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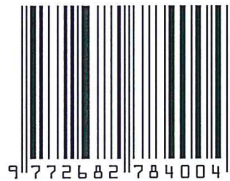
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# A STUDY OF THE EFFECTIVENESS OF LEARNING AIDS FOR THE DEVELOPMENT OF CONCEPTUAL FRAMEWORK

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## ARTICLE INFO

## ABSTRACT

*This paper reports on a study of learning disabilities experienced by students with Dyscalculia condition. The aims of this paper are firstly, to explore challenges of Dyscalculia students within the classroom environment and secondly, to develop a conceptual framework for learning aids to assist Dyscalculia children. