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Research Article

Handling Language Difficulties in Mathematical Word Problems Using Innovative Language-Supportive Pedagogy

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Abstract
This study examined the extent of language-related difficulties encountered in teaching and learning secondary school mathematics word problems and subsequently developed exemplary Language-Supportive Pedagogical (LSP) materials to mitigate these difficulties. The idea was raised because, despite the importance of mathematics in human life, reports show that its achievement worldwide is still low. In Tanzania, for example, the subject has performed poorly in national examinations, particularly in ordinary-level secondary education. According to national examination reports based on item analysis, students attempt questions incorrectly because they do not understand the demands of the questions, likely due to low language proficiency. This study aimed to develop LSP materials that help teach mathematics through user-friendly language. The social constructivism theory of learning, building on the work of van den Akker (2010), was employed to provide guidelines and principles for material design. After being piloted to gauge their feasibility, the language supporting materials were ultimately assessed to determine their effectiveness. Tests, questionnaires, interviews, and observation were used to gather both qualitative and quantitative data in an adaptation of developmental research. The study involved three secondary schools (a pilot school with 40 students, an intervention school with 48 students, and a control school with 41 students), three mathematics experts from the university, four teachers of mathematics, and Form IV students purposely sampled. The proposed design guidelines and principles for the material employed LSP characteristics that focused on simple language and context-based activities, pictures, real materials, and a mathematics glossary. Findings from formative and semi-summative evaluations indicate that teachers and students showed the need for language supportive materials in mathematics that could address the observed difficulties. During the post-test, students who were taught using LSP materials performed better than those who used the conventional approach.

Keywords: Design Principles, Exemplary Material, Language Supportive Pedagogy, Probability, Mathematics, Word Problems

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1. INTRODUCTION

Teaching for sustainable development places emphasis on pedagogy that favors learner-centered methods that engage them in the process of developing knowledge rather than just transferring it or providing them with passive learning experiences (UNESCO, 2017). Such methods are necessary in mathematics as a foundational field since they allow learners to investigate abstract ideas using idealized models prior to utilizing them in science and technology (Kitta, 2012). Despite this importance, Tanzanian mathematics instruction and learning at the ordinary secondary school level have produced unsatisfactory results (Masebo, 2018; Masele, 2018). This challenge is reflected in students' relatively low performance in mathematics compared to other subjects in the national Certificate of Secondary Education Examination (CSEE) (National Examination Council of Tanzania [NECTA], 2015, 2017, 2018, 2019, 2020).

Previous studies have linked the high failure rate in mathematics primarily to the continued dominance of traditional, teacher-centred instructional practices (Adolphus, 2011; Michael, 2015; Siumbu, 2013; Simon, 2014). Other research studies have attributed poor achievement to limited teaching and learning resources, including textbooks, models, and instructional aids, as well as insufficient teacher motivation and low qualifications among mathematics instructors (Joseph, 2013; King'aru, 2014; Kitta, 2004). More recently, however, the Language of Instruction (LoI) has been recognized as among the most important factors contributing to students' persistent underperformance in mathematics (Gabrieli et al., 2015; William & Ndabakurane, 2017). This issue is particularly evident in solving mathematical word problems, which require students to apply the English Language, which is the designated LoI, to interpret and translate information into mathematical symbols. Word problems are intended to help students connect classroom knowledge with real-life experiences (Sepeng & Sigola, 2013), a task that demands multiple skills and strategies facilitated through English as the medium of learning.

In Tanzania, changes from Kiswahili as the primary LoI to English as the LoI in secondary school pose challenges (William & Ndabakurane, 2017). According to NECTA (2014, 2015 & 2017), it was revealed that, due to their inability to convert word problems into the proper mathematical symbols, many students provided inaccurate answers. Another close reason for failing to attempt questions correctly in the mathematics examination, as analyzed by NECTA, was the lack of understanding of the demands of the questions. Considering these prominent reasons, it is clear that there is a link between LoI and student performance in mathematics.

The language issue is exacerbated by secondary school textbooks in Tanzania, which are said to have language that is challenging for students to understand (Barrett et al., 2014). Many examples are drawn from foreign contexts rather than local realities, making comprehension more challenging (Gabriel et al., 2015). Barrett et al. (2014) found that mathematics textbooks for Form One students contained lengthy sentences, dense passages, and complex vocabulary. Probability, a topic heavily reliant on word problems, is typically introduced through narratives and real-life scenarios in English. Zelime and Deutschmann (2019) maintained that utilizing a foreign language as an instructional medium runs the risk of isolating and decontextualizing school knowledge by serving as a barrier between the school and the outside world. Thus, such approaches put students at a disadvantage, especially when they abruptly switch from primary school in Kiswahili to secondary school in English.

Mathematics word problems are useful in connecting classroom mathematics teaching and learning to learners' real life (Larina, 2016). However, many African educators, academics, and policymakers have yet to give the language, which is essential to teaching and learning mathematics, much thought (Fredua-Kwarteng & Ahia, 2015). English, which is the LoI in secondary schools in Tanzania, has been found to restrict pupils' ability to participate in learning activities that require them to develop knowledge and extract information from textbooks (Barret et al., 2014). Therefore, this demonstrated that poor performance in mathematics is more likely to be influenced by English, which is a second language, but the LoI in secondary schools, since it hinders efficient communication throughout the teaching, learning, and assessment processes (Juma, 2022; Ndalichako & Komba, 2014).

Despite the fact that Tanzania, through different researchers, has undertaken a number of measures to enhance mathematics and science instruction, the achievement is still very low (Kitta, 2004; Ksuma, 2016). The problem of language in instruction needs to be resolved as most students are originating from remote areas where English is the third language (Juma & Opanga, 2021). The students continue to struggle with learning and attempting to solve world problems in exams. Thus, this study used cutting-edge Language Supportive Pedagogical (LSP) approaches to overcome language barriers in the teaching and learning of mathematical word problems. The approaches are designed to help students improve their communicative English language skills while acquiring the stated competencies. In addition, these approaches aim to enable students to effectively communicate mathematical concepts in word problems during examinations.

The study specifically aimed to determine the features of language-supportive lesson materials that help students overcome language and content barriers in teaching and learning probability-related mathematical word problems. It also sought to assess the usefulness of these materials in addressing language barriers during the teaching, learning, and assessment of probability word problems, and to evaluate how effectively the created materials improved these processes.

1.1. Theoretical Overview

This study adapts the social constructivism theory and the LSP model. Social constructivist theory views learning as an active process where knowledge is created by drawing on learners' past experiences and existing understanding (Bhattacharjee, 2015; Vygotsky, 1978). Rather than treating knowledge as a transmission of external reality, social constructivists underscore its construction through learners' engagement. The theory further posits that social interaction fosters the construction of knowledge and that meaningful learning emerges through the performance of authentic tasks. Vygotsky (1978) highlighted the central role of language in facilitating knowledge construction through social interaction. Language is a tool that facilitates efficient communication between students and teachers in the context of teaching mathematics (Mulwa, 2014).

1.1.1. Literature Review

Mathematics has its system of symbols and grammar for articulating mathematical concepts (Barrett et al., 2014). In Tanzanian secondary schools, students are required to convert word problems into mathematical equations, which involves identifying relevant information from word problems that often exceed two or three sentences (Barrett et al., 2014). Because of their limited proficiency in the language, students find learning mathematics in English difficult (Ndabakurane & William, 2017). The majority of pupils have trouble reporting numbers in English, even when they can write them flawlessly (Ndabakurane & William, 2017). Language is of paramount importance in communicating knowledge, skills, and values. Opanga and Nsengimana (2021) argue that, even while content-language integrated learning is not explicitly addressed at the policy level, some teachers have chosen the unsustainable strategy of utilizing familiar language to help students who struggle with the English language. Following exposure to a set of pedagogical language strategies, it was discovered that both teachers and students improved their methods of instruction and their responses to the content questions (Opanga & Nsengimana, 2021). García (2011) suggests that students may use their L1 to understand the subject matter, write in the L2, which is the language of instruction, and present in the L2. Gabrieli et al. (2018) found that in Tanzania, students' participation in knowledge generation during learning is limited when the L2 is solely used as the LoI. For instance, students in biology classrooms were able to express subject content in English, the L2, and their L1, Kiswahili, during teaching and learning. This indicates that language switching should be possible in classes where the LoI and the L1 differ.

Multilingual approaches have been shown to enhance both subject matter and language learning, particularly for students who are not fluent in the official Language of Instruction (LoI), while also facilitating the transition from one language of learning to another (Deutschmann & Zelime, 2022). For students adjusting to a new, unfamiliar LoI, this entails communicating knowledge through the language practices of the prior LoI or through language practices created in non-school groups (Barrett et al., 2024). When learners are not allowed to use a language they are already proficient in, they often restrict their understanding and conceptual growth to simply memorizing methods and texts (William & Ndabakurane, 2017).

Therefore, the Language Supportive Pedagogy (LSP) framework calls for diverse learning experiences that engage students in speaking, reading, writing, and listening while performing different tasks to promote both meaningful subject learning and mastery of the LoI. Within LSP, particular emphasis is placed on the strategic use of Kiswahili to support the acquisition of English as the LoI, in alignment with the subject content prescribed by the curriculum. Instructional materials developed under the LSP framework employ simple and accessible language to encourage social interaction between students and the educational resources, as well as between students themselves. To guide the process, van den Akker's (1999) design-based theory was employed to analyze the contextual problem, devise the intervention, and evaluate its effectiveness. LSP itself emerged from the Language Supportive Teaching and Textbook (LSTT) research project, which sought to foster innovation and practical solutions in the education of Tanzanian Form I students transitioning from Kiswahili as the LoI in primary school to English as the LoI in secondary school (Barrett et al., 2014). Initiated in 2013, the LSTT project specifically targeted the enhancement of language-supportive instructional strategies in underprivileged rural regions with lower proficiency levels in foreign languages (William & Ndabakurane, 2017). Findings from the LSTT initiative

demonstrated that when learners were permitted to use their fluent language, namely Kiswahili, the learning process became more engaging, participatory, and meaningful (Barrett et al., 2014).

The LSTT project developed materials for Form I in biology, English, and mathematics to support students in achieving both subject content and language proficiency (Barrett et al., 2014). The LSTT strategies used in the creation of these materials include the use of visual aids, simple and plain language, marginal space for vocabulary terms, strategic use of Kiswahili, and contextualizing learning through a variety of activities covering language skills, such as speaking, writing, reading, and listening (Barrett et al., 2014). Evidence from the piloting of the LSTT sample chapter showed notable improvements in both English proficiency and mathematics comprehension (William & Ndabakurane, 2017). Some learners developed the ability to describe mathematical processes in English and acquired new skills to articulate their mathematical reasoning, whether correct or incorrect, through spoken and written English. Nonetheless, the textbook designs were limited to Form I and covered only three subject areas, prompting the need for further interventions. This necessity became especially evident in relation to the teaching of probability in Form IV, which has been ranked as the most difficult topic in teaching, learning, and assessment with numerous word problems (Kitta, 2004; TIE, 2021).

2. METHODS

This study created and evaluated materials for LSP lessons aimed at overcoming language barriers in teaching mathematical word problems, using probability as a key example to emphasize real-world problem-solving skills.

2.1. Research Design

Both qualitative and quantitative methodologies were used in the study's data collection and analysis procedures. A quasi-experimental methodology was used for the quantitative component in order to measure the educational materials' efficacy. Three schools in Dodoma city were selected using convenience sampling, based on the accessibility provided by research permits that allowed frequent visits and follow-up, as well as the willingness of mathematics teachers to participate. One school was involved in the formative evaluation, whereas the other two schools participated in the materials' semi-summative assessment. In addition, purposive sampling was employed to recruit mathematics experts and teachers capable of providing in-depth insights regarding current practices in mathematics instruction and potential improvements. Three specialists in mathematics, all of whom taught at the University of Dodoma, assessed the materials and offered comments on their quality. One female mathematics teacher participated in the design and pilot stages. The other two teachers were males; one participated in the tryout of the materials in Intervention School (IS), and another implemented the traditional approach in Control School (CS). This was made possible by the fact that the pre-test revealed no differences in ability between the two groups, IS and CS.

