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Teachers' Perspectives on the Use of Basic Mathematical Operations Skills Modules for Dyscalculia Students

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ABSTRACT

Some pupils struggle with math due to dyscalculia, a condition that makes learning and working with numbers difficult. As agents of 21st-century education, teachers play a crucial role in applying student-centered, engaging methods to support these pupils effectively. To enhance our understanding of how to effectively support dyscalculic students, this study explores teachers' perspectives on the use of specialized modules for basic mathematical operations. The thoughtfully designed module aims to provide a structured and visually engaging learning experience, specifically tailored to address the unique challenges faced by students with dyscalculia. The design of this study uses qualitative approaches by using semi-structured interviews and observations to determine how the modules are used to teach basic arithmetic operations to dyscalculic students, verify whether the use of these modules would help dyscalculic students catch up with their peers in math performance, and find out teachers' barriers with handling the modules. The study sample consisted of three special education mathematics teachers. The findings show all of the three respondents use the basic mathematical operations skills module for dyscalculic students weekly during math lessons. Results indicate that providing modules tailored to the abilities and needs of dyscalculic students is crucial for overcoming their math difficulties. This study also reveals an effective strategy when students struggle in math. However, one of the most important challenges special education math teachers is the problem of student attendance. Nevertheless, research involving the mathematical skills of dyscalculia students can be further improved by looking for the development of teaching and learning of special education teachers and students. The implications of this paper are significant, offering a foundation for designing models and modules tailored for dyscalculic students and developing suitable instruments to enhance their learning experience.

1. Introduction

Mathematics is often regarded as a universal language, essential for various aspects of daily life and academic achievement. In Malaysia, mathematics is a core subject in the education system,

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mandated by the Ministry of Education Malaysia (MOE) as part of the national curriculum. This emphasis on mathematics is not merely for academic purposes; it serves as a foundation for critical thinking and problem-solving skills that are vital in today's rapidly evolving world [1]. It encourages cognitive development through problem-solving [2]. The MOE has recognized the importance of adapting its assessment methods to better reflect students' understanding and capabilities [3]. Consequently, annual exams for primary students in Standards 1 to 3 have been abolished in School-Based Assessment (PBS) and Classroom Assessment (PBD). This shift aims to provide a more holistic view of a student's abilities and progress throughout the academic year. The grading system has undergone significant changes in recent years, particularly with the introduction of the Level of Mastery (TP) grading system. It emphasizes mastery over mere rote learning, allowing educators to identify students' strengths and weaknesses in real time [3]. TP levels assess students' overall comprehension and skills rather than solely on their exams. The TP levels are as Table 1.

Table 1
Level of mastery grading system

TP Level	Description
TP 1	Lowest level of mastery
TP 2	Basic understanding
TP 3	Moderate understanding
TP 4	Good understanding
TP 5	Very good understanding
TP 6	Excellent mastery, able to apply knowledge creatively and analytically

Despite the structured grading system, many learners encounter significant challenges in mathematics, particularly in the early grades. Factors that contribute to the difficulties such as cognitive development [4], language proficiency [5], instructional methods and socioeconomic factors [6]. Based on the cognitive development theories, children progress through stages of cognitive development that influence their ability to understand mathematical concepts [4]. Learners may struggle with abstract thinking, which is crucial for grasping mathematical operations.

Mathematics is often perceived as a language of its own, requiring learners to read and interpret problems accurately. Coetzer *et al*., [7] emphasised that learners with limited proficiency in the language of instruction may find it challenging to understand mathematical terminology and concepts, leading to errors in reading and writing numbers. Socioeconomic status can influence access to educational resources, including tutoring and supplementary materials [8]. While Sani *et al.,* [9] emphasizes the need for teacher training and resources to support dyscalculic students, research specifically examining teachers' perspectives on using targeted instructional tools, such as Basic Mathematical Operations Skills Modules, is still limited.

