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The execution of Dual Language Programme (DLP) in Mathematics: Challenges faced by the primary school teachers in Samarahan district

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ABSTRACT

The Sarawak government is committed to enhancing students' English competency, thereby improving their global competitiveness in the future workforce. This is reflected through the implementation of the Dual Language Program (DLP) in Sarawak, which mandates the schools to teach Science and Mathematics in English. While challenges in implementing the national DLP are often reported, studies specifically addressing the DLP Sarawak remain scarce. This study intends to add significant value to the existing knowledge about the challenges faced by the primary school teachers in executing the Mathematics DLP, particularly in Malaysia context. A survey research design was employed, using a questionnaire featuring both closed-ended and open-ended questions to collect data from 40 respondents. Descriptive and inferential statistics were used to analyse the data. It was found that 97.5% of the respondents used a blend of Bahasa Melayu and English during the Mathematics class with 55% of them using Bahasa Melayu more than English. Over one-third perceived "Fractions, Decimals, and Percentages" and "Time" as the most challenging topics. The Friedman test ranked challenges related to students' English proficiency and their ability to learn Mathematics in English as the top two perceived challenges, followed by the lack of parental encouragement. Open-ended responses supported these findings and provided further explanations for the underlying reasons. The study highlights the need for concerted efforts from all stakeholders to address the significant challenges in teaching the Mathematics DLP. Limitations and recommendations for future studies are also discussed.

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1.0 INTRODUCTION

The endeavour to enhance the competency in English among the students throughout the nation has always been the emphasis of the Ministry of Education of the country. The initiatives started with the implementation of Teaching and Learning of Science and Mathematics in English or *Pengajaran dan Pembelajaran Sains dan Matematik Dalam Bahasa Inggeris* (PPSMI) in 2003 (Ministry of Education Malaysia (MOE), 2002, 2010). Under PPSMI, all the schools under MOE were required to use English as the medium in the teaching and learning of Science and Mathematics. This was then followed by the Implementation of the Policy in Enhancing Bahasa Melayu and Strengthening the English Language or *Pelaksanaan Dasar Memartabatkan Bahasa Melayu dan Memperkukuh Bahasa Inggeris* (MBMMBI) starting the year 2012 (MOE, 2010), which ended the teaching and learning of Science and Mathematics in school. In 2016, MOE introduced the Dual Language Program (DLP) as one of the initiatives under MBMMBI, which allows schools to opt using English as the medium of instruction for Science and Mathematics (MOE, 2018). Despite the different policies implemented at different stages over the years, the intention of the government to enhance the mastery of the English language is obvious.

Science and Mathematics are the subjects instructed to be the focus subjects under these policies as they are the foundation for the advancement of Science, Technology, Engineering, and Mathematics (STEM) education in the country (Gou & Hu, 2023; Ravi et al., 2023). STEM education is pertinent in cultivating competencies needed for the 21st century among students. Students who graduated from the STEM-related field are the workforce for the advancement of STEM-related fields in the country. With the subjects taught in English, the students are expected to be able to access STEM-related information which is mostly in English, from different sources of media (MOE, 2002). As the students master and become knowledgeable in the Science and Mathematics fields, they will eventually become future innovators, who are globally competitive in the STEM-related fields (MOE, 2002; Ravi et al., 2023).

Sarawak government became the first state in the country to make the initiative to use English in the teaching of Science and Mathematics in January 2020, starting with Year 1 of primary school. This initiative is coined the Dual Language Program (DLP) Sarawak (MOE, 2019). DLP Sarawak is different from the DLP implemented nationwide in 2016 in which DLP Sarawak mandates all Science and Mathematics classes to use English in its entirety in every school under MOE throughout Sarawak, with an exemption for the Chinese primary school. The implementation of DLP aims to enhance students' mastery of English by increasing their exposure to the language. By reinforcing the students' proficiency in English, DLP offers opportunities for students to access diverse knowledge related to Science and Mathematics. The students under DLP are expected to be the future workforce that possesses the skills needed to compete globally. It thereby increases their employability in the global workforce in line with the revolution of Industry 4.0, which is predominantly STEM-related in nature (Jabatan Pendidikan Negeri Sarawak, 2024). This initiative plays an important role as Sarawak strives to be a high-income region by 2030 (MOE, 2019; Sarawak Government, 2021). This tallies with the Sarawak government's post-COVID development strategy 2030 in which education and human capital are one of the seven enablers of which one of the key outcomes from this enabler is to achieve a 40% of science enrolment by 2025 (Sarawak Government, 2021). The catalytic initiatives to achieve this expected outcome include the teaching of Science and Mathematics in English for a science-literate workforce and society.

The implementation of DLP in teaching Mathematics all over the nation has reported various challenges. These include teachers' readiness (Abdullah et al., 2019; Has Bullah & Md Yunus, 2019; Moi & Mahmud, 2024; Othman et al. 2020), students' English proficiency (Lo & Mohamad Nasri, 2022; Moses & Malani, 2019), students' abilities, teachers' workload, and inadequate teaching resources and facilities (Has Bullah & Md Yunus, 2018; Ananthan & Mohd Said, 2020). However, few studies have been conducted on DLP Sarawak. In a baseline study on DLP Sarawak that has just started at the time of the study, insufficient references and materials for the teaching and learning of Mathematics in English is one

of the main challenges faced by the teachers and students, and the parents (Ling et al., 2021). Besides that, the demanding syllabus of the subject poses obstacles to DLP Sarawak as the teachers need to cope with the delivery of content of the subject and the understanding of the students with the English language used. Despite the innumerable impediments ahead as the implementation is scheduled to commence with the secondary schools under MOE in 2026, the Sarawak government has been making strides to overcome these hurdles and has spent RM 18 million on the program (Ali Basah, 2024). The ministry in charge has made 1,101 assessment visits to schools, involving 3,111 out of 5,200 teachers trained for the program where more teachers will be involved as the program progresses to Year 6 (Ling, 2023). Most studies on DLP are about the national DLP, while studies specifically addressing DLP Sarawak remain scarce.

Given the government's commitment to the implementation of DLP, it is indispensable to carry out studies on this initiative. The findings from such research would contribute to the effective execution of the program, ensuring that the financial, effort, and time invested yield commensurate benefits. Consequently, this study aims to explore and analyse the challenges faced by primary school teachers in Samarahan District in Sarawak, Malaysia in teaching DLP Mathematics. Specifically, this study is conducted to achieve the following objectives:

1. To determine the medium of instruction used by teachers in teaching Mathematics DLP and their reasons for these choices.
2. To investigate the significant challenges faced by teachers when teaching Mathematics.

The organization of this paper is structured as follows. Section one introduces the study and section two discusses the reviewed literature. This is followed by section three which outlines the methodology employed by the study while section four presents the findings and corresponding discussion. Finally, the last section concludes the study, highlighting limitations and providing recommendations for future studies.

2.0 LITERATURE REVIEW

2.1 Implementation of national DLP and DLP Sarawak

The national DLP was introduced to the Malaysian Education system in 2016, as a significant educational reform aimed at enhancing English proficiency among students and improving learning outcomes in Science and Mathematics. This initiative allowed schools the option to teach Science and Mathematics in either English or Bahasa Melayu (MOE, 2018). The DLP emerged as a successor to the earlier PPSMI policy which was been implemented in 2003. Despite facing substantial controversy (Sawal et al., 2010) and entirely phase-out in 2012, PPSMI's foundational goals persisted in the DLP, which sought to address the linguistic and educational needs of a diverse student population.

The transition from the PPSMI to MBMMBI policy has significantly impacted Malaysian students and schools. This policy shift has affected over two million students and caused confusion and disruption. Stakeholders, including the Parent Action Group for Education (PAGE), raised concerns, resulting in a directive for schools to adhere to the phased transition and continue supporting the last PPSMI cohort. (Azril, 2015). The transition has revealed challenges, particularly in schools' capacities to support the PPSMI students adequately. Some schools lack the resources or trained personnel necessary to continue teaching science and mathematics in English, leading to complaints and the need for further guidance from the Education Ministry (Has Bullah & Md Yunus, 2018; Moi & Mahmud, 2024). This policy change highlights the complexities of educational reform and the importance of consistent implementation to ensure student's learning experiences are not compromised. With the implementation of the MBMMBI policy, the medium of instruction reverts to the Malay language in national schools. However, the efforts to improve the command of the English language are not abandoned.

The DLP Sarawak, which was initiated in 2020, has been extended to secondary schools all over Sarawak. This initiative aligns with the Sarawak government's desire to have English as the medium of instruction in all schools throughout the state (Boon, 2024). The extension includes using English to teach the STEM subjects such as Additional Mathematics, Physics, and Chemistry. This move is part of the Sarawak government's broader strategy to foster an interest in STEM subjects among students and has been supported by legislative measures and comprehensive negotiations under the Malaysia Agreement 1963 (MA63) framework. The use of English is seen as a vital step in this direction, aiming to enhance students' proficiency and interest in these critical areas. Sarawak's proactive approach to teaching Mathematics and Science in English by 2026 highlights the critical need for bilingual education in a globalized economy.

2.2 Medium of Instruction in Mathematics DLP

Teachers' and students' proficiency in English is essential for delivering content effectively in Mathematics DLP. Othman et al. (2020) and Abdullah et al. (2019) reported that many teachers lack sufficient proficiency in English, with only a small percentage being proficient. This is due to compounded Even though certain schools are keen to teach Mathematics in English, nevertheless, students' lack of proficiency in the English language has hindered the effectiveness of DLP implementation, therefore resulting in confusion among students towards their learning content (Abdullah & Nordin, 2023). Unting and Yamat (2017) found that teachers have difficulty teaching students due to poor English proficiency. Language barriers significantly impact the student's understanding of Mathematics DLP, and lead to lower academic performance (Abd Jalil et al., 2023). In Malaysia context, students show a strong preference for learning Mathematics in Malay, their native language, over English (Moses & Malani, 2019). Thus, code-switching, a pedagogical practice where teachers switch between languages, plays a crucial role in enhancing the student's understanding. Code-switching allows students to navigate complex concepts by utilizing their first language alongside the English language (Abd Jalil et al., 2023). Incorporating code-switching can overcome the language barriers and teachers can explain concepts effectively, increase classroom engagement, and ultimately improve learning outcomes (Abd Jalil et al., 2023, Matope & Chiphambo, 2022).