Following the trial phase, the teacher in IS offered feedback and insights regarding the quality and effectiveness of the lesson materials. Both IS and CS teachers had a minimum of five years' experience teaching secondary school mathematics. For the students involved in the qualitative aspect of the study to develop and assess the materials' effectiveness in IS, the sample size was flexible, determined by the point of data saturation. However, the study estimated the sample size using quota and purposive sampling methods, aiming for 10 individuals per quota. These quotas were categorized by gender and various academic tracks, including science, arts, and business.

2.2. Participants

Quantitative data collection was done during the tryout and implementation phases, using the actual number of students present in each designated classroom stream. Accordingly, 48 students took part in the semi-summative evaluation of the materials in IS, while 41 students were involved in the implementation of the traditional approach in CS.

2.3. Research Instruments

Qualitative data from students and teachers regarding their experiences with current mathematics teaching and learning materials were collected through interviews and non-participant observation. The evaluation and pilot phases of the materials included interviews with curriculum experts, instructors, and students. Non-participant observations assessed student engagement during class sessions as part of the evaluation of the LSP materials. Four unstructured interviews were conducted with teachers throughout the design, pilot, and tryout stages for both IS and CS groups, focusing on whether the materials encompassed all LSP characteristics, the language used, and practicality. Additionally, these interviews aimed to evaluate the materials' effectiveness during the semi-summative evaluation phase, particularly in identifying challenges faced by teachers using traditional methods in CS. During the tryout and intervention phases, two semi-structured interviews with students were also conducted to gather their feedback on the materials' effectiveness in addressing language-related issues in teaching, learning, and assessing probability word problems.

The effectiveness of the materials in overcoming language challenges in teaching, learning, and assessing probability word problems was evaluated using a quasi-experimental pre-/post-test design with non-equivalent groups. The IS group, which utilized LSP-based materials, was compared to the CS group, which used traditional instructional methods. Tests were administered both before and after the intervention to measure student performance on probability word problems in both groups. To ensure confidentiality, numerical codes were used in place of names. Although the tests had the same content, they varied in question order and language presentation. The pre-intervention test helped the researcher determine if there were significant initial differences in probability skills between the IS and CS groups, while the post-intervention test assessed whether the intervention led to significant improvements in student achievement compared to the traditional methods of the control group. The results were then analyzed to evaluate the impact of the LSP approach between the intervention and control schools. Lastly, during the semi-summative evaluation phase, four-point Likert scale questionnaires were distributed to assess students' understanding and perceptions of the effectiveness of the LSP materials in improving the teaching and learning of mathematical word problems.

2.4. Data Analysis

The qualitative data gathered from interviews and observations were categorized, and the connections between words and concepts were analyzed. Participants' comments and expressions were systematically classified through content analysis. The collected data were then presented as quotes and interpreted from the researcher's perspective within the study's context. Following the study's objectives, the qualitative data were further examined based on categories, themes, and the relationships among words and concepts. For the quantitative data obtained from surveys and pre- and post-tests, SPSS version 21 was utilized for analysis. An independent sample t-test was conducted to determine significant differences in post-intervention test scores between IS and CS, while questionnaire results were summarized in percentage form. Additionally, a one-sample significance test was employed to compare mean scores from pre- and post-intervention tests within schools, assessing improvement before and after implementing the traditional approach in CS and the LSP-designed approach in IS. The statistical data were organized in tables and presented numerically.

The researchers strictly followed all ethical principles, starting by obtaining an introductory letter from the Director of Postgraduate Studies at the University of Dodoma, which was then presented to the Dodoma City Executive Director for further introduction to study participants. This formal process ensured cooperation from school leaders and teachers. Informed consent was acquired from participants before data collection, with both teachers and students expressing enthusiasm for the study. The collected data was handled confidentially and used exclusively for research purposes. In summary, the researcher complied with all ethical regulations.

3. RESULTS

The results of this investigation are presented in alignment with the study's objectives and the tools utilized for data collection.

3.1. The Characteristics of Language-Supportive Lesson Materials that Enable Students to Handle Language and Content Challenges in Mathematical World Problems

The study's findings align with the research objectives and data collection methods, focusing on the characteristics of language-supportive lesson materials designed to help students tackle language and content challenges in mathematical word problems. Key characteristics identified:

a) Use of Real Objects: Real objects (e.g., coins, dice, and fruits) were utilized not just as teaching aids but as integral learning tools. This hands-on approach helps students connect mathematical concepts to their daily lives, reducing the need for verbal explanations and addressing language barriers.

b) Learning through Different Activities: A student-centered approach featured various engaging activities, such as games and experiments, to facilitate active learning. These activities were aligned with the syllabus and sought to improve students' comprehension of probability ideas.

c) Use of Illustrations: The materials incorporated pictures, diagrams, and drawings to visually represent concepts, minimizing dense text and making the learning experience more accessible. This approach helps overcome language difficulties often found in traditional textbooks.

d) Language Development Strategy and Glossary: Emphasis was placed on using simple language, short sentences, and glossaries for complex vocabulary. This strategy aids in vocabulary comprehension, essential for understanding mathematical content.

Table 1. A Sample Lesson Designed Using the Key Characteristics Identified

First Lesson: The Probability Concept	
1. Learning objectives By the end of the lesson, every student ought to be capable of: a) Clearly define probability in terms of experiments. b) Define the experimental sample space. c) Recognize occurrences and complements to the sample space. **2. Language objectives** a) Use brief, straightforward sentences while writing the experimental report and other assignments. b) Describe some of the lesson's vocabulary, including coins, dice, actual objects, playing cards, and games are among the supplies that need to be ready for the class. **3. References** TIE (2013). *Secondary Basic Mathematics Book 4*. Dar es Salaam: Education Book Publisher. Jones, G. (2005). *Exploring Probability in School. Challenge for Teaching and Learning*. New York: Springer Science and Business Media. **4. Some useful words** Probability, possibility set, sample space, event and event compliments, experiments, die, coin, playing cards, and uncertainty. **5. Reminder** It is suggested to use the chalkboard in explaining the lesson content.	
Lesson Development	**Time**
1. Introduction a) It is recommended that the teacher begins the class with a hands-on exercise that asks the pupils to come up with ideas for: an instance of a choice they have ever made that illustrates the idea of uncertainty or that resulted in unforeseen events. For instance, a student may bring an umbrella to school because they anticipate rain at some point. i) While some students are throwing coins, others will be guessing answers. The students' answers can correctly or incorrectly be based on the results of a dice toss. ii) To help them understand what probability means, the students will keep providing examples of uncertainty-related activities from their everyday lives. For instance, during a game between two strong football teams and predict the results. b) The students use their own English words to define the term probability from examples	10 min