Previous studies have highlighted the challenges teachers face in adapting instructional materials to meet the unique needs of dyscalculic learners [10]. Additionally, the effectiveness of intervention modules in improving foundational mathematical skills for students with dyscalculia remains underexplored. Furthermore, research on barriers to implementing such tools in special education contexts, particularly within programs like the Special Education Integration Program (PPKI), is scarce [11]. This study addresses these gaps by exploring teachers' perspectives on the use of Basic Mathematical Operations Skills Modules, assessing their impact on dyscalculic students, and identifying implementation challenges. The findings aim to enhance teaching practices and resources for dyscalculic learners.

1.2 Objectives

This study seeks to explore teachers' perspectives on the use of Basic Mathematical Operations Skills Modules specifically designed for dyscalculic students within the Special Education Integration Program (PPKI). The specific research objectives are (i) to identify the use of modules in teaching basic mathematical operations to dyscalculic students, (ii) to assess the effectiveness of these modules in improving basic mathematical skills for dyscalculic students and (iii) to identify the challenges teachers face when using these modules to teach students with dyscalculia.

1.3 Literature Review

The theory of Multiple Intelligences by Howard Gardner based on the logical-mathematical intelligence, provides a solid theoretical support for this study. The applicable theory of Howard Gardner is logical-mathematical and is based on the idea that the intellectual abilities measured through IQ tests are very limited [12]. This is because the IQ test measures only logical-mathematical and linguistic abilities. Furthermore, intelligence is not only measured by the grades one achieves but also by the ability to perceive a problem and subsequently solve it. This intelligence is related to logic, abstraction, reasoning, and numbers. The dominant ability in the left hemisphere of the brain allows individuals to reason deductively and inductively as well as think conceptually [13,14]. Although it is often assumed that those with this intelligence naturally excel in fields such as mathematics, chess, computer programming, and other logical or numerical activities, a more precise definition places less emphasis on traditional and advanced mathematical abilities and more on reasoning skills, identifying abstract patterns, scientific thinking and investigation, and the ability to perform computational reasoning [15].

According to Talamás-Carvajal *et al.,* [16], complex reasoning is closely related to fluid intelligence and general ability. In this way, an understanding of the various dimensions and components that yield intellectual capacities can help provide similar insights into what it means to be a dyscalculic student. This had led to a theory that personalized instruction can encourage quantitative reasoning, abstract thought and logical thinking. Special attention is given to students with different backgrounds and learning abilities, ensuring that all learners acquire the mathematical knowledge and skills emphasized in the curriculum. Despite these advancements, students with specific learning disabilities, such as dyscalculia, often face unique challenges that hinder their mathematical development [18]. Dyscalculia affects approximately 3 – 6% of the population, leading to difficulties in understanding numbers and performing basic arithmetic operations [19,20]. As these students progress through their education, their struggles can result in low self-esteem and anxiety surrounding mathematics.

On the other hand, Piaget's theory of cognitive development provides a gradient for conceptualization to understand how dyscalculic students might process numbers and mathematical skills [19]. Piaget believed that children progress through four major stages in cognitive development, each characterized by a unique way of thinking. These students might be chronologically in the older ages, but they may show cognitive characteristics as mentioned above of earlier stages organisation and concrete operational thinking. This developmental lag can also slow down their capacity to think abstractly from mathematical ideas and resolve difficult difficulties [21].

Understanding how dyscalculic students are limited cognitively, allows for teachers to adjust their teaching style accordingly. The Basic Mathematical Operations Skills Modules can provide a developmental approach to help those learn how to perform operations with enough connection back the real world so that learners are not overwhelmed by abstract concepts. An example would

be the use of manipulatives and visual aids to provide concrete experiences for students with dyscalculia around number concepts and operations. Teacher can facilitate cognitive development through direct instruction and structured experiences where children are given the opportunity to practice.

2. Methodology

This study seeks to explore teachers' perspectives on the use of Basic Mathematical Operations Skills Modules specifically designed for dyscalculic students within the Special Education Integration Program (PPKI). While this study employs qualitative methods such as interviews and observations, which are well-suited for exploring teachers' perspectives and lived experiences, it is important to acknowledge potential biases inherent in data collection and analysis. To mitigate these biases, several measures were taken to ensure the reliability and validity of the findings. Triangulation was employed by cross-referencing data from multiple sources, including interviews, classroom observations, and document analysis, to enhance the credibility of the results [22]. Additionally, researcher reflexivity was maintained throughout the study to minimize personal bias by documenting reflections and decisions in a research journal [23].

2.1 Research Design

The qualitative approach allows for a comprehensive understanding of the subjective experiences and opinions of teachers regarding the effectiveness and applicability of the mathematical skills modules. By utilizing semi-structured interviews, the researcher can adapt questions based on the flow of conversation, ensuring that relevant themes are explored while allowing participants to express their views freely [24,25].

2.2 Participants

Participants will include mathematics teachers who are currently involved in teaching students with dyscalculia within the PPKI framework. A purposive sampling method will be employed to select participants who have direct experience using the Basic Mathematical Operations Skills Modules. The selection criteria include i) teachers with at least five year of experience in teaching mathematics to dyscalculic students, and ii) willingness to share their insights and experiences regarding the module.

2.3 Data Collection

In this study, the primary research instrument utilized is the interview and observation method, focusing on mathematics teachers from the Special Education Integration Program (PPKI) as respondents. These approaches aim to gather insights from teachers regarding their perspectives on the use of Basic Mathematical Operations Skills Modules for students with dyscalculia.

The interview process involves the careful design of a set of relevant questions aligned with the study's objectives. These questions are crafted to explore various aspects, including the challenges teachers encounter when implementing the mathematical skills modules for dyscalculic students. Before implementation, the instrument underwent rigorous validation processes to ensure its reliability and validity [26]. During the interviews, the researcher actively listens to teachers' perspectives on their experiences with the modules, as well as how these resources impact the

learning processes of students with dyscalculia. Additionally, teachers are encouraged to share any suggestions they believe are necessary for enhancing the effectiveness of these modules.

With participants' consent, interviews will be audio-recorded to ensure accurate data capture. Recordings will be transcribed verbatim for analysis to identify both the application of Basic Mathematical Operations Skills Modules for dyscalculic students and the challenges faced in their implementation. This analysis is involve coding the data and grouping key themes that emerge from the information gathered.

In addition to interviews, observations were conducted to provide a comprehensive understanding of how the Basic Mathematical Operations Skills Modules are utilized in practice. By employing methodological triangulation, this research aims to validate findings through the convergence of data collected from different sources, thereby increasing the overall credibility of the study's conclusions [27].

3. Results

3.1 Respondent Demographic Information

The respondent of this study is included three secondary school teachers who are currently teaching in PPKI. The alphabet S, H and M represent three of the teachers. The names of respondents are not disclosed to protect their anonymity and confidentiality [28]. According to Dougherty [29], anonymity is crucial, especially in sensitive qualitative research, where revealing identities could lead to harm or discomfort for participants.

4. Result and Discussion

4.1 The Use of Basic Mathematical Operation Skills Modules Employed by Teachers for Dyscalculic Students to Enhance their Skills

The study explored teachers' use of Basic Mathematical Operations Skills Modules to enhance dyscalculic students' math skills. Teachers were asked about their frequency of module use, the types of operations emphasized, and the necessity of using these modules. Teacher S reported using the modules two to three times weekly, while Teachers H and M implemented them weekly, aligning usage with current topics. Observations confirmed consistent module use, helping students become familiar with problem-solving formats and improving their foundational skills. All teachers emphasized the importance of frequent module practice in developing students' confidence and abilities.

In terms of operations, Teacher S focused on addition and subtraction, introducing regrouping only in addition. Teacher M prioritized mastery of simple operations, while Teacher H initially taught multiplication and division but shifted focus to addition and subtraction due to student difficulties.