2.3 Challenges in Teaching Mathematics DLP

Previous studies highlighted several challenges in teaching Mathematics DLP Malaysia, primarily revolving around language barriers. Unting and Yamat (2017) found that this language barrier significantly impacted the effectiveness of teaching Mathematics. Students generally prefer learning in Malay, which complicates the implementation of English-medium instruction. Many teachers struggle with insufficient English proficiency, which hampers their ability to teach complex mathematical concepts effectively (Abdullah & Nordin, 2023). Lack of readiness and competency in using English teaching among teachers poses a significant obstacle to successful DLP execution (Moi & Mahmud, 2024). This challenge is exacerbated by inadequate training and outdated resources, leaving teachers ill-prepared to support student learning under the DLP framework. Thus, it is important to enhance teachers' English proficiency through intensive training to ensure effective DLP implementation and academic success for students (Abdullah & Nordin, 2023; Lo & Mohamad Nasri, 2022)

Additionally, the necessity of code-switching in classrooms—mixing Malay and English—underscores the difficulty in achieving both language fluency and mathematical comprehension (Abd Jalil et al., 2023). While code-switching aids immediate understanding, it also highlights the ongoing struggle to balance the dual language requirements. To mitigate these issues, comprehensive teacher training, continuous professional development, and updated resources are essential. These measures will help teachers better navigate the bilingual teaching landscape and improve student engagement and outcomes in Mathematics under the DLP. However, the use of code-switching can sometimes disadvantage students during examinations when they are required to respond in English (Matope & Chiphambo, 2022). Thus, to address

language proficiency issues, schools are advised to organize English courses to minimize code-mixing and code-switching, promoting fluency in the language (Abdullah & Nordin, 2023).

Despite the challenges, most teachers and students hold positive views toward the DLP implementation. According to Moses and Malani (2019), students are interested in learning Mathematics in English, even though their current English proficiency levels are not ideal. This positive outlook suggests a willingness among students to improve their language skills and adapt to the bilingual educational framework. On the other hand, teachers recognize the potential benefits of the DLP in enhancing students' academic and better preparing them for global communication and academic opportunities.

Teachers also were not provided with adequate training or materials, forcing them to rely on outdated resources. This sentiment is echoed by Has Bullah and Md Yunus (2018), who reported that teachers in urban schools faced challenges due to inadequate teaching resources and facilities. Understanding students' perspectives is essential for improving the DLP. Masrom et al. (2021) explored students' satisfaction with the DLP, finding that readiness, interest, and confidence significantly influenced their engagement. Their study indicates the need for pedagogical approaches that boost students' confidence and interest in learning through a second language.

3.0 METHODOLOGY

3.1 Research Design

This study employed a survey study approach. A questionnaire predominantly featuring closed-ended rating scale questions, complemented with open-ended questions, is used to collect both quantitative and qualitative data. This method enables the collection of a comprehensive understanding of the challenges encountered by teachers in teaching Mathematics DLP, within primary schools in Samarahan District. Quantitative data can identify general patterns and significant factors, while qualitative data can provide context and deeper insights into these patterns. For example, if quantitative data reveals that many teachers find a particular topic challenging, an open-ended question can help to explain why they find it challenging and provide specific examples or anecdotes.

With 43 primary schools located in the Samarahan district, each assumed to have one Mathematics DLP teacher on average, a sample size of approximately 40 respondents was determined necessary to uphold statistical reliability. Stratified random sampling ensured representation from various schools and teaching experiences. This study serves as preliminary research aimed at exploring the initial challenges and experiences of teachers in the Mathematics DLP. These initial findings will guide more extensive future studies and contribute valuable insights into the implementation and challenges of the Mathematics DLP in the Samarahan district specifically, and in Malaysia generally.

3.2 Instrument

Data collection was conducted through a questionnaire administered via a Google Form. The questionnaire was divided into three sections. Section A collected demographic profiles of the respondents, such as gender, age, race, and school name. Section B gathered data on respondents' profiles of teaching Mathematics DLP, which include the number of years teaching this subject, level of subject taught, medium of instruction used, and difficulty level of each topic. Section C obtained feedback on the challenges in teaching Mathematics DLP. Sections A and B were self-constructed, while Section C was adapted from Has Bullah and Md Yunus (2019), with some modifications to meet the objectives of this study. Additionally, open-ended questions were added to capture detailed explanations and suggestions for improvement.

3.3 Data Reliability

The reliability test of the domain in Section C was examined using Cronbach's Alpha which ranges in value from 0 to 1. As shown in Table 1, the reliability coefficient of 0.807 (>0.70) suggests good internal consistency and reliability.

