movements, and using bubble dialogue instead of subtitles. Furthermore, the following can be done.

- 1) Teachers should be allowed to modify the activities in the e-learning materials to suit better the needs of their learners and their teaching styles;
- 2) Teachers may provide additional examples and illustrations to supplement the lesson ;
- 3) Additional exercises should be provided to give learners more opportunities to practice their skills;
- 4) Teachers may ask stimulating questions to help pupils connect the lesson to real-life experiences;
- 5) Teachers may modify the design or layout of the materials creatively to enhance learner engagement;
- 6) The lesson guide may be modified to align with the specific patterns or models used in the school.
- 7) Future researchers may explore factors such as learner motivation, engagement, satisfaction, and self-directed learning skills to gain a more comprehensive understanding of the effectiveness of e-learning interventions.

7. Ethical Consideration

The student has been approved by the ethics review committee of the College of Education, Mindanao State University-Iligan Institute of Technology, Philippines. All applicable ethical standards have been followed during the course of the study.

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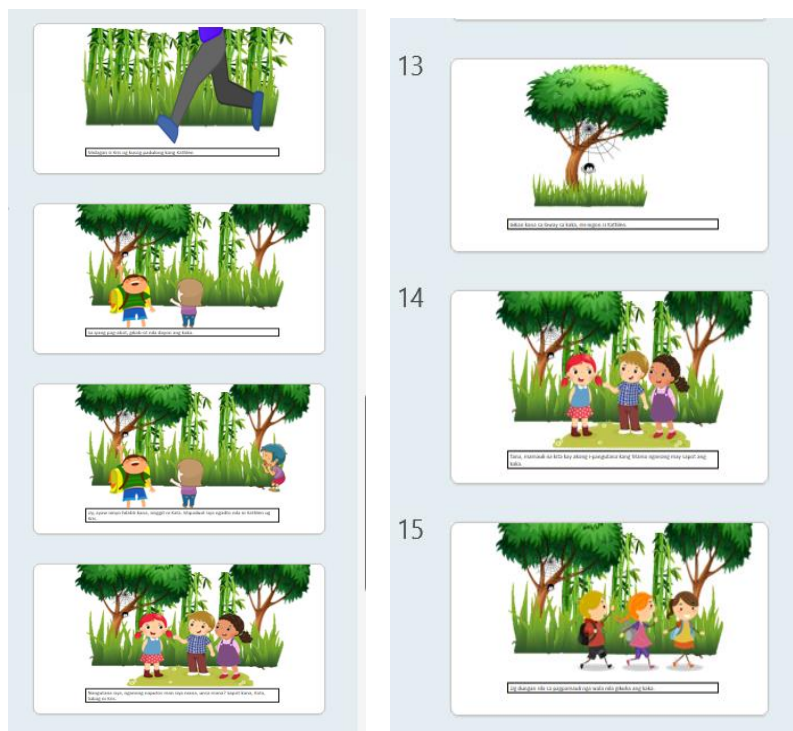
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Appendix A- Ang Kaka Storyboard

<p>Ang KAKA Story Board</p>	<p>5</p>  <p>5. Ang Kaka ay tumutulong sa mga bata sa paglalathala ng mga aklat.</p>
<p>Bonhomie Production (logo)</p>	<p>6</p>  <p>6. Ang Kaka ay tumutulong sa mga bata sa paglalathala ng mga aklat.</p>
 <p>Ang Bonhomie Production ay tumutulong sa mga bata sa paglalathala ng mga aklat.</p>	<p>7</p>  <p>7. Ang Kaka ay tumutulong sa mga bata sa paglalathala ng mga aklat.</p>
 <p>8. Ang Kaka ay tumutulong sa mga bata sa paglalathala ng mga aklat.</p>	<p>8</p>  <p>8. Ang Kaka ay tumutulong sa mga bata sa paglalathala ng mga aklat.</p>



Appendix B- Semi-Structured Interview Questions:

1. *Unsa man ang salida na inyo nakita?*

[What is the video that you watched?]

2. *Mahitabo ba sa tinuod na kinabuhi ang salida na inyong nakita?*

[Do you think what you saw in the video can happen in the real life?]

3. *Unsa man ang mga butang na nagsugod sa letrang Kk?*

[What are the things that start with letter K?]

4. *Unsa man ang nahitabo sa salida?*

[What happened in the video?]

5. *Giganahan ba mo sa inyong gilantaw? Kung oo, ngano man?*

[Did you like what you saw? If yes, then why?]

6. *Mas naka sabot ba mo sa estorya tungod sa salida?*

[Did you understand more about the story because you were watching a video?]