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## Inclusive Mathematics Teaching in Primary Schools: An Analysis of Challenges and Barriers Faced by Teachers

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**Abstract.** The implementation of inclusive education in primary school mathematics in Malaysia faces a range of complex challenges that require in-depth research to understand the scope and intensity of the issues encountered by teachers. This is a quantitative study employing a survey design and targeting 500 primary school mathematics teachers who teach in inclusive classrooms across Malaysia, including Sabah and Sarawak. The research instrument consisted of a questionnaire with 19 dimensions of challenges measured using a five-point Likert scale, while the data analyses were conducted using descriptive statistics and multiple linear regression analysis via IBM SPSS Statistics version 29. Multiple linear regression analysis revealed nine dimensions as significant predictor variables, which explained challenges related to inclusive mathematics teaching, while the regression model showed an excellent performance with a correlation coefficient value of 0.907 and a coefficient of determination value of 0.822. From the above, it has been estimated that 82.2% of the variance in inclusive mathematics teaching challenges can be accounted for by these nine dimensions, namely diverse student needs contributing the highest, followed by visual-spatial difficulties, overly advanced curriculum level, limited school financial resources, attitude toward mathematics, lack of pedagogical and content knowledge, shortage of special education teachers, limited teaching resources, and behavioral problems. The study successfully identified a hierarchy of nine challenge dimensions, with diverse student needs being the primary contributing factor. In addition, this mathematical model provides a detailed guide for all stakeholders in the systematic and effective

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management of the challenges in the teaching of inclusive mathematics. The employment of cognitive load theory (CLT) in understanding these challenges provides a well-founded theoretical basis for the development of more effective methods of teaching. The success of inclusive mathematics education depends on continuous commitment to providing sufficient support, training, and resources from policymakers, school administrators, and teachers.

**Keywords:** teacher challenges; inclusive education; mathematics teaching; primary school; special educational needs

## 1. Introduction

The implementation of inclusive education has been outlined in the Malaysia Education Blueprint (MEB) 2013-2025 as one of the nation's primary aspirations to provide equitable and comprehensive educational access to all Malaysian children (Ministry of Education Malaysia [MOE], 2013). Inclusive education is a notion that means that all students, even those with special needs, are allowed to learn in the same environment (United Nations Education, Scientific and Cultural Organization [UNESCO], 2020). This concept does not merely entail the consideration of the physical space being similar to all students; it also demands a complete change in teaching and learning strategies that are able to address the different needs of students in the same classroom.

However, the implementation of inclusive education, particularly in mathematics subjects, poses various complex and diverse challenges to teachers due to the need to accommodate different learning styles, varying levels of cognitive abilities, and specific support requirements within the same learning environment (Das, 2021). According to Bastian et al. (2025), mathematics teachers working in inclusive education must have more skills and knowledge than those in the traditional setting, such as sophisticated knowledge of inclusive learning theories, flexible instructional approaches, and the capability to develop mathematical tasks that can be accomplished by all learners irrespective of their ability levels.

The concept of inclusive mathematics education has captured the interest of numerous scholars because of the intricacy surrounding how best academic performance should be guaranteed to all types of students (Mahmud et al., 2023). In their research, Roos (2023) found that in mathematics, teachers have the dilemma of either upholding high academic standards or not leaving students behind during the learning process. This difficulty is particularly acute when it comes to students with special needs who might take longer to grasp simple mathematical ideas, on the one hand, while at the same time teachers should make sure that the rest of the students in the classroom do not feel bored or under-challenged by the quality of teaching offered.

However, a review of existing literature shows that there is a significant research gap in understanding the actual challenges faced by primary school mathematics teachers in the context of inclusive education, particularly in Malaysia. Schmidt (2015) emphasized that research related to inclusive teaching in mathematics is

still limited. Most studies conducted previously have focused more on theoretical aspects and inclusive education policies in general, while empirical studies that examine in-depth the experiences and challenges of mathematics teachers in implementing inclusive mathematics education in the classroom remain very limited (Moreira & Manrique, 2014). Furthermore, most previous studies have used qualitative approaches such as interviews and case studies; however, there is still a lack of large-scale quantitative research that can measure the level of challenges statistically and allow generalization to a broader population of teachers.

The context of primary schools in Malaysia exhibits a unique scenario in the implementation of inclusive mathematics education owing to the very pronounced diversity of students' cultural, linguistic, and socioeconomic backgrounds. Rahim et al. (2020) explained that primary school mathematics teachers in Malaysia not only need to deal with the diversity of students' academic abilities but also need to use teaching approaches that are sensitive to cultural and linguistic differences, especially in the Malaysian context which comprises various races and different mother tongues. This scenario makes inclusive mathematics teaching in Malaysian primary schools a phenomenon that requires in-depth study to understand the actual challenges faced by teachers and to find effective solutions to improve the quality of inclusive mathematics education.

## **2. Problem Statement**

Teaching mathematics inclusively in primary schools is a complex issue that has numerous challenges that negatively affect the success of all students, especially learners with special educational needs (SEN) in the inclusive education program (IEP). Even though the Ministry of Education Malaysia (MOE) has set the goal of having 75 percent of SEN students enrolled in the IEP by the year 2025 (MOE, 2016), all levels of mathematics performance also indicate a concerning downward trend. The state of affairs can be proved with reference to the 2022 data published by the Program for International Student Assessment (PISA), which showed that the average score of mathematical literacy in Malaysia declined by 31 points, raising concerns regarding the standard of mathematics education at the country level.

The principal difficulties of the establishment of inclusive mathematics teaching can be attributed to a number of acute issues. Teachers have a problem of in-depth learning of the content of mathematics; in such cases they have difficulty in being able to explain mathematical procedures and skills to students with different levels of ability. As emphasized by Ling and Mahmud (2023), a teacher must have a good command of mathematical concepts and appropriate instruction skills to impart the programs to students with various needs. Quality mathematics teaching in both regular and special education requires subject-matter expertise because, without it, the teacher is not able to achieve the learning goals of every group of students (Ekstam et al., 2017). This deficiency in content mastery makes it difficult to adjust the curriculum and instructional approaches to suit the diverse student capabilities.

The fact that mathematics teachers do not have the underlying knowledge in special education and methods of dealing with students with SEN often leaves them unprepared to encounter inclusive classroom settings. As Kirmizigül (2022) points out, not all mainstream teachers giving IEP classes are even basically trained in special education or experienced in dealing with SEN students. The lack of training to work in inclusive environments is a major problem among mathematics teachers, which results in the lack of motivation to work with diverse learners in the same classroom (Gardesten, 2023).

Mathematics teachers are often unprepared for inclusive classroom environments owing to their lack of foundational knowledge in special education and strategies for managing students with SEN. According to Kirmizigül (2022), some mainstream teachers assigned to teach IEP classes have no basic training in special education or experience in handling SEN students. Gardesten (2023) also noted that the absence of preparation for working in inclusive settings is a significant issue among mathematics teachers, leading to a lack of motivation to manage diverse learners within the same classroom. The lack of pedagogical skills for inclusive mathematics teaching has resulted in students' showing limited responses to lessons that lack meaningful engagement (Madasamy & Nasri, 2025).

The implementation of inclusive mathematics teaching is further complicated by environmental factors such as high student numbers in the classes, time constraints in achieving the syllabus, inaccessibility of special teaching resources and materials, and inappropriate classroom conditions. Rousseau and Powell (2005) explained that several factors can act as barriers to inclusive mathematics instruction, including large class sizes, high-stakes standardized testing, student absenteeism and mobility, as well as the lack of high-quality curricula. Hamdan and Al-Muz-Zammil (2022) stated that teachers are generally burdened with additional responsibilities beyond teaching, which can widen the gap in providing effective inclusive mathematics instruction. Furthermore, Thwalaa et al. (2020) indicated that the lack of preparation in teaching inclusive mathematics classes is not a unique issue as teachers have time constraints in making and creating instructional material and activities to meet the different ability levels of students.

Effective two-way communication remains a significant barrier, particularly when dealing with students who have hearing impairments, language comprehension difficulties, or differing cognitive abilities. Ling and Mahmud (2023) also note that the challenges associated with effective two-way communication in the inclusive teaching of mathematics tend to arise when students cannot communicate what they do not know for fear of being judged by their peers in a classroom. Kompara et al. (2022) observed that educators experience communication challenges when dealing with deaf or hard of hearing students. Mainstream teachers tend to be unfamiliar with the use of sign language or other communication tools; therefore, it is challenging to offer constructive feedback and proper evaluation (Allala, 2024).

Avramidis (2002) stated that teachers' perceptions, attitudes, and mindsets are key to the successful implementation of inclusive teaching. Saiful Azam (2017) also acknowledged that one of the recurring issues in inclusive education is the attitude of mainstream teachers who struggle to accept students with special educational needs in their classrooms. Students' perceptions of learning mathematics greatly influence their motivation to participate as well as their academic achievement (Khanal, 2022). Therefore, negative teacher attitudes can have a ripple effect on students' motivation and performance in learning mathematics.

The cognitive burden of the teachers is also a major problem that prevents the adoption of inclusive mathematics teaching. As CLT according to Sweller (1988) posits, the human working memory is limited in terms of capacity; when the cognitive load surpasses this capacity, learning becomes inefficient. As a part of teaching mathematics inclusively, educators have to cope with complex information at once, knowing the various needs of learners, developing differentiated instruction, controlling diverse student behaviors, and measuring the success rates using a variety of assessment tools.

The lack of resources and time, as well as the necessity to work through the syllabus within a given period only adds to this mental load (Asmara, 2020). As a result, the teachers working in inclusive classrooms are subjected to too much mental load, which makes it difficult to make correct and holistic pedagogical choices that can meet the needs of every student. This theoretical framework of CLT provides the foundation for understanding how the nineteen challenge dimensions examined in this study contribute to teachers' overall cognitive burden in implementing inclusive mathematics education in Malaysian primary schools.

These problems and difficulties have established a significant disparity in the quality of inclusive mathematics education in Malaysian primary schools. The scarcity of research that pays particular attention to the specific issues of learning mathematics in the inclusive setting has resulted in a narrow perspective on the actual conditions and challenges educators have to cope with. Thus, these challenges need to be thoroughly investigated in order to come up with viable and applicable improvement measures that could be used to make the teaching of inclusive mathematics in Malaysia effective.

### **3. Methodology**

#### **3.1 Research Design**

This study employs a quantitative approach using survey design. According to Ariffin et al. (2021), a survey is a form of research aimed at describing a problem or phenomenon that is currently occurring. This design is also appropriate for identifying and analyzing the challenges faced by teachers in implementing inclusive mathematics instruction. The quantitative approach enables the researcher to measure and analyze data statistically in order to understand the scale and scope of the issues encountered in the field.

### 3.2 Population and Sample

The population under study includes primary school mathematics teachers working in inclusive classes in Malaysia. According to the statistics, there are about 3,982 teachers who teach in inclusive classes in primary schools (Special Education Division, 2023). According to the Bukhari sample size calculator, the minimum required sample size is 350 (Bukhari, 2020). This study targets 500 mathematics teachers as respondents to account for the possibility of incomplete or low-quality questionnaire responses.

The sampling method used is purposive sampling, ensuring that selected respondents meet specific criteria (Chua, 2021), namely primary school mathematics teachers with experience teaching in inclusive classes. This approach enables the researcher to obtain accurate and meaningful data from individuals with direct, relevant experience of the challenges of inclusive mathematics instruction.

### 3.3 Data Collection Instrument

The main tool employed in the present research is the questionnaire conducted with the help of Google Forms. The questionnaire was based on the thorough literature analysis and revised according to the previous instruments related to the issue of inclusive mathematics teaching and special education. It has two main sections: Section A consists of items on the background of the respondents, and Section B consists of 19 dimensions of challenges, namely (a) diversity of learner needs; (b) difficulties in behavior management; (c) parental attitudes; (d) an excessive number of topics; (e) the level of curriculum difficulty; (f) students' attitudes toward mathematics; (g) assessment systems that are not inclusion-friendly; (h) inadequate school facilities; (i) non-conducive classroom environments and overcrowding; (j) limited teacher pedagogical and content knowledge; (k) workload from differentiated daily lesson plans (RPH); (l) weaknesses in basic mathematical facts; (m) student behavior problems; (n) limited financial resources; (o) an insufficient number of special-education teachers; (p) mathematics anxiety; (q) visual-spatial difficulties; (r) limited teaching resources; and (s) communication problems.

All of the items were rated using a five-point Likert scale whereby 1 means "Strongly disagree" and 5 means "Strongly agree". The respondent were able to identify the extent to which they agree with a given challenge.

### 3.4 Instrument Validity and Reliability

Instrument validity was established through face and content validity. Four specialists, two in special education and two in mathematics education, in major educational institutions were selected to review the appropriateness of the items, the language clarity, and their relevance to the aims of the study.

Reliability was assessed through a pilot study involving 50 mathematics teachers with characteristics similar to the actual study sample. The pilot data were analyzed using Cronbach's alpha to determine the instrument's internal consistency. The Cronbach's alpha value was 0.935, indicating satisfactory

reliability. According to Bond and Fox (2015), an alpha value between 0.71 and 0.99 reflects a good level of reliability.

### **3.5 Data Collection Procedure**

A systematic collection of data was carried out. First, approval was applied through the ePenyelidikan (ERAS) system, with the Education Policy Planning and Research Division of the Minister of Education. After approval, the appropriate State Education Departments (JPN) and District Education Offices (PPD) were approached. Once all the necessary approvals had been received, the Google Forms link was sent to respondents via school administrators and official school email. The respondents had four weeks to fill in the questionnaire. The research was conducted according to ethical guidelines. All respondents were informed of the study before receiving the questionnaires, and their confidentiality was guaranteed.

### **3.6 Data Analysis**

The data obtained were analyzed with the IBM SPSS Statistics version 29. Statistical analysis was conducted in two forms: descriptive and inferential. The demographic profiles of the respondents in frequencies and percentages were reported using descriptive analyses. To analyze the findings in an inferential manner, multiple linear regression was used to identify the level of contribution of each of the demographic variables to the severity of the challenges faced in inclusive mathematics teaching. Before executing the multiple regression, the statistical assumptions, normality, linearity, multicollinearity, and homoscedasticity were analyzed to verify the validity of the analysis.

## **4. Research Findings**

### **4.1 Descriptive Analysis**

In this study, 500 primary school mathematics teachers in Malaysia participated, including Sabah and Sarawak. The majority of the respondents were female teachers (56.2) as compared to male teachers (43.8). Regarding age, the highest percentage was shown in the 40-49 age group; this implies that the majority of the respondents are experienced educators. The respondents were well-established and experienced in the area of mathematics teaching with over half of them having teaching experience of more than 15 years (51.0%). In terms of academic qualifications, the majority at 65.8% of the respondents had a bachelor's degree in education. On the issue of the classroom size, 38.0% of the teachers were teaching a class size of 20 to 30 students, and 30.6% were teaching a class size of 31 to 40 students. This means that the class sizes are moderately large in the case of mathematics teaching and learning.

**Table 1: Profiles of study respondents**

<b>Characteristics</b>	<b>Total n (%)</b>
<b>Gender</b>	
Male	219 (43.8)
Female	281 (56.2)
<b>Age</b>	
20-29 years	44 (8.8)
30-39 years	198 (39.6)
40-49 years	228 (45.6)
50 years and above	30 (6)
<b>Teaching Experience</b>	
Less than 5 years	47 (9.4)
5-10 years	72 (14.4)
11-15 years	126 (25.2)
More than 15 years	255 (51)
<b>Academic Qualification</b>	
Diploma in education	25 (5)
Bachelor's degree in education	329 (65.8)
Master's degree	110 (22)
Doctoral degree	21 (4.2)
Others	15 (3)
<b>Class Size Taught</b>	
Fewer than 20 students	99 (19.8)
20-30 students	190 (38)
31-40 students	153 (30.6)
More than 40 students	58 (11.6)

#### 4.2 Inferential Analysis

Before conducting the multiple regression analysis, all five basic assumptions were tested and met. Compliance with these assumptions ensured the validity and reliability of the results obtained. The multiple linear regression analysis identified nine statistically significant predictor variables ( $p < 0.05$ ) in explaining the challenges of inclusive mathematics teaching, namely Diversity of Students' Needs, Visual-Spatial Difficulties, Curriculum Level Too High, Limited Financial Resources, Attitudes toward Mathematics, Teachers' Lack of Pedagogical and Content Knowledge, Limited Teaching Resources, Insufficient Number of Special Education/Resource Teachers, and Behavioral Problems.

The multiple regression model demonstrated excellent performance, with a correlation coefficient (R) value of 0.907, indicating a very strong linear relationship between the combination of nine challenge dimensions and the difficulties in inclusive mathematics teaching. The coefficient of determination ( $R^2$ ) value of 0.822 shows that 82.2% of the variance in the challenges of inclusive mathematics teaching can be significantly explained by the combination of these nine challenge dimensions:  $F(9, 490) = 251.576$ ,  $p < .001$ .

Table 2: Model summary<sup>d</sup>

R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change
0.907 <sup>a</sup>	0.822	0.819	0.34724	0.002	4.624	1	490	0.032

Predictors: (Constant), Diversity of Students' Needs, Visual-Spatial Difficulties, Curriculum Level Too High, Limited Financial Resources, Attitudes toward Mathematics, Teachers' Lack of Pedagogical and Content Knowledge, Limited Teaching Resources, Insufficient Number of Special Education/Resource Teachers, and Behavioral Problems.

The ANOVA analysis below also confirmed that the model was statistically significant, with  $F(9, 490) = 251.576$ ,  $p < 0.001$  at a confidence level of  $\alpha = 0.001$ . The sum of squares for regression (273.006) compared to the sum of squares for residual (59.082) indicates that the model successfully explained a substantial proportion of the variance in the data.

Table 3: ANOVA<sup>b</sup>

Analysis	Sum of Squares	df	Mean Square	F	Sig.
Regression	273.006	9	30.334	251.576	<.001 <sup>j</sup>
Residual	59.082	490	0.121		
Total	332.088	499			

Table 4 presents the regression coefficients analysis. All nine challenge dimensions contributed positively and significantly to the challenges of inclusive mathematics teaching.

Table 4: Multiple regression coefficients for the challenges of inclusive mathematics teaching

Analysis of Predictor Variables	Coefficients Unstandardized B	Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.	Correlations		
						Zero-order	Partial	Part
(Constant)	0.146	0.081		1.799	0.073			
Visual-Spatial Difficulties	0.125	0.034	0.134	3.717	0.000	0.797	0.166	0.071
Diversity of Students' Needs	0.145	0.030	0.163	4.855	0.000	0.791	0.214	0.093
Limited Financial Resources	0.122	0.031	0.136	3.932	0.000	0.787	0.175	0.075
Teachers' Lack of Pedagogical and Content Knowledge	0.087	0.026	0.102	3.318	0.001	0.742	0.148	0.063
Curriculum Level Too High	0.125	0.029	0.136	4.346	0.000	0.761	0.193	0.083
Attitudes toward Mathematics	0.121	0.033	0.130	3.725	0.000	0.792	0.166	0.071
Limited Teaching Resources	0.079	0.027	0.093	2.952	0.003	0.745	0.132	0.056
Insufficient Number of Special Education/Resource Teachers	0.080	0.028	0.093	2.833	0.005	0.760	0.127	0.054
Behavioral Problems	0.069	0.032	0.074	2.150	0.032	0.776	0.097	0.041

Notes: B = Unstandardized coefficient; Beta ( $\beta$ ) = Standardized coefficient

The multiple regression model developed can be represented by the following mathematical formula:

$$Y = 0.146 + 0.145X_1 + 0.125X_2 + 0.125X_3 + 0.122X_4 + 0.121X_5 + 0.087X_6 + 0.080X_7 + 0.079X_8 + 0.069X_9$$

where  $Y$  represents the challenges of inclusive mathematics teaching,  $X_1$  = Diversity of Students' Needs,  $X_2$  = Visual-Spatial Difficulties,  $X_3$  = Curriculum Level Too High,  $X_4$  = Limited Financial Resources,  $X_5$  = Attitudes toward Mathematics,  $X_6$  = Teachers' Lack of Pedagogical and Content Knowledge,  $X_7$  = Insufficient Number of Special Education/Resource Teachers,  $X_8$  = Limited Teaching Resources, and  $X_9$  = Behavioral Problems. The constant value of **0.146** indicates the baseline level of teaching challenges that exists even when all challenge dimensions are at zero, suggesting that inclusive mathematics teaching inherently involves unavoidable basic challenges.

## 5. Discussion

This study successfully identified nine main challenges faced by mathematics teachers in implementing inclusive teaching at the primary school level. The challenge of diversity of students' needs was found to contribute the most, with a regression coefficient value of 0.145 units. This indicates that this challenge is the main factor influencing the level of difficulty in teaching mathematics within an inclusive environment. The high contribution reflects the complexity of teachers' tasks in addressing students' diverse abilities and learning needs within the same classroom. Banerjee and Gautam (2024) state that the variety of needs of students in an inclusive classroom demands that teachers should be able to master three or four different teaching techniques to be used on each topic in mathematics taught.

This challenge is complicated by the fact that differentiation in instruction has to be adopted by teachers. Educators should design learning materials at different degrees of complexity; employ different modes of teaching, such as visual, auditory, and kinesthetic media; and adapt their methods of delivery depending on the specific learning styles of the students (Mustaffa et al., 2021). This observation is in line with the views of Vodickova et al. (2023), who explained that mathematics educators in inclusive settings endure enormous challenges of meeting the needs of students with vastly different achievement levels.

The dimensions of visual-spatial difficulties and curriculum level being too high, both recorded the same regression coefficient value of 0.125 units. The visual-spatial challenge is an indication of the challenges faced by teachers in presenting mathematical ideas that involve visualization and appreciation of space, especially to the student who has problems with this. Blatto-Vallee et al. (2007) reported that learners with visual-spatial problems usually have problems in understanding spatial relations between objects, visualizing geometric operations, and interpreting information on a graphical or chart representation. Thus, their teaching should be more practical and concrete so that this group of students could understand abstract mathematics better.

The current mathematics syllabus might not be appropriate to the capability of all students in inclusive classes; thus, the teaching and learning process is difficult.

Bouck and Kulkarni (2009) also argue that the mathematics courses taught to mainstream students often have concepts which are very abstract and demand high level of skills and thus are not accessible to students with special needs of education who need a more practical and gradual learning style.

Limited financial resources were identified as a challenge with a significant impact, reflected by a regression coefficient value of 0.122 units. This indicates that insufficient funding and financial support serve as major barriers to the effective implementation of inclusive mathematics teaching. According to Gubbels et al. (2017), the cost of implementing a high-quality inclusive education program is considerably higher than that of conventional education programs. This challenge is closely linked to the need to provide specialized mathematics teaching aids, assistive technologies such as specialized software and learning tools, adequate physical facilities, as well as the costs associated with teacher training and professional development.

Attitudes toward mathematics recorded a regression coefficient value of 0.121 units, reflecting the challenges teachers face in implementing inclusive mathematics teaching. The fact that negative attitudes of students towards mathematics in inclusive classrooms which combine students with special educational needs and mainstream students complicates the process of providing teachers effective instruction to all students with diverse needs. Such negative views based on Malaysian cultural assumptions such as mathematics are challenging to study serve as a greater psychological barrier among students with special educational needs, who already have other learning challenges (Lee Fang Mei, 2021). The commonly held stereotype that mathematics is a subject that only students with higher academic ability can do adds to the belief that special educational needs students are more likely to accept failure (Roos, 2023).

Thus, the problem of negative attitudes to mathematics should be addressed since it can weaken the chances of success of students with the inclusive classroom. The challenge of teachers' lack of pedagogical and content knowledge recorded a regression coefficient value of 0.087 units, indicating that insufficient skills and knowledge in inclusive pedagogy and mathematics content are also factors influencing teaching challenges. Buscher and Prediger (2022) explain that teachers need pedagogical content knowledge that includes knowledge about the curriculum, the subject matter, instructions, and student traits to provide efficient teaching.

Among the essential elements of pedagogical knowledge, the capacity to give effective feedback in oral questioning activities has been established as one of the main factors contributing to an increase in student comprehension and engagement in mathematics classrooms (Mahmud et al., 2020) The use of various approaches in oral questioning has been shown to help students increase their mathematical language fluency and enable them to understand mathematical concepts better (Mahmud et al., 2020b).

DeSimone and Parmar (2006) also noted that one of the main challenges faced by inclusive mathematics teachers is their inability to adapt mathematical content to the SEN students owing to limited knowledge of relevant learning theories. Many mathematics teachers continue to struggle to adjust their teaching approaches because of a lack of specialized training in inclusive pedagogy.

Meanwhile, the insufficient number of special education or resource teachers which has a regression coefficient value of 0.080 units suggests that insufficient support of resource teachers is also a factor that adds to the problems of inclusive mathematical teaching. According to Hamdan et al. (2023), the shortage of resource teachers in inclusive education is one of the main challenges affecting the effectiveness of inclusive education programs in Malaysia. Without adequate support from the Program Pendidikan Khas Integrasi (PPKI) or resource teachers, mathematics subject teachers are often required to manage students with special needs on their own, making it difficult to provide individual attention and appropriate adaptations to the mathematics content.

The regression coefficient value of limited teaching resources was 0.079 units which indicated the difficulty that teachers experience when trying to obtain suitable mathematics teaching resources. The unavailability of appropriate resources makes it difficult for teachers to design meaningful and effective learning experiences in mathematics for every student (Roos, 2023). The supporting materials that teachers need include manipulatives, technological tools, such as a graphing calculator or special software, and electronic materials that can be customized to meet the needs of students with different abilities. There are, however, numerous cases when teachers are left with the option of relying on the available resources only, including textbooks that are usually too complex for SEN students. In the absence of relevant technologies and resources, teachers are not always able to make the learning process interesting, interactive, and relevant to the real needs of students.

Furthermore, the issue of behavioral problems was determined to have the lowest value of regression coefficient of 0.069 units although still significant in the regression model. Orsati and Causton-Theoharis (2012) state that SEN students tend to behave differently from others. Therefore, teachers need to be knowledgeable and adaptable in order to change their approaches. Lack of adequate skills may prove to be a challenge to the teachers when the student conduct disrupts the progression of mathematics classes as it not only impacts the learning of the SEN students but also the general classroom atmosphere.

## **6. Implications of the Findings**

The findings have implications for the CLT of inclusive mathematics instruction. The first aspect of different student needs requires that teachers will have to cope with various cognitive loads among the learners with different working memory capacities. Santerre et al. (2011) presented three types of cognitive loads, including intrinsic (complexity of the content), extraneous (the way information is presented), and germane (construction of the schema). In inclusive classrooms, the teachers need to maximize all three types in respect to students with different

abilities. Visual-spatial difficulty implies that the SEN students have higher intrinsic cognitive load when dealing with mathematical concepts that require spatial visualization. Therefore, the teacher ought to reduce extraneous cognitive load by offering learning materials in different modes such as physical manipulation, simplified illustrations, and with usage of relevant digital tools. The overloaded curriculum suggests the problem of disconnectivity between intrinsic cognitive load and the working memory of SEN learners, and the necessity of the modular and tiered approach that separates the complex concepts into easily digestible units.