Table 1. Cronbach's alpha

Constructs	No. of items	Cronbach's Alpha
Challenges in teaching Mathematics DLP	10	0.807

3.4 Data Collection

To reach the actual sample size, the survey link, along with a detailed explanation of the study's purpose and instructions, was sent to the respective teachers through WhatsApp. The contact information was obtained from the list of teachers who were involved in a mathematics competition facilitated by the researchers. Periodic follow-up reminders were sent to encourage participation and ensure that the target sample size was reached. Additionally, teachers were also encouraged to share the survey with their colleagues within the Mathematics DLP program. This method proved effective due to its convenience, ultimately allowing the survey to achieve the desired sample size.

3.5 Data Analysis

Quantitative data analysis involves both descriptive and inferential statistics. Descriptive statistics such as frequency, percentage, mean, and standard deviation were utilized to summarize demographic data, perceived difficulty levels, and encountered challenges. Inferential statistics such as the Chi-Square test, Shapiro-Wilk test and Friedman test, were employed for specific reasons related to the nature of the data and the research objectives. The Chi-Square test was used for categorical data to determine the preference for the medium of instruction among Mathematics DLP teachers, the difference in the perceived difficulty levels of different mathematics topics among teachers, and the challenges in teaching Mathematics DLP. Meanwhile, the Shapiro-Wilk test was used to assess the normality of the data distribution, particularly suitable for the small sample size of 40 respondents. Upon finding that the data did not follow a normal distribution, the Friedman test was used to analyse the difficulty level of Mathematics DLP topics, and the challenges faced by teachers, as it handles ordinal data effectively.

3.6 Hypotheses for Inferential Statistics

Following are the hypotheses for the inferential statistical tests, allowing for a comprehensive examination of the medium of instruction and challenges faced by teachers.

Medium of instruction:

H1: There is a significant preference for using either English or Bahasa Melayu as the medium of instruction among Mathematics DLP teachers.

Difficulty levels of Mathematics DLP topics:

H2: There is a significant difference in the perceived difficulty levels of different mathematics topics among teachers.

Difficulty levels of challenges faced by teachers:

H3: There is a significant difference in the perceived difficulty levels of challenges encountered in teaching Mathematics DLP.

4.0 RESULTS AND DISCUSSION

4.1 Respondents' Demographic Profiles

A total of 40 Mathematics DLP teachers from 24 primary schools in Samarahan district participated in this survey. Although only 24 out of 43 schools participated, the sample size of 40 teachers likely includes a diverse range of experiences and perspectives, ensuring a significant representation of the district and a substantial dataset. Table 2 presents the demographic profiles of the respondents.

Table 2. Respondents' demographic profiles

Demographic Profiles	Total	
Gender (n=40)		
Male	29	(72.5%)
Female	11	(27.5%)
Age group (n=40)		
20 to 29 years old	1	(2.5%)
30 to 39 years old	4	(10.0%)
40 to 49 years old	27	(67.5%)
50 years old and above	8	(20.0%)
Ethnicity (n=40)		
Malay	16	(40.0%)
Chinese	7	(17.5%)
Iban	4	(10.0%)
Bidayuh	9	(22.5%)
Melanau	3	(7.5%)
Others	1	(2.5%)

As shown in Table 2, 29 (72.5%) respondents are male, and the remaining 11 (27.5%) are female. Most respondents (87.5%) are aged 40 years and above. In terms of ethnicity, 16 (40.0%) of the respondents are Malay, 9 (22.5%) are Bidayuh, 7 (17.5%) are Chinese, 4 (10.0%) are Iban, 3 (7.5%) are Melanau and 1 (2.5%) are from other ethnic groups.

4.2 Respondents' Profiles of Teaching Mathematics DLP

Table 3. Respondents' Profiles of Teaching Mathematics DLP

Mathematics DLP Profiles	Total	
Number of years teaching Mathematics DLP (n=40)		
1 year or below	3	(7.5%)
Between 2 to 3 years	9	(22.5%)
4 years or above	28	(70.0%)
Level of Mathematics DLP subject taught (n=40)		
All 5 levels (Year 1,2,3,4,5)	10	(25.0%)
4 levels only	4	(10.0%)
3 levels only	10	(25.0%)
2 levels only	13	(32.5%)
1 level only	3	(7.5%)
Medium of instruction used for teaching Mathematics DLP (n=40)		
English only	1	(2.5%)
More English than Bahasa Melayu	17	(42.5%)
More Bahasa Melayu than English	22	(55.0%)

Table 3 presents the respondents' profile of teaching Mathematics DLP since 2020. As described in the table, 28 (70.0%) respondents have 4 or more years of experience teaching Mathematics DLP, indicating substantial expertise among the respondents. Meanwhile, 9 (22.5%) respondents have 2 to 3 years of teaching experience and only 3 (7.5%) are relatively new, with one year or less of experience. With regards to the level of Mathematics DLP subjects taught since 2020, the finding shows that 13 (32.5%) respondents have taught the subjects across two levels, while equal proportions of 10 (25.0%) respondents have taught all five levels (Year 1 to Year 5) and three levels, respectively, indicating a diverse range of teaching scopes. This reflects a balanced mix of specialized and broad teaching experiences among the respondents.

