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Best Practice of Mathematical Intervention Screening Among Primary School Teachers for Learning Disabilities

Nafisah Baharom*, Siti Mahirah Ab Wahab

Sekolah Kebangsaan Kem Terendak 2, Melaka

*nafisah_baharom@yahoo.com

ABSTRACT

Screening is a mechanism that targets the needs of students with learning disabilities by providing education based on scientific evidence. It is the first step in identifying students who have difficulties in learning. In the context of mathematical intervention, screening is a process of early identification of students who struggle to master basic math skills so that an instructional program based on resources and appropriate math intervention teaching can be provided. The best practice of mathematical intervention screening carried out in the Special Education Integration Programme (PPKI) of SK Kem Terendak 2 (Kem Terendak 2 National School) aims to ensure the process of early identification of students with learning problems is implemented before mathematical interventions that suit the needs of the students are planned. The best practice highlights the 3 main elements of mathematical intervention screening, namely the identification process, the consent of the relevant parties and the category of students with learning disabilities. The results from the mathematical intervention screening practice carried out have successfully provided positive impacts on the implementation of mathematical intervention for students with learning disabilities in terms of time saving and data-based results. Therefore, it is suggested that the best practice of mathematical intervention screening based on the three elements (identification, agreement of relevant parties and student category) needs to be considered collectively when implementing mathematical intervention for students with learning disabilities at school. This could be done through scientific and continuous discussion within the scope of implementing mathematical interventions for students with learning disabilities in Malaysia.

Keywords : Screening, Students with Learning Disabilities, Mathematical Intervention, Identification

Introduction to Best Practices

The screening process determines whether each student may meet, exceed, or fail to meet the specified benchmark. Based on the Response to Intervention (RtI) model, Riccomini & Witzel (2010) have identified the principles of screening to measure the students' skill level at least three times a year so that students who need more specific instructions can be identified. In the context of the RtI model, screening is the first step in identifying students who are at risk of facing learning problems. During this particular

stage, student data is collected. Screening involves the process of providing a brief assessment to all students to identify those who may experience lower academic achievement than expected (National Center on Response to Intervention, 2010). Assessments conducted through tracking practices are focused on targeted skills so that students' future learning can be predicted (Jenkins et al., 2007).

A report by the National Council of Teachers of Mathematics (2011) asserts that the implementation of mathematical intervention should support students' understanding through explicit instructions based on diagnostic assessment. This is in line with the previous education development which had shifted to a student-centred approach to emphasise on understanding the learning needs of a student and the options provided (Boston, 2003; Pashler et al., 2009). Therefore, feedback that focuses on the detailed content of what is learned is the main function of formative assessments conducted (Paul, 2016). Additionally, during the screening process, teachers need students' background information so that the teaching and learning activities can be modified to improve their students' achievement. As stated by Bahagian Pendidikan Khas (2014), parents are responsible for making decisions for their children, therefore, parents' views should be taken into account when determining the appropriate mathematical intervention approach. The parties involved during the intervention will eventually use the screening data obtained to make decisions about instructions, make the movements in each stage of the intervention and identify students' disabilities (Fuchs et al., 2012).

Justification on the Implementation of Best Practices

The inability of students with learning disabilities affects their ability to listen, think, communicate, read, write, spell or perform mathematical calculations (US Department of Education, 2006). Most students with learning disabilities are also unable to understand certain calculation principles such as the use of problem-solving procedures that are often used by typical children. Identifying learning disabilities in the school environment and planning appropriate interventions is a complex and challenging process for teachers. This is because special education teachers are burdened with non-instructional responsibilities in addition to the essential duties of teaching in schools. Thus, this best practice guide for the screening process of mathematical interventions for students with learning disabilities provides a specific process to help teachers systematically plan the screening process before implementing mathematical interventions. Furthermore, this practice also describes a step-by-step approach that teachers can use to assess students' current needs as well as determine the steps needed to develop, strengthen and build a system that supports mathematical intervention for students with learning disabilities.

The development of intervention programs in Malaysia is traced to the enshrining of the Persons with Disabilities (OKU) Act 2008 (Perlembagaan Persekutuan Malaysia, 2008) which has been affirmed under para 36. (1). Article 36. (1) (b) which explains about early identification of disability and timely intervention to prevent disability and rehabilitation treatment. This improved policy shows the importance and needs of implementing mathematical intervention for students with learning disabilities to maximize the potential and achievement of this group in

mathematics. Therefore, it is suggested that identification practices that target mathematical skills for students with learning problems are carried out in the form of tests, interviews and observations (Dowker, 2004). Based on this recommendation, the implementation of mathematical screening of students with learning disabilities based on identification practices has become the main focus by taking into account the verdicts attained through discussions with parents (National Center for Learning Disabilities, 2004) in achieving students' expected academic progress.

Implementation Objectives

The objectives of implementing these best practices are:

1. To implement the mathematical screening process for students with learning disabilities based on the agreement of relevant parties.
2. To implement the process of mathematical screening of students with learning disabilities based on identification practices.

Implementation of Best Practices

Every decision made before conducting a mathematical intervention should be based on test-based decisions such as diagnostic tests as well as non-test-based decisions such as interviews and observations. The best practice of screening mathematical interventions for students with learning disabilities that is implemented consists of three aspects, namely student categories, parties involved and identification. The student category aspect refers to students with learning disabilities from the Special Education Integration Programme (PPKI) who have difficulties following the KSSR (Revision) for Special Education in Mathematics. Meanwhile, the aspect of the parties involved refers to the parents of the students as they must give permission and approval to every learning plan and strategy used to improve their children's learning progress (National Center for Learning Disabilities, 2004). Lastly, the identification aspect is aimed at identifying mathematical skills for students with learning disabilities by carrying out evaluations in the form of tests, interviews and observations. Figure 1 shows the aspects that are required to ensure that the mathematical intervention screening for students with learning disabilities can be implemented successfully.

Figure 1
Mathematical Intervention Screening Best Practices for Students with Learning Disabilities

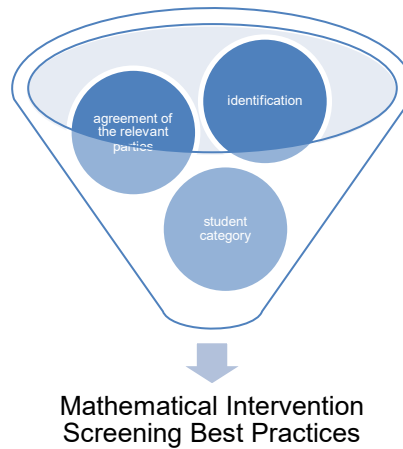
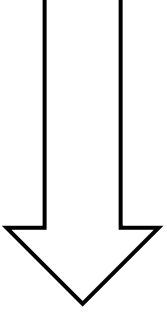
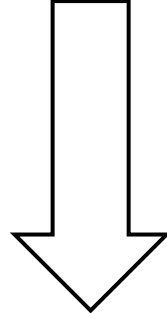
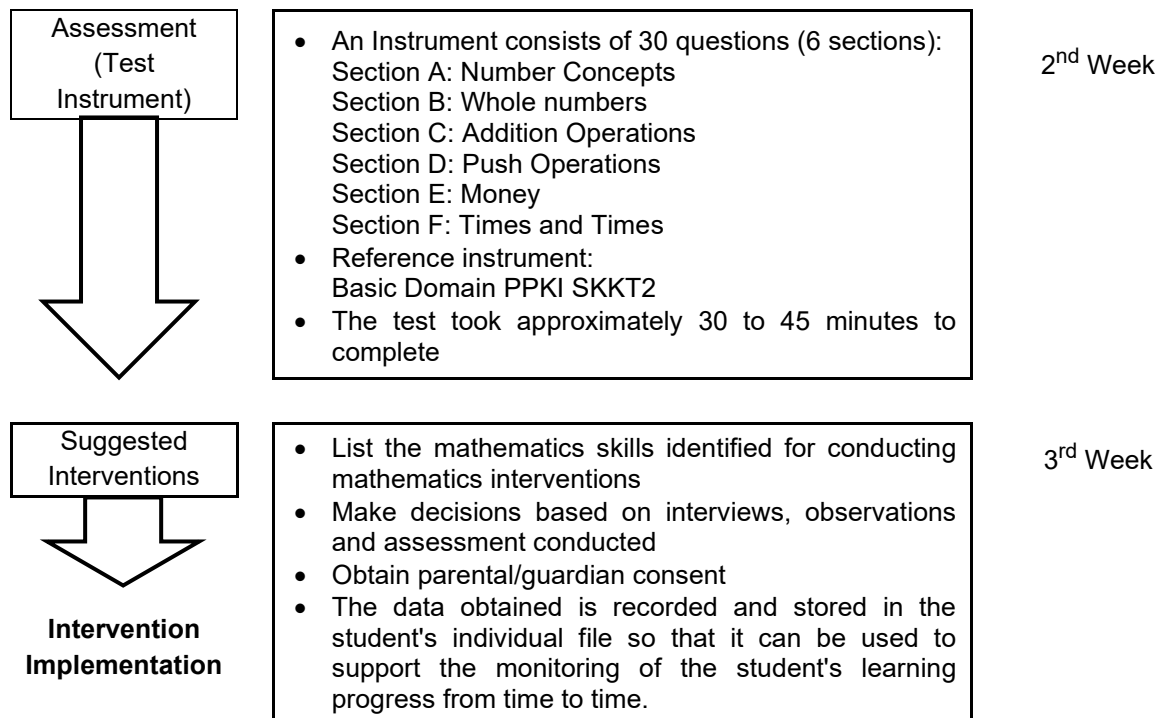


Figure 2 below shows the instruments and procedures used for the implementation of the best practices of mathematical intervention screening in SK Kem Terendak 2 which involved three main steps namely interview, observation and identification through assessment.

Figure 2
Instruments and Implementation Procedures for Mathematical Intervention Screening

Procedure	Implementation	Duration
<p data-bbox="212 1265 442 1310">Interview</p> 	<ul style="list-style-type: none"> • Interview with parents/guardians • Individual interviews (one-to-one interviews) with students using open-ended questions • Students were directly involved during the interview session where they demonstrated their current level of understanding of existing mathematics skills. • Conducted interviews also focus on: <ol style="list-style-type: none"> 1. Health information 2. Daily routines at home 3. Requirements while at school 	<p data-bbox="1230 1265 1382 1310">1st Week</p>
<p data-bbox="212 1675 442 1720">Observation</p> 	<ul style="list-style-type: none"> • Identifying the objective of the observation: <ol style="list-style-type: none"> 1. Made an initial assessment of the developmental level and basic mathematical skills of students with learning disabilities. 2. Identified mathematics skills that require intervention and need to be trained for students with learning disabilities. 3. Determined the strategy and method of learning mathematics according to student's ability. 4. Learnt the interests of each student. 5. Identified the behavior and personality of each student. 	<p data-bbox="1230 1675 1382 1720">1st Week</p>



Effectiveness from the Implementation of Best Practices

The effectiveness of this best practice is observed by focusing on the implications of the duration of the screening process and improvements from the implementation of the screening process. A discussion based on the concept of brainstorming was conducted among six teachers of PPKI SK Kem Terendak 2. Table 1 shows the results of the discussion among the teachers. The results reveal that three main elements which were interviews, observation and detection through assessment could ensure the screening process takes place effectively and systematically.

Table 1
Discussion Findings of Screening Elements

Sub Category	Category	Coding Frequency						Total
		P1	P2	P3	P4	P5	P6	
Identify Student	Identification	4	6	9	4	2	11	36
Assessment		1	2	1	1	7	2	14
PBD		2	1	2	1	2	1	9
Interviews		2	1	1	4	2	1	11
Evidence		2	3	3	2	1	2	13
Learning Disabilities	Student Category	6	3	2	4	4	10	29
Others		2	2	1	2	0	1	8
Discussion	Agreement of	5	2	4	2	3	4	20

Inspection	the Relevant Parties	1	2	1	1	4	1	10
Total		25	22	24	21	25	33	150

The Implementation of the Mathematical Screening Process for Students with Learning Disabilities Based on the Agreement of the Relevant Parties

Identified students who need mathematical intervention must first obtain the consent of their parents or guardians and medical experts. Parental approval was obtained through written consent from parents before the mathematical intervention was carried out as shown in Figure 3. Generally, intervention programmes carried out in schools require parental consent. Thus, consents from the identified students' parents were obtained so that the students could participate in the designed intervention programme. This process involves communication and direct access to parents. However, some argue that teachers need to appreciate children's interactions in their families, neighbourhoods, and communities to support children's academic learning and social behaviour (Masten, 2003). Furthermore, effective interaction can address issues such as low literacy levels among parents and mistrust among communities (Fantuzzo et al., 2003; Hatchett et al., 2000) which could contribute to problems involved in submitting the signed consent forms. Besides that, cultural interests is also another situation (Khalil et al., 2007; Nabulsi et al., 2011; Seibert et al., 2002) that is considered when obtaining parental consent.

Figure 3
Discussion Session between Teacher and Parents



The Implementation of the Process of Mathematical Screening of Students with Learning Disabilities Based on Identification Practices

Potential students with learning disabilities have to be screened so that their learning problems and current learning level could be identified. Assessment instruments such as the existing Literacy and Numeracy Program (LINUS) instruments, Classroom Assessment (PBD) or suitable assessment tasks designed by the teacher that could measure related skills could be used for screening. Thus, the best practice of the mathematical screening process for students with learning disabilities based on the

practice of identification using the Basic Domain PPKI SKKT2 Instrument was carried out by focusing on new students who are registered at PPKI SK Kem Terendak 2. Figure 4 shows a student who has been nominated as a student with learning disabilities is taking a mathematical identification test. She took around 30 to 45 minutes to complete the test. The results of the test were discussed among the special education mathematics teachers so that an accurate mathematical intervention program could be designed according to the student's current abilities and needs.

Figure 4
Identification using Basic Domain PPKI SKKT2 Instrument



Conclusion and Recommendations

Special education teachers who interact directly with students with learning disabilities were specifically targeted to conduct this mathematical intervention screening during mathematical intervention in schools. Other than contributing to the development of knowledge in the field of special education for learning disabilities itself, this best practice can also be carried out by closely related parties in the implementation of mathematics interventions in schools, which are the special education teachers for learning disabilities. Screening is a process of identifying students with learning disabilities who need appropriate support. The identification practice that was carried out includes all categories of students with learning disabilities and was done consistently. Based on the evidence, this best practice brings a positive impact on data-based decisions and also becomes a factor in boosting more practical, systematic and proactive implementation of mathematical interventions in schools.

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