

The Findings of Symptomatic Behaviour Screening Tool (Symbest) For Children of Age 3-4 years old

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Abstract—The study focused on developing a behaviour difficulties screening tool for early childhood education(ECE)educators to screen and identify symptomatic behaviours among children aged 3 to 4 years old in the ECE centres. This research is a design and development study based on the model of Richey& Klien (2007) with 3 phases that is (i) Need analysis, (ii) Design and Develop, and (iii) Testing Usability. The findings of the study are expected to empower teachers to screen and identify children with symptomatic behaviour for intervention and medical referrals. Data findings of phase (i) educators have stated that they need support like a screening tool to identify and understand children's behaviour to be typical or symptomatic to a disorder. Findings phase (ii) reports, four constructs of child development have reached the experts' consensus and numbered the ranked items in a sequence, and it was organised accordingly to represent the constructs of Symbest. Finally, in phase (iii), all the constructs and items of Symbest have reached the agreement of usability according to the perception of the expert participants.

Keywords—Early identification; need analysis; Fuzzy Delphi; nominal group technique.

I. INTRODUCTION

In the public education system; assessment has always been an essential aspect of a child's progress. Typically; educators adopt the standardised assessment method to recognise the strength and weakness of a child academically. There are several screening procedures implemented in the national schooling system currently. Apparently; in compliance of Individual with Disabilities Education Improvement Act (IDEA); states are required to implement services of early identification; screening; and assessment for infants; toddlers; and preschoolers most commonly referred to as Child Find[1].

Besides parents' acknowledgement and consent on the found delays; screening for behaviour difficulties are also reliable if it is done in the educational settings by educators due to factor like the number of hours educators spend with children in the school daily. However; in the current practice; there is lacking screening tools used in the early childhood programs in Malaysia; especially in the government aided child care centres to identify children at risk of emotional and behavioural disorders. It is vital for schools and educators to utilize early identification methods with a comprehensive and user-friendly screening tool to meet the needs of at-risk children. To bridge this gap; a screening tool for ECE educators to identify symptomatic behaviours among young children in mainstream early childhood education centres was developed.

II. RESEARCH QUESTIONS

Based on the objectives of the study; the purpose of the study and problem statement; the research questions for the study is formulated in three phases; according to Design and Development Research:

1. What are the needs to develop a screening tool to identify children's behaviour problems in the mainstream ECE in Malaysia?
 - a) What are educators' perceptions in managing children's behaviour problems in the classroom?
 - b) What strategies educators' use to manage children with behaviour problems in the classroom?
 - c) What is the support from the school climate for educators to identify children with behaviour problems
 - d) in the classroom?
 - e) What are ECE educators' perceptions of the needs of a screening tool?
2. What is the design and development model of the screening tool to assess children's symptomatic behaviour?
 - a) What are the suitable constructs of measurement for screening symptomatic behaviours by children based on experts consensus?

- b) What are the suitable items in the constructs for screening symptomatic behaviour by children based on experts consensus?
 - c) What is the sequence priority of the items in the screening tool based on experts consensus?
3. What is the usability of the screening tool to screen children with symptomatic behaviours from educators opinions?
 - a. What are educator's opinions on the suitability of the items under the section of child's details in SymBest
 - b. What are educators opinions on the suitability of the main constructs of SymBest?
 - c. What are educators opinions on the suitability of the items in each construct of SymBest?
 - d. What are educators opinions on the usability of SymBest overall to identify children's symptomatic behaviours to a disorder?

III. METHODOLOGY

This quantitative study is using the design & development (DDR)[2]. The study employed a DDR approach to developing the symptomatic behaviour screening tool (SymBest) for young children with behaviour problems. The phases are as follows:

- I. Need Analysis.
- II. Design & Development

IV. FINDINGS

The development of SymBest is based on two child developmental theories; Developmentally Appropriate Practices (DAP); Red Flags: A Quick Reference Guide for Early Years Professionals by York Region Early Identification Planning Coalition; 2009; and Paediatric Group Discussion.

(I) Findings of Phase I: The Need Analysis.

This phase was conducted using the need analysis online survey questionnaire; which was distributed among ECE educators from KEMAS; PERMATA; PERPADUAN; and YPKT. The online survey questionnaire was distributed to 3550 respondents with a response rate of 538. However; only educators who are teaching children age 3 and 4 was needed for this phase; and they comprise a number of 434 ECE educators from the response rate as the sample size for this phase.