In terms of the medium of instruction used for teaching Mathematics DLP subjects, the analysis reveals a predominant preference for integrating Bahasa Melayu alongside the English language. The result shows that only 1 (2.5%) respondent used English exclusively for teaching Mathematics, while 17 (42.5%) used more English than Bahasa Melayu and 22 (55.0%) used more Bahasa Melayu than English.

Based on the Chi-Square result shown in Table 4, there is a significant preference for the medium of instruction among Mathematics DLP teachers (Chi-Square = 18.050, df = 2, $p < 0.05$). The findings confirm the strong tendency in the medium of instruction in which most of the teachers opted for Bahasa Melayu as compared to English (Abdullah et al., 2019). This preference for Bahasa Melayu may be due to several reasons such as the past and present language in education policies availed in Malaysia.

Table 4. Chi-Square Test on the Mathematics DLP teachers' preference for the medium of instruction

N	40
Chi-Square	18.050[a]
Df	2
Asymp Sig.	0.000

a. 0 cells (0.0%) have expected frequencies less than 5. The minimum expected cell frequency is 13.3.

The open-ended responses provide further explanations for their preferences. A teacher who primarily uses English remarked, "It is compulsory to use English for teaching Mathematics DLP". This highlights a mandatory requirement in some schools that dictates the use of English as a medium of instruction for teaching Mathematics DLP.

Meanwhile, teachers who used more English than Bahasa Melayu gave various reasons for their choice, such as: "Trying my best to emphasize English in Mathematics terms. Besides, English is easier, and the term is shorter than in Bahasa Melayu", "Many students are not fluent in English", "Students need the question or instruction to be explained in Bahasa Melayu to enhance their understanding", "to fulfill the requirement of the Mathematics DLP subject", "To achieve the objectives of DLP". On the other hand, teachers who use more Bahasa Melayu than English explained: "Students' English vocabulary is too weak. Had to teach in Bahasa Melayu to encourage them to learn Mathematics", "Students understand better when the teacher explains in Bahasa Melayu, but still focuses on Mathematics terms in English", "Not many students can understand English. As a teacher, I need to make sure they can learn Mathematics. We're not teaching them English. It's much easier for them to understand when Mathematics is taught in Bahasa Melayu".

The above preference is largely driven by the necessity to ensure students' comprehension. Students facing language barriers may struggle to comprehend the teacher's explanations, leading to confusion and a focus on task completion rather than understanding (Wahab et al., 2020). Thus, proficiency in the language of instruction is essential to grasp mathematical concepts effectively (Matope & Chiphambo, 2022; Abd Jalil et al., 2023). Additionally, previous research has shown the positive impact of using a combination of languages, such as English and the learner's home language, on understanding mathematical concepts. Multilingual approaches, such as code-switching allow teachers to incorporate students' first language in the learning process, enhancing their comprehension and engagement in Mathematics (Matope & Chiphambo, 2022; Abd Jalil et al., 2023; Afiyanti et al., 2021). Similarly, Moses

and Malani (2019) reported that extensive use of code-switching during class and when talking to students proved a clear indication that language mixing is important for better communication in the classroom. The findings underscore the significance of leveraging a combination of languages to facilitate better understanding and enhance students' learning outcomes in Mathematics.

4.3 Challenges in Teaching Mathematics DLP

Difficulty levels of Mathematics DLP topics

The perceived difficulty levels (rated from "Very Easy" to "Very Difficult") of Mathematics DLP topics covered in the Primary School Standard Curriculum or *Kurikulum Standard Sekolah Rendah* (KSSR) are presented in Table 5. Among the 8 topics, "Fractions, Decimals, and Percentage" (M=3.23; SD=0.891) is identified to be the most challenging topic, followed closely by the topic "Time" (M=3.18, SD=0.903). This finding is supported by the fact that 37.5% of respondents rated "Fractions, Decimals, and Percentages" and 35.0% rated "Time" as "Difficult" or "Very Difficult". On the other hand, "Whole Numbers and Basic Operations" is perceived to be the least challenging (M=2.53; SD=0.640) with none of the respondents rating the topic as "Difficult" or "Very Difficult" and 60.0% rated it as "Fair". Other topics, such as "Money" (M=2.78; SD=0.733), "Coordinates, Ratio, and Proportion" (M=2.80; SD=0.911), "Data Handling" (M=2.93; SD=0.829), "Measurement" (M=2.93; SD=0.888), and "Space" (M=3.05; SD=0.932) are considered moderately challenging, with mean scores that ranging from 2.78 to 3.05.