2. New knowledge 40 min

a) The teacher ought to develop a shared concept of probability based on the students' definitions.
b) The teacher is recommended to lead groups of students in experiments involving coin and die tosses and to present the results. The students should engage in the following tasks here:
c) Conducting studies with coin and die tosses in groups and documenting the outcomes.
d) Providing descriptions of the various number types, such as even, odd, prime, and factors of any number that are produced by the die.
e) Explaining the various sorts of playing cards in the deck according to their illustrations, such as the king, queen, and jack of French suits like spade, heart, and club. The images of dice, playing cards, and a coin are seen below.

f) Determining the sample space based on the experiments. For instance, the sample for the die experiment is S = {1, 2, 3, 4, 5, 6} from activity (i) above.
g) Determining the events and compliments to them. For instance, if a die's event is a prime number, then E = {2, 3, 5}; keeping in mind that the die's remaining number is known as an event complement, E' = {1, 4, 6} from activity (ii)
h) The teacher will assist students while performing the following language activities:
   i) Determining and discussing the meaning of terms like probability, sample space, possibility set, event complement, fair experiment, fair tools, equal events, and unequal events.
   ii) Grammar and pronunciation corrections made throughout the presentation.

3. Reinforcement 20 min

a) It is suggested that the teacher assigns more group and individual tasks for the students to complete in class, including,
   i)Determining events, sample space, and event complements from other items.
   ii) Presenting their answers on the chalk/whiteboard and, if needed, summarizing the students' conversation by offering more clarifications.
b) It is recommended that teachers assist pupils in connecting concepts as they are solving probability problems on the chalk/whiteboard.

4. Summary, reflections and homework 10 min

a) To wrap up the lesson, the teacher should guide the class in discussing key topics such as the significance of experiments, sample spaces, events, and event complements.
b) Through casual classroom discussions, the teacher and students should assess the lesson materials.
c) It is suggested that teachers assign homework that includes some questions to encourage students to read more.

3.2. The Practicality of the Instructional Designed Materials in Addressing Language Barriers in the Instruction, Acquisition, and Assessment of Probability Word Problems

The practicality of the developed lesson materials for addressing language challenges in teaching, learning, and assessing word problems was evaluated by three lecturers. These experts recognized the language issues affecting secondary school students and supported the use of real objects (e.g., dice, coins, playing cards) to enhance understanding of probability concepts. They also appreciated the focus on vocabulary and language development skills, such as speaking and writing, to improve students' language abilities. However, they provided feedback on language and grammar, suggesting that some long sentences be paraphrased and that local materials be used to contextualize lessons. Following their comments, the prototype was revised into a second version, Prototype I, for further testing in a secondary school.

During the formative evaluation, the researcher observed that while the teacher initially struggled with the LSP guidelines, subsequent sessions showed improvement. Students actively engaged in experiments and discussions, which enhanced their understanding of concepts like "replacement" and "non-replacement". However, the lesson exceeded the planned time limit due to high student engagement. Unstructured interviews with the teacher indicated that the LSP approach significantly improved student

participation and understanding, although it was time-consuming. The teacher noted that students were more engaged than ever before. Semi-structured interviews with students revealed that practical activities increased their interest and comprehension of probability, contrasting with previous, more passive learning experiences. Students reported feeling active and engaged throughout the lesson. Overall, the findings from the experts suggested that the LSP approach is feasible and effective for teaching word problems in probability, fostering greater student involvement and understanding.

Table 2. Students' Perspectives on the Potential of LSP to Enhance Mathematics Teaching and Learning

Item	N	Level of Agreement								M
		Strongly Disagree		Disagree		Agree		Strongly Agree		
		F	%	F	%	F	%	F	%	
Teaching through activities is more engaging than traditional methods.	37	0	0	7	18.9	5	13.5	25	67.6	3.49
The lesson was well comprehended.	37	1	2.7	9	24.3	7	18.9	20	54.1	3.24
Activities in the lesson mirrored the circumstances in real life.	37	0	0	7	18.9	14	37.8	16	43.2	3.24
Teaching with tangible items was more beneficial than merely using words to explain.	37	1	2.7	2	5.4	8	21.6	26	70.3	3.59
Group work improved the lesson's enjoyment, comprehension, and retention.	37	1	2.7	2	5.4	8	21.6	26	70.3	3.59
I actively participated in the lesson because of the activity.	37	0	0	5	13.5	11	29.7	21	56.8	3.43
I can more easily retain mathematical concepts and formulas if I learn by doing.	37	1	2.7	2	5.4	11	29.7	23	62.2	3.51
The lesson's wording was clear and easy to understand.	37	0	0	2	2.7	12	32.4	23	62.2	3.57
The lesson became clearer after the definitions of the new terminology were discussed.	37	1	2.7	3	8.1	15	40.5	18	48.6	3.35
Teaching in the students' immediate surroundings gives the lesson greater significance.	37	1	2.7	5	13.5	6	16.2	25	67.6	3.49
The language issues were reduced by using the discussion method.	37	0	0	9	24.3	10	27.0	18	48.6	3.24
Presentations improve language skills and increase comprehension of the subject.	37	1	2.7	2	5.4	6	16.2	28	75.7	3.65
The session today was enjoyable, and I discovered that the probability is much more practical in everyday life.	37	1	2.7	3	8.1	7	18.7	26	70.3	3.57
My ability to solve mathematical word problems has improved.	37	0	0	2	5.4	23	62.2	12	32.4	3.27
I want to learn lessons like the one we did today.	37	0	0	1	2.7	7	18.9	29	78.4	3.73

Note: F = Frequency, N = Numbers of participants and M = Mean

3.3. The Effectiveness of the Prepared Lesson Materials in Teaching, Learning, and Assessment of Mathematics Word Problems

The implementation of the Language Supportive Pedagogy (LSP) in Teaching, Learning, and Assessment of Mathematics Word Problems revealed significant disparities in lesson delivery between two teachers. In the intervention school (IS), students engaged in collaborative discussions, presentations, and problem-solving activities, including demonstrating solutions on the chalkboard. This approach helped

students learn to organize their thoughts and connect ideas using terms like "then" and "therefore". The teacher effectively gauged students' prior knowledge through mind-on activities, facilitating brainstorming sessions that led to understanding the concept of probability. Hands-on experiments with real objects, such as dice and coins, were integral to the learning process. For example, group activities like tossing coins allowed students to establish the sample space (S = {HH, HT, TH, TT}) through direct observation, enhancing their engagement and understanding. Students reported that these experiments reduced language barriers and boosted their confidence in speaking English.