In the case of education policy, the MOE needs to re-write the mathematics curriculum to allow flexibility and adaptability without the need to compromise on academic standards. Drawing from best practices in informal STEM learning environments, the curriculum redesign should incorporate inquiry-based approaches, hands-on activities, and design-based problem-solving that have proven effective in engaging diverse learners while addressing the challenges identified in this study (Hussim et al., 2024). Teachers must be given clear instructions on how to tailor learning curricula to SEN students without compromising the core learning aims.

A small budget implies that the government needs to invest specifically in assistive technology, mathematical manipulatives, and infrastructure development, such as equipment upkeep and replacement costs. In teaching, educators should use differentiated instructions and multisensory learning to support visual-spatial challenges using manipulatives, computer-based programs, and kinesthetic activities so that complex mathematical concepts can be made available to all students by using scaffolded learning.

The absence of pedagogical knowledge points to the need to have an all-encompassing professional development program that includes not only a command of mathematical material but also a solid understanding of inclusive teaching techniques, behavior management, and the use of assistive technologies. Johari et al. (2022) concluded that STEM professional programs produced by workshops were effective in terms of teaching practices and student outcomes. Higher learning institutions, the MOE and schools need to work together to develop training programs that will respond to the needs of the inclusive classroom setting, including the application of the CLT to various students.

In the case of school support systems, the scarcity of special education teachers must be managed in terms of strategic recruitment and training in line with the student requirements, with inclusive mathematics pedagogical training. The shortage of teaching materials requires the creation of specialized learning resource centers of mathematics provided with manipulatives, assistive technology, and digital materials and which requires the NGOs and the private sector to supply more materials and investment.

## 7. Conclusion

In this research a hierarchical list of nine forms of challenges was established. The primary factor is the diversity of the needs of the students. The mathematical model created acts as a guide to all the stakeholders to approach the issues of inclusive mathematics teaching in a systematic manner. The constant of 0.146 indicates a minimum level of difficulty that is not affected by all the other dimensions, being at zero. It implies that there are always some fundamental challenges in inclusive mathematics teaching that cannot be overlooked.

The CLT can help develop an effective teaching strategy with a solid framework. Inclusive mathematics education requires commitment on the part of policymakers, school administrators, and teachers. They should provide adequate support, training, and appropriate resources. By collectively addressing all of the challenges mentioned, we will be able to work towards the achievement of high-quality and inclusive mathematics education among all students. This could assist in the reduction of the academic achievement disparity and building a more advantageous and equitable learning atmosphere for all.

Despite the significant contribution that this study makes on our comprehension of the challenges in inclusive mathematics teaching, there are several limitations that one should consider when interpreting the findings. To have a deeper insight into the complexity and details of the real-world experiences of teachers in inclusive classrooms, the research initially applied a quantitative survey methodology that relied on the perception and self-report data of respondents. Secondly, the researchers did not consider the viewpoints of other stakeholders such as students, parents, or school administrators; only the viewpoints of the teachers were considered. Thirdly, the contextual factors that could influence the types and levels of the difficulties that teachers face, including the type of school, its location (rural or urban), and the various composition of students with special education needs, were not considered in the study.

Future research is recommended to include qualitative research design, integrate the views of multiple stakeholders, and be stratified random sample-based, and longitudinal research to investigate the changes in the difficulties with time. It is also recommended to incorporate other theoretical frameworks that are complementary to each other such as the universal design for learning (UDL) to uncover the best practices and the strategies that can help improve the quality of inclusive mathematics education in Malaysia.

## 8. Acknowledgments

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