Table 5. Teachers' Perceptions on Difficulty Levels of Mathematics DLP Topics

	Item	Very easy	Easy	Fair	Difficult	Very Difficult	Mean	SD
1	Whole Numbers, and Basic Operations	3 (7.5%)	13 (32.5%)	24 (60.0%)	0 (0%)	0 (0%)	2.53	0.640
2	Fractions, Decimals, and Percentages	2 (5.0%)	4 (10.0%)	19 (47.5%)	13 (32.5)	2 (5.0%)	3.23	0.891
3	Money	3 (7.5%)	7 (17.5%)	26 (65.0%)	4 (10.0)	0 (0%)	2.78	0.733
4	Time	0 (0%)	10 (25.0%)	16 (40.0%)	11 (27.5%)	3 (7.5%)	3.18	0.903
5	Measurement	3 (7.5%)	6 (15.0%)	24 (60.0%)	5 (12.5%)	2 (5.0%)	2.93	0.888
6	Space	2 (5.0%)	8 (20.0%)	18 (45.0%)	10 (25.0%)	2 (5.0%)	3.05	0.932
7	Coordinates, Ratio, and Proportion	4 (10.0%)	9 (22.5%)	18 (45.0%)	9 (22.5%)	0 (0%)	2.80	0.911
8	Data handling	2 (5.0%)	8 (20.0%)	22 (55.0%)	7 (17.5%)	1 (2.5%)	2.93	0.829

The overall result shows that most topics were rated as 'Fair' difficulty level. This indicates a balanced perception of difficulty, neither too challenging nor too easy, which suggests that teachers find these topics manageable but not without effort. Although it reflects that the curriculum offers a balanced challenge, potentially accommodating a broad spectrum of student abilities, it is important to note that perceptions of difficulty can be subjective and may differ among teachers.

Further analysis using the Shapiro-Wilk test, as shown in Table 6, indicates that all eight topics in Mathematics DLP of the KSSR curriculum are significant and do not follow a normal distribution ($p < 0.05$). As normality was violated, The Friedman test was then performed to assess the differences in perceived difficulty levels across these mathematical topics. It ranks the data and compares the sums of these ranks to determine the relative significance of each item. Table 7 shows the mean ranks of the items

and the Friedman test statistics, which indicate significant differences among the items (Chi-Square = 40.891, df = 7, $p < 0.05$).

Table 6. The Shapiro-Wilk test of the normality

No.	Item	Statistic	df	Sig.
1	Whole Numbers, and Basic Operations	.701	40	.000
2	Fractions, Decimals, and Percentages	.872	40	.000
3	Money	.773	40	.000
4	Time	.869	40	.000
5	Measurement	.843	40	.000
6	Space	.903	40	.002
7	Coordinates, Ratio, and Proportion	.864	40	.000
8	Data handling	.869	40	.000

Table 7. Mean rank and the Friedman test statistics

No.	Item	Mean Rank
1	Whole Numbers, and Basic Operations	3.24
2	Fractions, Decimals, and Percentages	5.44
3	Money	4.00
4	Time	5.36
5	Measurement	4.49
6	Space	4.86
7	Coordinates, Ratio, and Proportion	4.15
8	Data handling	4.46
	N	40
	Chi-Square	40.891
	df	7
	Asymp Sig.	0.000

The result reveals significant differences in the perceived difficulty levels of the topics and confirms "Fractions, Decimals and Percentages" and "Time" as the most challenging topics, with mean ranks of 5.44 and 5.36, respectively. Conversely, "Whole Numbers and Basic Operations" was perceived as the least difficult, with a mean rank of 3.24.

According to the open-ended responses, students struggle to grasp the concepts of fractions, decimals, and percentages due to the extensive conversions required, which often lead to confusion. Problem-solving questions further complicate understanding, especially for Level 2 students, who may also face language barriers that hinder their comprehension of these topics. Additionally, students often find the vocabulary associated with these topics difficult, adding another layer of challenge to mastering the material. Unexpectedly, "Time" is also ranked as the most challenging topic as it requires lots of converting that confuses the students. For instance, calculating the duration of time according to the date and performing addition and subtraction of time are particularly difficult. Students struggle to convert time well, further complicating their understanding and ability to solve problems related to this topic. These complexities make "Time" as challenging as "Fractions, Decimals and Percentages" for many students.

On the other hand, "Whole Numbers and Basic Operations," is generally easier for students because of its fundamental nature and straightforward calculations. The basic operations are more familiar and require less complex reasoning and conversions, making them more accessible to students. The fundamental understanding of whole numbers serves as a foundation upon which other, more complex mathematical concepts are built, explaining why students find this topic less challenging compared to "Fractions, Decimals and Percentages" and "Time."

The findings emphasize the need for tailored teaching strategies and additional support and resources for challenging topics to enhance student understanding and performance. The significant differences in perceived difficulty levels suggest that targeted interventions and curriculum adjustments are necessary for a more balanced and effective learning experience. According to Panopio (2020), understanding fundamental mathematical concepts remains a primary challenge for many students. Students' insufficient knowledge, language barriers, and the complexity of the topic often exceed their abilities, requiring innovative approaches to ensure their understanding (Hafizi & Kamarudin, 2020). Additionally, Baiduri (2020) recommended that using visual aids can help students better understand the relationships among fractions, decimals, and percentages. Teachers should use specific interventions like detailed modelling to ensure students grasp these concepts early on (Kamii & Russell, 2012).

Difficulty Level of Challenges in Teaching Mathematics DLP

Table 8 presents the perceived difficulty levels (rated from "Very Low" to "Very High") of challenges encountered in teaching Mathematics DLP. Among the 10 listed challenges identified from the literature, the most concerning challenge is "Lack of students' proficiency in the English Language" (M=3.58; SD=1.083), with 57.5% of respondents rating "High" or "Very High". This is closely followed by “Lack of students' ability to learn Mathematics in English” (M=3.45; SD=1.037), with 50% of respondents rating "High" or "Very High". In contrast, among the least concerning items are "Lack of confidence to teach" (M=2.38; SD=0.774) and "Lack of support from school" (M=2.45; SD=0.815), "Lack of teaching skills" (M=2.48; SD=0.784) and "Lack of guidance for teacher" (M=2.50; SD=0.784). Other noteworthy challenges include "Lack of encouragement from parents" (M=3.30; SD=0.853), "Lack of teaching and learning facilities" (M=2.98; SD=0.947), "Lack of teaching and learning resources" (M=2.78; SD=0.768) and "Lack of competence to teach using English" (M=2.68; SD=0.859).

Table 8. Teachers’ Perceptions of Difficulty Levels of Challenges in Teaching Mathematics DLP

	Item	Very low	Low	Moderate	High	Very high	Mean	SD
1	Lack of students’ proficiency in the English Language	2 (5.0%)	4 (10.0%)	11 (27.5%)	15 (37.5%)	8 (20.0%)	3.58	1.083
2	Lack of students' ability to learn Mathematics in English	2 (5.0%)	4 (10.0%)	14 (35.0%)	14 (35.0%)	6 (15.0%)	3.45	1.037
3	Lack of encouragement from parents	0 (0%)	6 (15.0%)	20 (50.0%)	10 (25.0%)	4 (10.0%)	3.30	0.853
4	Lack of teaching and learning facilities	3 (7.5%)	8 (20.0%)	17 (42.5%)	11 (27.5%)	1 (2.5%)	2.98	0.947
5	Lack of teaching and learning resources	3 (7.5%)	7 (17.5%)	27 (67.5%)	2 (5.0%)	1 (2.5%)	2.78	0.768
6	Lack of competence to teach using English	3 (7.5%)	12 (30.0%)	22 (55.0%)	1 (2.5%)	2 (5.0%)	2.68	0.859
7	Lack of guidance for the teacher	5 (12.5%)	12 (30.0%)	21 (52.5%)	2 (5.0%)	0 (0%)	2.50	0.784
8	Lack of teaching skills	5 (12.5%)	13 (32.5%)	20 (50.0%)	2 (5.0%)	0 (0%)	2.48	0.784
9	Lack of support from school	7 (17.5%)	9 (22.5%)	23 (57.5%)	1 (2.5%)	0 (0%)	2.45	0.815
10	Lack of confidence to teach	6 (15.0%)	14 (35.0%)	19 (47.5%)	1 (2.5%)	0 (0%)	2.38	0.774

As the perceived difficulty levels of challenges were also not normally distributed, as illustrated in Table 9, further analysis was conducted using The Friedman test, as presented in Table 10. The result indicates significant differences among the items (Chi-Square = 86.511, df = 9, $p < 0.05$).

Table 9. The Shapiro-Wilk test of the normality

No.	Item	Statistic	df	Sig.
1	Lack of students' proficiency in the English Language	.892	40	.001
2	Lack of students' ability to learn Mathematics in English	.900	40	.002
3	Lack of encouragement from parents	.858	40	.000
4	Lack of teaching and learning facilities	.894	40	.001
5	Lack of teaching and learning resources	.765	40	.000
6	Lack of competence to teach using English	.821	40	.000
7	Lack of guidance for the teacher	.823	40	.000
8	Lack of teaching skills	.833	40	.000
9	Lack of support from school	.767	40	.000
10	Lack of confidence to teach	.821	40	.000

The result reveals significant differences in the perceived difficulty levels of challenges encountered in teaching Mathematics DLP and confirms "Lack of students' proficiency in the English Language" and "Lack of students' ability to learn Mathematics in English" as the most concerning challenges, with mean ranks of 7.28 and 7.08, respectively. Conversely, "Lack of confidence to teach" was perceived as the least concerning challenge, with a mean rank of 4.09.