In contrast, the control school (CS) relied on traditional lecture methods, with limited opportunities for students to engage actively. The teacher used a few practical experiments due to a lack of materials, resulting in minimal activity-based learning. Many students struggled to respond to questions, often due to language barriers, as the teacher primarily used English without integrating Kiswahili for better understanding. Overall, while the LSP approach showed promise in enhancing student engagement and understanding, teachers expressed concerns about time constraints related to the overloaded syllabus and the need to prepare for external examinations.

To find out how the students felt about the new approach of teaching and learning mathematics, especially probability, four-scale Likert questionnaires were given to the intervention group. The results of the questionnaires are shown in Table 2.

The findings from Table 2 show that a significant majority of students found the LSP-based activities more engaging than traditional methods, with 81.1% agreeing on their interest and 91.9% appreciating the use of real materials for teaching probability word problems. Additionally, 83.8% felt that the local environment context made lessons more meaningful, and 91.9% believed presentations enhanced their language skills. Overall, 97.3% of students favoured the teaching approach used during the LSP materials test. These findings align with insights from interviews and observations, indicating that students benefit more from interactive, practical learning than from verbal explanations. Furthermore, the effectiveness of the LSP approach was evaluated through post-tests of two groups: the intervention school (IS) using LSP and the control school (CS) using traditional methods. A pre-intervention test assessed the initial understanding of both groups, with 48 students from IS and 41 from CS participating. Table 3 presents pre-intervention test results.

Table 3. Mean and Standard Deviation for Pre-Intervention Test Scores in the IS and CS

School	N	Mean	Std. Deviation	Std. Error Mean
IC	48	8.17	4.30	.62
CS	41	8.22	4.60	.72

According to the pre-intervention test findings, the IS group's mean score was 8.17% (range: 0-19), whereas the CS group obtained a mean score of 8.22% (range: 0-20). The similarity between the two means suggests that both groups possessed a comparable degree of comprehension of the subject before the treatments. After the implementation of the probability lessons in both groups, the researcher conducted the post-intervention test on the same groups, IS and CS. These groups were assessed previously and found to have a very closely related ability level related to the understanding of the topic of probability. Table 4 presents the results from the post-intervention test.

Table 4. Mean and Standard Deviation for Post-Intervention Test Scores in IS and CS

Category	School	N	Mean	Std. Deviation	Std. Error Mean
Students' post-test scores	IS	448	47.65	19.88	2.87
	CS	441	22.59	17.33	2.71

Key: IS= intervention school, CS = control school, and N = total number of students

Table 4 indicates that students in the IS group obtained a mean test score of 47.65% with a standard deviation of 19.88, which was higher than the mean score of 22.59 and the standard deviation of 17.33 recorded in the CS group. To further compare these mean scores, the results of an independent samples t-test are shown in Table 5.

Table 5. An Independent Sample *t*-Test for the Mean Scores of the Post-Intervention Test between CS and IS

Category		Levene's E. V. test		*t*-test for Means Equality						
		F	Sig.	*t*	*df*	Sig. (2-tailed)	Mean Diff.	Std. Err Diff.	95%C. I of Difference	
									L	U
Students' post-test	Equal variances assumed	.75	.39	.28	87	.000	25.06	3.99	7.13	32.99

The independent sample *t*-test comparing post-test Mean scores between IS and t CS revealed a significant difference ($t = 6.28$, $p < 0.05$). The IS had a Mean score of 47.65 (SD = 19.88), while the CS had a Mean score of 22.59 (SD = 17.33). These findings imply that students in IS fared better, indicating that teaching probability word problems using the LSP approach was more successful than using the conventional way. Additionally, the *t*-test findings corroborated results from questionnaires and interviews, where both students and teachers agreed that the new approach was beneficial for learning.

4. DISCUSSION

The results of this study highlight the importance of language-supportive materials created within the Language Supportive Pedagogy (LSP) framework, which are vital for assisting students in addressing the language and content difficulties related to mathematical word problems. Fuchs et al. underscore the need for language comprehension in solving word problems (WPS), pointing out that while arithmetic skills are valuable, they are inadequate without language-focused teaching strategies (Fuchs et al., 2020). Powell and Fuchs (2018) further emphasize the importance of incorporating language comprehension strategies into math instruction, in line with LSP principles. Moreover, Daroczy et al. (2015) argue that these instructional strategies, including language-supportive materials, significantly improve students' understanding and engagement with mathematical concepts. Together, these authors reinforce the essential role of language-supportive materials in helping students understand mathematical word problems through the LSP approach.

While this study emphasizes the importance of language-supportive materials within the LSP framework, differing opinions exist regarding their effectiveness. Relying exclusively on these materials may not adequately represent students' real-world communication skills, as successful performance depends on both language and content knowledge. Brown (2000) stresses that language proficiency should not be the sole emphasis in LSP contexts, highlighting the need for background knowledge and context-specific understanding. Marian et al. (2021) clarify that if language proficiency were the only determinant of success, native speakers would excel effortlessly, suggesting that language-supportive materials may not be sufficient for all students, especially those who struggle with content knowledge. Additionally, Boonen et al. (2016) point out that instructional strategies heavily focused on language might neglect fundamental mathematical concepts, leading to superficial comprehension. Lenz et al. (2024) contend that the effectiveness of fraction instruction varies according to students' language proficiency, as those with lower proficiency tend to gain more when additional language support is provided, whereas students with higher proficiency do not, and overall learning gains are also influenced by levels of mathematics anxiety. Collectively, these viewpoints underscore the challenges of implementing language-supportive materials in mathematics education, indicating that their application needs to be thoughtfully adjusted to effectively address the diverse needs of all learners.