Observations showed that students' skills in these two operations improved with regular practice. When discussing the necessity of the modules, Teacher S highlighted the need for more tailored modules to suit different student levels. Teacher H agreed but stressed that module use should depend on topic complexity and suggested seeking additional guidance for challenging topics. Teacher M regarded the module as a critical tool for helping dyscalculic students master basic operations and improve overall math skills.

The findings demonstrate how the modules are integrated into teaching using strategies such as step- by-step guidance, visual aids, and hands-on activities. Repetition, feedback, and gamified elements also helped engage students and build confidence, offering valuable insights for improving teaching practices for dyscalculic learners.

4.2 The Effectiveness of using Modules in Basic Mathematical Operation Skills for Dyscalculic Students

All three respondents agreed on the effectiveness of the modules in improving dyscalculic students' basic math skills. Teacher H emphasized the importance of conducting action research to identify student needs, assess understanding of basic operations, and address challenges faced by dyscalculic students. He highlighted the role of action research in refining teaching methods and developing suitable modules.

Teacher S found the module effective in helping students answer questions related to basic operations like addition and subtraction with ease. Similarly, Teacher H observed that his students showed improvement in answering basic operation questions and noted that the module helped enhance their skills. Teacher M also regarded the module as highly effective, although he stressed the importance of tailoring its use to each student's learning pace and capabilities.

Regarding the acceptance of the modules, Teacher S reported that dyscalculic students at his school actively engaged with the module, collaborating to solve problems and showing interest in answering questions. Teacher H noted that when appropriate modules are used, students find it easier to solve problems. Teacher M agreed, stating that students generally accept the modules but emphasized the need for them to be customized to suit individual abilities.

Overall, the respondents highlighted the effectiveness of the modules in improving basic math skills and acknowledged that their acceptance depends on how well the modules align with each student’s unique needs and abilities.

4.3 The Challenges Faced by Teachers in using the Basic Mathematical Operations Skills Module for Dyscalculic Students

Teachers assess the suitability of basic mathematical operation skills modules by adapting them to meet their students’ individual needs. Teacher S modifies module content by downloading additional questions and tailoring them to match each student’s abilities. If students overcome challenges, they progress to the next level; otherwise, the module is adjusted to suit their needs, ensuring a personalized and confidence-building approach. Teachers H and M emphasize that module suitability depends on individual student abilities, as some students learn quickly while others require more time and support.

Barriers to using the modules vary among teachers. Teacher S identified challenges such as limited internet access in remote areas, inconsistent student attendance, and inadequate school infrastructure, particularly in newer schools. Poor attendance disrupts the learning process, requiring teachers to repeat lessons for absent students, which delays progress. Teacher H, on the other hand, reported no significant obstacles but noted that students’ varying abilities can affect how effectively the modules are used. Teacher H stressed the importance of patience in assessing module suitability for dyscalculic students. Teacher M echoed this sentiment, highlighting that the effectiveness of the module depends on its acceptance by students and their readiness to engage with it.

Regarding preparation for using the modules, Teacher S emphasized evaluating their suitability before implementation. She also noted that existing modules for special education are underdeveloped and suggested collaborating with colleagues to create better resources. Teacher H outlined the importance of preparatory steps, including practice exercises, proper guidance, and effective teaching aids to support dyscalculic students. Teacher M recommended improving the modules further, suggesting the creation of bound module books for individual study to enhance accessibility and usability. The use of these modules also presents broader challenges, such as inconsistent attendance, which can hinder student progress. Students who miss lessons often fall

behind, necessitating repeated instruction to help them catch up. Fastame [30] highlights the importance of addressing individual learning needs and the role attendance plays in skill development. Ensuring regular attendance and engagement is crucial for improving students' understanding of basic mathematical operations.

To address these challenges, the researcher proposes a structured module series that progresses from simpler to more complex concepts. This design allows students to learn at their own pace while enabling teachers to better assess and address individual needs. By regularly evaluating student progress, teachers can adapt the modules to meet evolving requirements, ensuring they remain effective tools for supporting dyscalculic students.

5. Conclusions

This project explores teachers' perspectives on the use of Basic Mathematical Operations Skills Modules designed for dyscalculic students in the Special Education Integration Program (PPKI). Findings reveal that teachers have a positive view of the modules, particularly for teaching foundational operations like addition and subtraction. These basic skills are critical for dyscalculic students as they serve as building blocks for understanding more complex mathematical concepts and are applicable in everyday tasks like budgeting and time management. Teachers find the modules effective in helping students answer questions related to basic operations. However, they highlight the need for more modules tailored to different student levels. Key challenges include inconsistent student attendance and limited internet access, particularly in remote areas [31].

According to Noël and Karagiannakis [32], using familiar modules in teaching creates a supportive learning environment, which helps students engage more effectively with the content. While the study demonstrates the benefits of the current modules, there remains a need for further research to address limitations, such as the lack of effective strategies to enhance basic mathematical skills for dyscalculic students. Teacher-led instruction alone is insufficient to address these challenges. Research suggests that combining cognitive, mathematical, and motivational training, especially through technology, can significantly improve students' abilities [29].

Future research should explore diverse instructional strategies for dyscalculic students, employing both qualitative and quantitative methods to provide a comprehensive understanding of effective teaching approaches. Collaboration among parents, teachers, and peers is essential for supporting dyscalculic students in mastering basic mathematical skills. Fastame [30] emphasizes that such collaboration, combined with engaging teaching aids, is crucial for overcoming the challenges these students face. By examining collaborative efforts and effective teaching aids, future studies can identify practical solutions to improve learning outcomes for dyscalculic students, especially in mastering foundational mathematical operations [33,34].

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References

[1] Abayeva N, Mustafina L, Zhurov V, Yerakhtina I, Mustafina B. The role of mathematical knowledge in the development of critical and analytical thinking in students of technical university. *Sci Herald Uzhhorod Univ Ser Phys.* 2024;(56):1889-1899. https://DOI: 10.54919/physics/56.2024.188ln9

[2] Popescu, Anamaria. "The Role of Mathematical Competence In The Initial Training of Students'professional Skills." In *Education, Society, Family. Interdisciplinary Perspectives and Analyses* , pp. 105-110. Editura Eikon. https://DOI:10.56177/epvl.ch14.2021.en