Analysis of educator's perception in managing children's behaviour problems.

Therefore before considering of developing a screening tool to identify symptomatic behaviours among children; there was a need to investigate if the early childhood educator's needs a screening tool for managing and understanding children and their symptomatic behaviours. Thus; the study attempted to answer the first sub-question of this phase:

1(a). What are educators' perceptions in managing children's behaviour problems in the classroom?

In response to identifying whether ECE educators need a screening tool; the study attempted to seek educators perception towards managing children's behaviour problems in the classroom. Data interpreted shows mean value 3.75 and a standard deviation of 0.68. This number value interprets that majority of ECE educators to have a positive perception towards managing behaviour problems in the classroom. This explains that educators can manage children and their behaviours; mostly in the classroom. Most of the items in this constructs are falling into the score mean of high level. However items like "I tend to get through to the most difficult child in the class" (M = 3.56; SD = 0.73); "I prefer to use assessment strategies to gain knowledge on children's behaviour" (M = 3.63; SD = 0.72) and "I am able to prevent children's behaviour problem from ruining an entire lesson" (M = 3.63; SD = 0.69) at this point falling into the moderate level.

Analysis of strategies educator's use to manage children with behaviour problems in the classroom.

In this section; the study sought to investigate if the educators are using some behaviour management strategies in the classroom to manage children's behaviour problems. Thus the study attempted to answer the second sub-question of this phase:

1(b). What strategies educators' use to manage children with behaviour problems in the classroom.

In response to identifying what strategies educators use to manage behaviour problems in the classroom are; the study attempted to recognize the most common behaviour management strategies used by ECE educators currently. Data interpreted shows mean value 3.09 and a standard deviation of 1.28 on the average. This number value interprets that majority of ECE educators are using some behaviour management strategies to manage children and their behaviours in the classroom. Most of the items in this constructs are falling into the score mean of moderate level on the average. When the items are analysed individually; some items are showing low mean value; whereas some are showing moderate and high mean value. Hence; from the findings; these are the most favorable and frequent strategies used by educators to manage children and their behaviours.

Analysis of the supports available currently for educators to identify children with behavior problems in the classroom.

In this section; the study seeks to investigate if educators are receiving support from the school climate to identify children with behavior problems in the classroom. Thus the study attempted to answer the third sub-question of this phase:

1(c) What are the supports available currently for educators to identify children with behavior problems in the classroom?

This section analysed the supports available currently for educators to identify children with behaviour problems in the classroom. Data is reporting the average mean value obtained from the data analysis. The average mean value of this section

is 2.43; and the standard deviation is 1.25. The mean value indicates that ECE educators from KEMAS; PERPADUAN; PERMATA NEGARA; and YPKT is receiving support from the school climate moderately (2.34-3.66).

Analysis of ECE educator's perceptions of the needs of a screening tool.

In this section; the study sought to investigate; ECE educator's perceptions on the needs of a screening tool to identify children with symptomatic behaviours. Thus the study attempted to answer the final sub-question of this phase:

1(d) What are ECE educators' perceptions of the needs of a screening tool?

This final section analyzed ECE's educator's perceptions of the needs of a screening tool to identify children with symptomatic behaviours. Data is reporting the average percentage and mean value obtained from the data analysis. When probed further the perception of ECE educators on the needs of a screening tool; the average mean value of this section is 4.36; and the standard deviation is 0.60. The mean value indicates that ECE educators from KEMAS; PERPADUAN; PERMATA NEGARA; and YPKT strongly agree that they need a screening tool to identify children with symptomatic behavior (3.67- 5.00).

To sum up; ECE educators have strongly agreed that there is a need for a screening tool to identify children with symptomatic behaviour at risk of developmental delays.

II) Findings of Phase II: Design & Development.

This section will elaborate on the design and developmental process of the SymBest. There are two processes involved in this phase; which the design of SymBest and development of SymBest. The focus of this phase is the measurement constructs and the items representing Symbest for ECE educators to identify children of age three to four years with symptomatic behaviours. Before the development of Symbest; the need analysis findings in the previous section states that there is a strong need for a screening tool for ECE educators to identify children with symptomatic behaviours based on each developmental domains. This contributed to the decision to develop a screening tool for ECE educators to identify children with symptomatic behaviours. Symbest consists of constructs of five developmental domains that is; sensory and motor development; language & communication development; social & emotional development; cognitive development; and creativity development. There are 30 items in the construct of sensory and motor development; 25 items in language and communication development; 28 items in social and emotional development; 18 items in cognitive development and 11 items in creativity development. The screening tool then was changed into the Fuzzy Delphi Questionnaire with linguistic scale to obtain the validation from 18 experts who were the participants of phase II.

Findings of the suitability of the constructs of SymBest analysed with Fuzzy Delphi Method (FDM).

Based on the seven points linguistic scale; the responses of the expert participants from the fuzzy Delphi questionnaire were obtained. This section answered the first sub-question of phase II; that is :

2 (a) What are the suitable constructs of measurement for screening symptomatic behaviours by children based on experts consensus?

It is interesting to note that; four constructs out of five constructs proposed is accepted. Referring to the first rule of FDM; construct of sensory and motor development; language and communication; social and emotional and cognitive have consensus among the experts with threshold value below than 0.2.

The second rule of FDM is calculating the consensus of experts in percentage whereby it must be more than 75%. Based on the analysis; construct sensory; and motor development; language; and communication; social and emotional and cognitive have gained 100% of group consensus from the experts. However; the construct creativity alone was rejected based on the calculated percentage of 66.67% of group consensus. The third rule of FDM is the fuzzy score (A) Average of a fuzzy number of each construct must be $\alpha - \text{cut} = 0.5$ (Bodjanova; 2006). The average fuzzy number is calculated to determine the ranking; but it is not needed for this section as the constructs are arranged as it is in the literature. In response to this rule; constructs creativity is still rejected even though the fuzzy score value is more than 0.5. The reason emerged is; in order for the construct to be accepted; it has to meet the criteria set for all the three rules in FDM. Apparently; from this; it is noted that for construct creativity development; only one rule is accepted. Therefore the construct of creativity is rejected from representing SymBest.

Suitability of the items under the constructs of SymBest analysed with Fuzzy Delphi Method (FDM).

The following section will elaborate on the findings of the suitability of the items under all the constructs of SymBest. There are five constructs proposed for Symbest; which was validated by experts; and the data were analysed with FDM. The five constructs are; i) sensory and motor development; ii) language and communication development; iii) social and emotional development; iv) cognitive development; and v) creativity development. The findings of the five proposed constructs were elaborated in the section above. This section answered the second sub-question of phase II:

2(b) What are the suitable items in the main constructs for screening symptomatic behaviours of children based on expert's consensus?

Construct Sensory Motor Development

Precisely to meet the first rule in FDM; there are 13 items under the construct of sensory and motor development have consensus among the experts with threshold value below than

0.2. The threshold value exceeded the value of 0.2. This indicates the individual expert's views for the particular items do not agree with other expert participants. However; the calculation of the threshold value is performed overall for the questionnaire items. The second rule of FDM is percentage consensus of experts must be more than 75 %. Table 4.14 shows that 13 items under the construct sensory and motor development have gained a group consensus of more than 75 %. Therefore; the remaining 17 items (item number 2;5;6;7; 11; 12; 13; 17; 18;19; 20; 23;25; 27;28;29;and 30) from the total proposed items was rejected based on the calculated percentage of below than 75%.

Construct Language & Communication

In this section; 12 items under the construct of language and communication development have consensus among the experts with threshold value below than 0.2. The threshold value exceeded the value of 0.2. This indicates the individual expert's views for the particular items do not agree with other expert participants. However; the calculation of the threshold value is performed overall for the items of this section. The second rule of FDM is percentage consensus of experts must be more than 75%. Table 4.15 shows that 12 items under the construct of language and communication development have gained a group consensus of more than 75 %. As such; the remaining 13 (item number 5; 6; 7; 8; 10;14; 16; 17; 18; 20; 21; 24 and 25;) were rejected based on the calculated percentage of below than 75%.

Construct Social & Emotional Development.

The finding reports; 17 items under the construct of social and emotional development have consensus among the experts with threshold value below than 0.2. The threshold value exceeded the value of 0.2. This indicates the individual expert's views for the particular items do not agree with other expert participants (Cheng and Lin; 2002). However; the calculation of the threshold value is performed overall for the questionnaire items. The second rule of FDM is percentage consensus of experts must be more than 75%. 17 items under the construct of language and communication development have gained a group consensus of more than 75%. Thus the remaining 11 items (item number 4;6;8;9;14;18;19; 20;21;23 and 25) were rejected based on the calculated percentage of below than 75%.

Construct Cognitive Development.

This section reports the findings of the suitability of the items under the construct cognitive development which was analysed with FDM. Nine items under the construct of cognitive development to have consensus among the experts with threshold value below than 0.2. The threshold value exceeded the value of 0.2. This indicates the individual expert's views for the particular items do not agree with other expert participants. However; the calculation of the threshold value is performed overall for the questionnaire items. The second rule of FDM is percentage consensus of experts must be more than 75 %. 9 items under the construct language and

communication development which have gained group consensus more than 75 %. Hence; the balance of nine items (item number 1; 5;6;7;10;13;14;16; and 17) proposed was rejected based on the calculated percentage of below than 75%.

Construct Creativity Development.

The following section presents the findings of the suitability of the construct creativity development. Based on the data analysis of this section; the items of creativity development is dropped. In the previous section; findings reported the lack of group consensus of this construct. Therefore; the construct was rejected. As such; the construct and items of creativity will not be included to form SymBest. As explained in the previous sections; construct creativity was rejected based on the calculated percentage of 66.67% of group consensus. Findings show only 4 items selected out of 11 (item number 2.;3;4;5;9;10; and 11) proposed. Since the construct itself was rejected; and the number of items accepted was low based on expert's consensus; creativity development was eliminated from SymBest.

Sequence priority or the ranking of the items in each construct with FDM.

In this section; the sequence priority of the items in each construct is presented. The findings of the suitability of the constructs and items as elaborated in the previous section report that there are four constructs; sensory and motor development; language and communication development; social and emotional development; and cognitive development were confirmed to represent SymBest. The constructs creativity was dropped as it did not gain the consensus of the experts; and the items obtained acceptance was also too low to represent a construct. Therefore; the sequence priority or ranking of the items will be presented for the four accepted constructs of SymBest. The following sub-questions were answered:

2 (c) What are the sequence priority of the items in each construct in the screening tool based on experts consensus?

The third rule of FDM is the fuzzy score (A). Average of a fuzzy number of each item must be $\alpha - cut = 0.5$ (Bodjanova; 2006). The average fuzzy number is calculated to determine the ranking of the items. The ranks of the items are arranged based on the fuzzy scores. In response to this rule; Table 2; 3; 4 and 5 shows the accepted items under the construct sensory and motor development; language and communication development; social and emotional development and cognitive in ranking with fuzzy scores above 0.5.

III) Findings of Phase III: Nominal Group Technique.

Phase III is meant to test the usability of the developed screening tool; SymBest Satisfaction and opinion from the user shall determine the usability of every new product [3]. In the context of this study; the researcher is seeking for the satisfaction of the user who is the early childhood educators; teaching children age three and four years old. The process of measuring the usability of SymBest started with a presentation

slot to the participants of this phase who were the ECE educators teaching children of age three and four years old currently. Shortly after the presentation slot; the educators were required to answer the usability questionnaire provided to them along with the SymBest screening tool developed) to refer while rating their opinions. Like so many other products and services which require for users perception on the usage for commercial purpose; it is also essential to understand the comfortability of Symbest among the users who are the ECE educators from PERMATA; PERPADUAN; KEMAS & YPKT [4].

Thus; to measure the usability of SymBest; the Modified Nominal Group Technique (Modified NGT) method was employed to seek for the perception of the ECE educators on the usability of the tool. A number of 21 participants of ECE educators who are teaching children age 3 to 4 years old from KEMAS early childhood centres were selected to participate in this data collection procedure. The sample of this phase is kept small yet precise because it requires only educators who are directly involved in at least a period of 5 to 10 years of working with children age 3 to 4 years old. The rationale behind the selection of this sample size is similar to [5] that Modified NGT can be used to draw responses from groups of 6 to 40 and the samples selected represent the whole population. The level of agreement on the suitability by seven points Likert by each participant has left a score value for each measurement constructs and items. This score value was converted to a percentage to interpret the data obtained to determine if the constructs and the items of SymBest are suitable and usable or the other way around. In connection with this; the percentage score as a group must be equal to or more than 70% for the constructs and the items to be accepted. As such; to this subjected rule [6] and [5] affirms that in Modified NGT a particular construct or item is accepted if the total percentage score by the participant is equalled to or more than 70%.

Educator's view on items suitable for a child's information details.

The suitability evaluation of this section answered the following research question:

3(a) What are educator's opinions on the suitability of the items under the section of child's details in SymBest?

Findings obtained from the data analysis reports that all the items under the child's details are reported suitable based on the educator's view. There were 10 items suggested in the child's details section; which was accepted based on usability percentage of $\geq 70.0\%$ [5]; [6]. The accepted items for suitability are Rator's Name; Child's Name * (confidential); Child's Gender; Child's Age; Child's Ethnic; School Enrolment Date; Date Rated; State the concerned behaviour issues (speech delayed; hyperactivity; aggressive; etc); State the frequency of the behaviour issue(3/6/9) months and state educator's opinion from the findings.

Educator's view on the suitability of the constructs in SymBest's.

In this section; the suitability evaluation was carried for the constructs of SymBest by seeking an opinion from the expert participants. The evaluation answered the following research question:

3(b).What are educators opinions on the suitability of the main constructs of SymBest?

There are four constructs in SymBest that is; sensory & motor development; language & communication development; social & emotional development; and cognitive development. The 4 constructs are child's developmental domains from Developmentally Appropriate Practices by National Association for the Education of Young Children[7].

The analysis was carried out to view the educator's opinion on the suitability of the four constructs representing SymBest. The findings report that all the four constructs are suitable to represent SymBest based on educator's opinion. The constructs are accepted based on usability percentage of $\geq 70.0\%$ [5]; [6]. The reason for adapting the child developmental domains as measuring constructs is because at risk of developmental delays are reliable to identify according to the domains [8].

3(c). What are educators opinions on the suitability of the items in each construct of SymBest?

The findings obtained will be presented in 4 segments according to the constructs.

(i) Items under construct sensory & motor development.

There are 13 items gathered under the construct of sensory & motor development. The analysis reports that all the 13 items are suitable and accepted based on educators opinion and NGT usability percentage of $\geq 70.0\%$ (Deslandes et al.; 2010; Dobbie et al.; 2004).

(ii) Items under the construct language & communication.

There are 12 items accumulated under the construct of language & communication development. The analysis reports that all the 12 items are found suitable based on educators opinion and accepted based on NGT usability percentage $\geq 70.0\%$ (Deslandes et al.; 2010; Dobbie et al.; 2004).

(iii) Items under the construct social & emotional development.

There are 17 items gathered under the construct of social and emotional development. The analysis reports that all the 17 items are suitable based on educators opinion and accepted based on NGT usability percentage of $\geq 70.0\%$.

(iv) Items under the construct cognitive development.

There are nine items gathered under the construct of cognitive development. The analysis reports that all the nine items are suitable based on educators opinion and accepted based on NGT usability percentage of $\geq 70.0\%$ [9].

V. DISCUSSION AND CONCLUSION

The article discussed the findings of Symptomatic Behaviour Screening Tool (SymBest) in three phases. As a conclusion; based on the need analysis result; early childhood educators in KEMAS; PERMATA; PERPADUAN; and YPKT centers have positive perceptions towards managing behavior problems of children in the classroom. By working with children over the years; they have learned behavioural techniques used for better classroom control (teaching experience for more than five years). However; educators feel that with the availability of supports like access to experts for behaviour issues; behaviour consultants; behaviour modification plans; behaviour training; and screening tools in the school system will enable them to handle children more efficiently. Therefore from the data collected; educators have stated a positive opinion that they need support like a screening tool to identify and understand children's behaviour to be typical or symptomatic to developmental delays. Hence the findings from the need analysis is a strong reason to develop the Symptomatic Behaviour Screening Tool (SymBest). Based on the Fuzzy Delphi results; findings show that the constructs of sensory and motor development; language and communication development; social and emotional development; and cognitive development is suitable as a measurement construct for SymBest. The items accepted under each construct based on experts group consensus is fairly representing children's symptomatic behaviors. There is a need to identify children at-risk of developmental delays as early as 3 to 4 years old or earlier; and a screening tool is vital in the early education system. Finally; in the usability phase; the developed screening tool has gained strong agreement from the 21 experts who represent the user population. The

entire development process of SymBest is designed for educators to feel convenient and feasible for screening.

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