Nevertheless, the results of this study emphasize the crucial role of language-supportive materials developed within the LSP framework, especially in the Tanzanian context, where secondary school students transition from using Kiswahili as the language of instruction in primary schools to English in secondary education. This transition presents challenges in understanding and solving mathematical word problems. It necessitates the use of language development strategies, including simple English, short sentences, illustrations, and glossaries for key terms, which are crucial for ensuring that students grasp subject-specific vocabulary. This multifaceted approach not only supports comprehension but also aligns with effective pedagogical strategies that activate prior knowledge and facilitate meaning-making (Bowden & Barrett, 2022; Barrett & Bainton, 2016; Opanga & Nsengimana, 2021; William & Ndabukurane, 2017). The strategic

use of Kiswahili within classroom interactions ensures that lesson materials comply with national language policies while enhancing student understanding. That is why, during formative evaluation of the designed approach in this study, experts supported the LSP approach, highlighting the incorporation of real objects such as dice, coins, and playing cards as essential for facilitating practical learning. Additionally, they noted the significance of focusing on vocabulary and language development skills, which are crucial for improving students' language proficiency. This aligns with Mlay's (2010) findings, which indicated that complex vocabulary can impede comprehension, and with William and Ndabakurane (2017), who recognized the benefits of translating key terms to aid student understanding.

Despite the positive feedback, experts recommended using locally available materials to enhance contextualization and improve educational resources (William, 2012; Mbiling'i, 2012; Ksuma, 2016). This supports the notion that well-designed materials can enhance student engagement and understanding in mathematics (Deogratias, 2022; Kitta, 2004), making the LSP approach a valuable strategy for overcoming language barriers in mathematical word problems. Observations revealed that students using the LSP approach in the intervention school (IS) were required to discuss, present, and collaboratively solve probability problems while demonstrating problem-solving procedures on the blackboard in front of their peers. It can be inferred that mathematics teachers have made deliberate efforts to employ engagement strategies as a means of improving students' problem-solving skills in mathematics instruction (Bature et al., 2020). In order to meet linguistic objectives, students contributed ideas, asked and answered questions in accordance with the LSP, and wrote, read, and presented their reports from probability experiments (Barrett et al., 2014). However, Erath et al. (2021) highlight the scarcity of empirical studies linking language learning to measurable mathematical learning, emphasizing the need for more research that includes quantitative data and examines the impact of specific learning environments over time. They also stress the importance of understanding the complexities of classroom dynamics and advocate for the development of research-based professional development for teachers that integrates both mathematics and language, along with investigations into the effectiveness of such training. Although Erath et al. (2021) report positive findings in their research, they highlight a gap in empirical studies linking language learning to measurable improvements in mathematical learning. They call for additional research that includes quantitative data and investigates the long-term effects of specific learning environments.

To respond to these concerns, this study employed a mixed-methods approach, integrating interviews and non-participant observation with quantitative data from Likert scale questionnaires and pre- and post-tests. This methodology aimed to assess the practicality and effectiveness of the developed materials in addressing language challenges in word problems while also examining classroom dynamics that might be overlooked by a single research design. However, several areas for deeper exploration and alternative methodologies could enhance the understanding of language-supportive practices. Longitudinal and comparative studies could provide insights into the long-term effects, contextual factors, and the experiences of teachers and students related to these strategies. Additionally, more comprehensive professional development and policy analysis could further illuminate the effectiveness and broader implications of language-supportive methodologies in education (Erath et al., 2021). Throughout the design and formative evaluation of the materials developed in this study, teachers were involved at every stage of the process, providing opportunities for professional development while tackling challenges in both mathematics and language.

Erath et al. (2021) outline fundamental design principles for research-based instructional approaches. These include fostering students' engagement in meaningful discourse practices, establishing a range of mathematics language routines, linking multiple language forms with multimodal representations, drawing on students' multilingual resources, employing macro-scaffolding to structure and integrate opportunities for language and mathematics learning, and comparing linguistic features (e.g., form and function) to raise students' language awareness. These principles align with some of the recommended features of language-supportive lesson materials discussed in this paper, which aim to help students overcome language and content challenges in mathematical word problems through the use of real objects, varied learning activities, illustrations, and language development strategies, including glossaries. These insights are particularly relevant for researchers in other disciplines, such as the sciences and social sciences, where a solid understanding of the language of instruction is crucial for addressing similar issues.

Language barriers in secondary education are evident not only in learning mathematical word problems but also in tackling examination items in mathematics, science, and social science subjects. In

Tanzania, for example, Mlay (2010) conducted a study to investigate how the language of teaching affected the academic achievement of secondary school students, found that students faced challenges with mock exam results in History and English, which were conducted in English, the language of instruction. This indicates that the findings discussed in this paper would have a greater impact and significance if aligned with assessment practices in sciences social science subjects. This alignment could provide a fresh perspective on connecting teaching, learning, and assessment through language-supportive theories and practices. It underscores the need for schools and the National Examination Council of Tanzania (NECTA) to emphasize a language-supportive approach when constructing test and examination items during formative and summative assessments, respectively.

This research builds on earlier studies by expanding the application of Language Supportive Practices (LSP) in educational contexts, particularly in curriculum development (William & Ndabukurane, 2017; Opanga & Nsengimana, 2021). Previous research studies (e.g., Mbiling'i, 2012; Ksuma, 2016) have primarily focused on theoretical frameworks without fully exploring practical implementations of LSP in diverse classroom settings. One unique contribution of this study is its emphasis on integrating language-supportive theories, thereby creating a cohesive framework that connects teaching and learning. This approach highlights the importance of using accessible language and relevant contexts in assessments, an area that has been underexplored in the literature. Additionally, this study provides empirical evidence on the effectiveness of language-supportive strategies in improving student comprehension and engagement, thereby filling a gap in the existing research. By offering clear recommendations for schools and NECTA, the study not only contributes to academic discourse but also has practical implications for policy and curriculum design within the Tanzanian educational system.

5. CONCLUSION AND RECOMMENDATION

The study discovered that both teachers and students in secondary schools require pedagogically and linguistically supportive instructional tools in order to successfully teach mathematics word problems. The activity- and context-based LSP instructional materials created in this study, which included language development and visualization techniques, proved to be quite helpful in this regard. Such materials enhanced students' learning of probability word problems and were developed with the input and validation of mathematics experts and subject teachers. During the try-out and evaluation phases, these materials not only motivated students to engage in learning mathematics but also improved their comprehension of probability word problems. Consequently, employing a design-based research approach is recommended to further develop instructional materials and support teachers' professional growth, particularly in content knowledge and pedagogical skills.

Based on the study's results, discussions, and conclusions, the researchers advise the government, via the Ministry of Education, Science and Technology (MoEST), to continue adopting the LSP approach in the development of curriculum materials, including textbooks. This should involve collaboration with various researchers engaged in design-based research to ensure the creation of high-quality and relevant curriculum resources. Additionally, teachers should receive in-service training from the government. On lesson material design and development across different topics within the LSP framework. Future studies grounded in design-based research should be conducted to inform what schools and the National Examination Council of Tanzania (NECTA) should prioritize in adopting LSP, utilizing, for example, simple language, short sentences, and illustrations when creating test and examination items during formative and summative assessments. Implementing this approach will help address the current challenges and meet the needs of learners and society as a whole.

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selected institutions for the research study. In general, all regulations guiding the conduct of research and the University of Dodoma's guidelines were observed.

Data Availability Statement. This study's supporting data for this study can be obtained from the corresponding author upon reasonable request.

Conflict of Interest. The authors declare that there are no potential conflicts of interest, both financial and non-financial, relevant to the research reported in this paper.

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REFERENCES

Adolphus, T (2011). Problems of teaching and learning of geometry in secondary schools in Rivers State, Nigeria. *International Journal of Emerging Sciences*, *1*(2), 143-152.

Barrett, A. M., & Bainton, D. (2016). Re-interpreting relevant learning: an evaluative framework for secondary education in a global language. *Comparative Education, 52*(3), 392–407. https://doi.org/10.1080/03050068.2016.1185271

Barrett, A. M., Biseko, J. M., Clegg, J. C., Mbwafu, F. A., Ndabakurane, J. J., Wayimba, S. J., & Bowden, R. (2024). *Language learning across transition in the language of learning and teaching: An analysis of the Tanzanian curriculum.* (Working Papers in Education; No. #03/2024). School of Education, University of Bristol. https://doi.org/10.5281/zenodo.11233387

Barrett, A., Mtana, N., Osaki, K., & Rubagumya, C. (2014). *Baseline study report language supportive teaching and textbooks in Tanzania*. The University of Bristol.

Bature, I. J., Atweh, B., & Oreoluwa, F. (2020). Investigating the perception of senior secondary school students on the role of classroom engagement in mathematics problem solving. *Journal of Research in Science, Mathematics and Technology Education*, *3*(2), 73–105. https://doi.org/10.31756/jrsmte.323

Bhattacharjee, J. (2015). Constructivist approach to learning: an effective approach of teaching learning. *International Research Journal of Interdisciplinary & Multidisciplinary Studies, 1*(6), 65-74. https://oaji.net/articles/2015/1707-1438677336.pdf

Boonen, A. J., De Koning, B. B., & Jolles, J. (2016). Word problem solving in contemporary math education: a plea for reading comprehension skills training. *Frontiers in Psychology, 7*, 155518. https://doi.org/10.3389/fpsyg.2016.00191

Bowden, R. & Barrett, A. (2022). *Theory, practices and policies for 'late exit' transition in the language of learning and teaching: a literature review*. Bristol Working Papers in Education Series.

Brown, H. D. (2000). *Teaching by principles: an interactive approach to language pedagogy* (2nd ed.). Longman. https://octovany.wordpress.com/wp-content/uploads/2013/12/ok-teaching-by-principles-h-douglas-brown.pdf

Daroczy, G., Wolska, M., Meurers, W. D., & Nuerk, H. C. (2015). Word problems: A review of linguistic and numerical factors contributing to their difficulty. *Frontiers in Psychology, 6*, 1–13. https://doi.org/10.3389/fpsyg.2015.00348

Fredua-Kwarteng, E. & Ahia, F. (2015). Learning Mathematics in English at Basic Schools in Ghana: A Benefit or Hindrance? *European Journal of Educational Research, 4*(3), 124-139. https://doi.org/10.12973/eu-jer.4.3.124

Fuchs, L. S., Fuchs, D., Seethaler, P. M., & Craddock, C. (2019). Improving Language Comprehension to Enhance Word-Problem Solving. *Reading & Writing Quarterly, 36*(2), 142. https://pmc.ncbi.nlm.nih.gov/articles/PMC7295164/

Gabrieli, P., Sane, E. & Alphonce, R. (2015). *From access to quality secondary education in Tanzania: developing language supportive textbooks to enhance teaching and learning.* College of Education & Humanities and Social Sciences. The University of Dodoma.

Joseph, G. (2013). *A study on school factors influencing students' attitudes towards learning mathematics in the community secondary schools in Tanzania: The case of Bukoba Municipal Council in Kagera Region* [Master's thesis, The Open University of Tanzania]. https://repository.out.ac.tz/919/

Juma, Z. R. & Opanga, D. (2021). Language supportive pedagogy as a tool for improving science teaching and learning

in Tanzania: Case of Dodoma Secondary Schools. *Journal of Research Innovation and Implications in Education, 5*(2), 50-60. https://www.jriiejournal.com/language-supportive-pedagogy-as-a-tool-for-improving-science-teaching-and-learning-in-tanzania-case-of-dodoma-secondary-schools/

Juma, Z. R. (2022). The role of language of instruction and development of biological literacy among Tanzanian secondary school students. *Journal of Research Innovation and Implications in Education, 6*(1), 56 – 62. https://www.jriiejournal.com/the-role-of-language-of-instruction-and-development-of-biological-literacy-among-tanzanian-secondary-school-students/

King'aru, J. M. (2014). *Investigation of the factors that contribute to poor performance in science among students in secondary schools in Tanzania: A case of secondary schools in Kawe Division, Kinondoni municipality* (Doctoral dissertation, The Open University of Tanzania).

Kitta, S. (2004). *Enhancing mathematics pedagogical content knowledge and skill in Tanzania* [PhD Thesis Enschede, University of Twente].