[3] Ismail, Fazlina Nadrah, and Roslinda Rosli. "Mathematics education textbook research trends: A systematics literature review." *International Journal of Advanced Research in Education and Society* 4, no. 3 (2022): 122-133. https://myjms.mohe.gov.my/index.php/ijares/article/view/19925
[4] Sriastuti, Lucia, and Musa Masing. "Application Of Jean Piaget's Cognitive Learning Theory In Early Childhood Education." *SOKO GURU: Jurnal Ilmu Pendidikan* 2, no. 1 (2022): 14-22. https://doi.org/10.55606/sokoguru.v2i1.101
[5] Barnes, Marcia A., Nathan H. Clemens, Anna-Mária Fall, Greg Roberts, Alice Klein, Prentice Starkey, Bruce McCandliss, Tricia Zucker, and Kylie Flynn. "Cognitive predictors of difficulties in math and reading in pre-kindergarten children at high risk for learning disabilities." *Journal of Educational Psychology* 112, no. 4 (2020): 685. https://doi.org/10.1037/edu0000404
[6] Dowker, Ann. "Children's mathematical learning difficulties: Some contributory factors and interventions." *International handbook of mathematical learning difficulties: From the laboratory to the classroom* (2019): 773-787. https://doi.org/10.1007/978-3-319-97148-3_44
[7] Coetzer, Tanja, Candice Livingston, and Elna Barnard. "Eleven Grade 1 teachers' understandings of mathematical language in a South African context." *Reading & Writing-Journal of the Reading Association of South Africa* 14, no. 1 (2023): 409. http:// 10.29333/mathsciteacher/13887
[8] Azmi, Nur Liyana, and Mohd Mokhtar Tahar. "Challenges Students with Special Education in the Implementation of Teaching and Facilitation of Mathematics." In *Proceeding of International Conference on Special Education in South East Asia Region*, vol. 2, no. 1, pp. 61-72. 2023. https://doi.org/10.57142/picsar.v2i1.68
[9] Sani, Yulvia, Ossy Firstanti Wardany, Dela Devita, Heni Herlina, and Genesa Vernanda. "Challenges of Special Education Teachers in HOTS (Higher Order Thinking Skills) Based Learning for Students with Special Needs in Lampung Province." In *Proceeding of International Conference on Special Education in South East Asia Region* , vol. 3, no. 1. 2024. https://doi.org/10.57142/picsar.v3i1.489
[10] Noël, Marie-Pascale, and Giannis Karagiannakis. *Effective Teaching Strategies for Dyscalculia and Learning Difficulties in Mathematics*. Routledge, 2022. https://doi.org/10.4324/b22795
[11] Alshoura, Hamza. "Critical review of special needs education provision in Malaysia: discussing significant issues and challenges faced." *International Journal of Disability, Development and Education* 70, no. 5 (2023): 869-884. https://doi.org/10.1080/1034912X.2021.1913718
[12] Maslo, Iryna. "GARDNER'S THEORY OF MULTIPLE INTELLIGENCES IN THE LEARNING PROCESS." In World-Us Conference proceedings, no. usc21-01, pp. 85-88. 2023. https://doi.org/10.30888/2709-2267.2023-21-01-02
[13] Nguyen, Thi, Hong, Minh. Applying Multiple Intelligences Theory in Designing English Vocabulary Activities for High School Students. International journal of scientific and research publications (2023): 13(4) https://dx.doi.org/10.29322/IJSRP.13.04.2023.p13642
[14] CHRIssoN, MARY ANN, and UTAH EPHRAIM. "Applying multiple intelligence theory in the foreign language classroom." (1996). https://mextesol.net/journal/public/files/f722f70056dbc31b3c510485b7469d02.pdf
[15] Abdelhak, Hammoudi. "Multiple Intelligences Theory And The 99 Names Of God In Islam (asma Allah Al Husna): A Brain-based Perspective."5, no. 4 (2021): 1025-1041. https://www.asjp.cerist.dz/en/article/155331
[16] Talamás-Carvajal, Juan Andrés, Héctor G. Ceballos, and María-Soledad Ramírez-Montoya. "Identification of Complex Thinking Related Competencies: The Building Blocks of Reasoning for Complexity." *Journal of Learning Analytics* 11, no. 1 (2024): 37-48. https://doi.org/10.18608/jla.2024.8079
[17] Salisa, Resminati Dinda, and Wardani Rahaya. "Conceptual Understanding and Reasoning of Students with Dyscalculia: A Literature Review." *Hexagon: Jurnal Ilmu dan Pendidikan Matematika* 1, no. 2 (2023): 94-102. https://doi.org/10.33830/hexagon.v1i2.5356
[18] Kunwar, Rajendra. "Dyscalculia in learning mathematics: underpinning concerns for delivering contents." *Dristikon: A Multidisciplinary Journal* 11, no. 1 (2021): 127-144. https://doi.org/10.3126/dristikon.v11i1.39154
[19] Shalev, Ruth S., Orly Manor, Batsheva Kerem, Mady Ayali, Navah Badichi, Yechiel Friedlander, and Varda Gross - Tsur. "Developmental dyscalculia is a familial learning disability." Journal of learning disabilities 34, no. 1 (2001): 59-65. https://doi.10.1177/002221940103400105
[20] Cerovac, Milorad, and Therese Keane. "Early insights into Piaget's cognitive development model through the lens of the Technologies curriculum." *International Journal of Technology and Design Education* (2024): 1-21. https://doi.org/10.1007/s10798-024-09906-5
[21] Hidayati, Kurnia. "Pembelajaran matematika usia SD/MI menurut teori belajar Piaget." *Cendekia: Jurnal Kependidikan Dan Kemasyarakatan* 10, no. 2 (2012): 291-308. https://doi.org/10.21154/cendekia.v10i2.417
[22] Creswell, John W., and J. David Creswell. *Research design: Qualitative, quantitative, and mixed methods approaches*. Sage publications, 2017 https://doi.org/10.1080/15424065.2022.2046231
[23] Patton, Michael Quinn. *Qualitative research & evaluation methods: Integrating theory and practice*. Sage publications, 2014. http://10.12691/education-3-10-6