Table 10. Mean rank and Friedman test statistics

No.	Item	Mean Rank
1	Lack of students' proficiency in the English Language	7.28
2	Lack of students' ability to learn Mathematics in English	7.08
3	Lack of encouragement from parents	6.64
4	Lack of teaching and learning facilities	6.18
5	Lack of teaching and learning resources	5.34
6	Lack of competence to teach using English	4.96
7	Lack of guidance for the teacher	4.60
8	Lack of teaching skills	4.48
9	Lack of support from school	4.38
10	Lack of confidence to teach	4.09
	N	40
	Chi-Square	86.511
	df	9
	Asymp Sig.	0.000

The analysis indicates that the most significant challenge affecting teaching and learning Mathematics DLP is the lack of students' proficiency in the English Language and this area should be prioritized for intervention. This aligns with the qualitative feedback from teachers who expressed concern about their students' language abilities. They remarked that "English is not the students' daily spoken language", "Students are from different family educational backgrounds", "Students unable to respond in English orally", "Students can easily understand the topic when taught using Bahasa Melayu", "In every class, there are too many students who are weak in English. This obstacle causes interest in learning Mathematics to

disappear", and "Mathematics is a difficult subject to learn for most students and yet students need to learn in English". These findings highlight the difficulty students faced in understanding and engaging with the curriculum delivered in English.

The above results reveal that students' proficiency in English is a major barrier to effectively teaching Mathematics DLP. This is consistent with findings by Mphahlele et al. (2022) who found that students' proficiency in English poses a significant barrier to Mathematics instruction, while the lack of parental encouragement further compounds this challenge, emphasizing the critical role of parents in the success of DLP initiatives (Wafiroh & Harun, 2022). Moreover, moderate challenges stemming from inadequate teaching facilities and resources highlight the need for improved infrastructural support in education settings (Wafiroh & Harun, 2022). Addressing these issues requires targeted strategies that focus on improving English language skills, increasing parental involvement, and enhancing teaching resources and facilities to optimize the effectiveness of Mathematics instruction through DLP (Mphahlele et al., 2022; Wafiroh & Harun, 2022).

The educational research community is generally interested in a possible link between English language competency and mathematical achievement among students. Numerous studies have examined how students' English proficiency impacts their mathematical abilities, with findings indicating that success in Mathematics is closely tied to English language competency (Henry et al., 2016). Low English reading proficiency has been shown to significantly hinder students' performance in Mathematics (Stoffelsma & Spooren, 2018). Students with limited English proficiency consistently perform worse in Mathematics and Science as compared to their English-proficient peers (Sandilos et al., 2020). These results underscore the importance of English competency in education, suggesting that improving English skills will lead to better performance in Mathematics and other academic subjects (Stoffelsma & Spooren, 2018; Karim et al., 2023).

5.0 CONCLUSION

The study reveals a critical issue in the execution of Mathematics DLP within the KSSR curriculum, that is students' lack of proficiency in English significantly hinders their ability to learn. To address this, immediate interventions are required to enhance students' English proficiency. The findings also disclose that teachers frequently use a blend of Bahasa Melayu and English to help students understand the material, emphasizing the necessity for multilingual teaching strategies. This blended approach ensures students grasp mathematical concepts despite language barriers.

To enhance the success of DLP, comprehensive English language intervention programs should be integrated, focusing on diverse teaching methods related to Mathematics. Regular assessment of students' language proficiency should be conducted, alongside ongoing professional development for teachers in bilingual instruction and second language acquisition. Apart from that, parental involvement is also crucial. Workshops and resources should be provided to help parents create English-rich environments at home, reinforcing their child's learning. Furthermore, improving teaching resources and facilities, such as digital libraries and language labs, is vital to ensuring equal learning opportunities for all students. Implementing these initiatives will lead to more effective DLP outcomes, better educational achievements, and increased student competitiveness.

Overall, the study underscores the significant impact of students' English proficiency on their ability to learn Mathematics under the DLP and the challenges it poses for teachers. The dual burden of learning both language and mathematical content compromises the effectiveness of the DLP, necessitating targeted interventions. These interventions include professional development for teachers in bilingual education, enhanced support systems for students, and the integration of bilingual teaching materials. Schools must create supportive learning environments, and the Ministry of Education should consider revising DLP guidelines and providing additional resources. Stakeholders, including parents and policymakers, play a

crucial role in advocating for these changes and supporting ongoing efforts to refine and sustain the DLP for successful nationwide implementation. These measures are expected to contribute to a more effective and sustainable DLP, in alignment with the 2024 guidelines. The insights from this study can significantly inform the improved guidelines for the DLP Implementation year 2024 (MOE, 2024). Addressing these issues in the guidelines will ensure that the new policies are responsive to the actual challenges faced by teachers and students, ultimately leading to a more effective and sustainable educational framework.

6.0 LIMITATIONS AND RECOMMENDATION FOR FUTURE STUDIES

The sample of the study, drawn from a single district, limits the generalizability of its findings, which may not fully represent the broader challenges faced in other districts or regions implementing the Mathematics DLP. Thus, future studies are recommended to broaden the scope to multiple districts or regions and include longitudinal studies to evaluate the long-term impact of interventions on students' language proficiency and mathematical achievement. Additionally, the development and assessment of bilingual teaching strategies, enhanced learning materials, and support systems, such as additional language classes or tutoring sessions are also recommended to refine the DLP for more effective nationwide implementation.

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The authors confirm the equal contribution to this paper and approve the final version.

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9.0 CONFLICT OF INTEREST STATEMENT

All authors declare that they have no conflict of interest.

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