Kitta, S. (2012). The importance of exemplary materials in stimulating and supporting mathematics teacher's professional development. *Journal of Education and Development, 2*(1), 32-43.

Ksuma, V. (2016). *Enhancing students' positive attitude in learning mathematics in Tanzania: Design and evaluation of exemplary learner-centered materials for teaching set* [Master dissertation, The University of Dodoma. Tanzania].

Larina, G. (2016). Analysis of real-world math problems: Theoretical model and classroom applications. *Vo prosy Obrazovaniya/Educational Studies Moscow, 3*(3), 151–168. https://doi.org/10.17323/1814-9545-2016-3-151-168

Lenz, K., Obersteiner, A., & Wittmann, G. (2024). Who benefits most from language-responsive learning materials in mathematics? Investigating differential effects in heterogeneous classrooms. *Educational Studies in Mathematics, 116*(2), 185–211. https://doi.org/10.1007/s10649-024-10321-9

Marian, V., Bartolotti, J., & Hayakawa, S. (2021). Costs and benefits of native language similarity for non-native word learning. *Frontiers in Psychology, 12*, 651506. https://doi.org/10.3389/fpsyg.2021.651506

Masebo, A. (2018). *Mastery of basic mathematical concepts among secondary school teachers and students in Mbeya Region, Tanzania* [Master dissertation, The Open University of Tanzania].

Masele, J. (2018). Efficacy of information provision strategies for promoting mathematics education in Tanzania: A case of selected secondary schools in Dar es Salaam. *University of Dar es Salaam Library Journal, 13*(1), 69-87. https://journals.udsm.ac.tz/index.php/lj/article/view/2321

Mbiling'i, A. (2012). *Mobile chemistry laboratory as a promising solution to chemistry practical in community secondary schools in Tanzania* [Master dissertation, The University of Dodoma, Tanzania].

Michael, I. (2015). *Factors leading to poor performance in mathematics subject in Kibaha Secondary Schools* [Master dissertation, The Open University of Tanzania].

Mlay, N. (2010). *The influence of the language of instruction on students' academic performance in secondary schools: a comparative study of urban and rural schools in Arusha-Tanzania* [Master dissertation, University of Oslo].

Mulwa, E. C. (2014). The role of the language of mathematics in students' understanding of number concepts in Eldoret Municipality, Kenya. *Journal of Humanities and Social Science, 4*(3), 264-295. https://ijhss.thebrpi.org/journals/Vol_4_No_3_February_2014/26.pdf

National Examinations Council of Tanzania (2015). *Examiners' report on the performance of candidates for CSEE*. Dar es Salaam. NECTA.

National Examinations Council of Tanzania (2017). *Examiners' report on the performance of candidates for CSEE*. Dar es Salaam. NECTA.

National Examinations Council of Tanzania (2018). *Examiners' report on the performance of candidates for CSEE*. Dar es Salaam. NECTA.

National Examinations Council of Tanzania (2019). *Examiners' report on the performance of candidates for CSEE*. Dar es Salaam. NECTA.

National Examinations Council of Tanzania (2020). *Examiners' report on the performance of candidates for CSEE*. Dar es Salaam. NECTA.

Ndalichako. J. L., & Komba, A. A. (2014). Students' subject choice in secondary schools in Tanzania: A matter of students' ability and interests or forced circumstances? *Open Journal of Social Sciences, 2*, 49-56. https://doi.org/10.4236/jss.2014.28008

Opanga, D., & Nsengimana, V. (2021). Practice in teaching and learning of invertebrates: evaluating the effectiveness of pedagogical language strategies in Tanzania secondary schools. *Eurasia Journal of Mathematics, Science and Technology Education, 17*(2), em1940. https://doi.org/10.29333/ejmste/9697

Powell, S. R., & Fuchs, L. S. (2018). Effective word-problem instruction: using schemas to facilitate mathematical reasoning. *TEACHING Exceptional Children, 51*(1), 31–42. https://doi.org/https://doi.org/10.1177/0040059918777250

Sepeng, P. & Sigola, S. (2013). Making sense of errors made by learners in mathematical word problem solving. *Mediterranean Journal of Social Sciences, 4*(13), 325-333. https://doi.org/10.5901/mjss.2013.v4n13p325

Simon, R. (2014). *Enhancing teaching and learning mathematics textual books use in ordinary level secondary schools in Tanzania: the case of Misungwi District* [Master dissertation, The University of Dodoma].

Siumbu, J. (2013). *A study of effectiveness of discussion and activity-based mathematics materials (DAB-MM) in mathematics learning in Tanzania* [Master dissertation, The University of Dodoma].

Tanzania Institute of Education (2013). *Secondary basic mathematics book 4*. Education Book Publishers LTD.

Tanzania Institute of Education (2021). *Continuous professional learning module for ordinary level secondary school teachers: mathematics*. Tanzania Institute of Education.

The United Republic of Tanzania-URT. (2014). *Sera ya Elimu na Mafunzo*. Dar es Salaam. MoEVT

UNESCO. (2017). *Education for sustainable development goals: learning objectives*. UNESCO. https://www.unesco.org/en/articles/education-sustainable-development-goals-learning-objectives

Vygotsky, L. (1978). *Mind in society: The development of higher psychological processes* (M.A Cole, V. John-Steiner, S. Scribner, & E. Sonberman, Eds. and Trans.). Harvard University Press.

William, F. & Ndabakurane, J. (2017). Language supportive teaching and textbooks (LSTT) for bilingual classrooms mathematics teaching and learning in Tanzania. *African Journal of Teacher Education, 6*(1), 96-118. https://doi.org/10.21083/ajote.v6i0.3946

William, F. (2012). Enabling science teaching and learning in rural high schools in Tanzania. Design and development of integrated chemistry modules (ICM) for A-level secondary education [Unpublished doctoral thesis, University of Dodoma, Tanzania].

Zelime, J., & Deutschmann, M. (2019). Communicating local knowledge in a foreign language-A comparative study of ideational and interpersonal aspects of primary school pupils' L1 and L2 texts in the Seychelles. *L1-Educational Studies in Language and Literature, 19*, 1-28. https://doi.org/10.17239/L1ESLL-2019.19.01.12