[24] Lopes, Laio. "Delineamento metodológico voltado a uma realidade de educação inclusiva no ensino fundamental anos finais." *LUMEN ET VIRTUS* 15, no. 39 (2024): 1641-1666. https://doi.org/10.56238/levv15n39-003
[25] Weber, Birke-Johanna, Jana Breuer, and Anke Lindmeier. "How do school-related mathematical problems become relevant for prospective teachers in mathematics courses at university? A qualitative interview study." *Research in Mathematics Education* (2023): 1-26. https://doi.org/10.1080/14794802.2023.2243261
[26] Ambulkar, Ameya, Abhinav Tiwary, and Rashmi Mehrotra. "Examining through interviews parent advocate dyad perceptions of special education representation." *Multidisciplinary Science Journal* 5 (2023). https://doi.org/10.31893/multiscience.2023ss0221
[27] Meydan, Cem Harun, and Handan Akkaş. "The Role of Triangulation in Qualitative Research: Converging Perspectives." In *Principles of Conducting Qualitative Research in Multicultural Settings* , pp. 98-129. IGI Global, 2024. https://doi.org/10.4018/979-8-3693-3306-8.ch006
[28] Czarnota-Bojarska, Joanna. "The ethics of organizational research: Methodological considerations for ensuring respondents' anonymity and confidentiality." *EWOP in Practice* 15, no. 1 (2021). https://doi.org/10.21825/ewopinpractice.87141
[29] Dougherty, M. V. "The use of confidentiality and anonymity protections as a cover for fraudulent fieldwork data." *Research Ethics* 17, no. 4 (2021): 480-500. https://doi.org/10.1177/17470161211018257
[30] Fastame, Maria Chiara. "Intervention programmes for students with dyscalculia: Living with the condition." In *Understanding Dyscalculia*, pp. 41-64. Routledge, 2020. https://doi.org/10.4324/9780429423581-4
[31] Soon, Vestly Kong Liang. "A Study of Attitudes, Skills, and Barriers Among the Special Education Hearing Impairment Teachers in the Use of Assistive Technology in Teaching." Journal of Advanced Research in Applied Sciences and Engineering Technology 35, no. 1 (2024): 121-128. https://doi.org/10.37934/araset.34.3.121128
[32] Noël, Marie-Pascale, and Giannis Karagiannakis. *Effective Teaching Strategies for Dyscalculia and Learning Difficulties in Mathematics*. Routledge, 2022. https://doi.org/10.4324/b22795
[33] Mortier, Kathleen, and Corrine Aramburo. "Collaborative teaming to support quality inclusive education for students with disabilities." *Collaborative Teaming to Support Quality Inclusive Education for Students with Disabilities.* (2022). https://doi.org/10.4324/9781138609877-REE157-1
[34] Lehane, Paula, and Joyce Senior. "Collaborative teaching: exploring the impact of co-teaching practices on the numeracy attainment of pupils with and without special educational needs." *European Journal of Special Needs Education* 35, no. 3 (2020): 303-317. https://doi.org/10.1080/08856257.2019.1652439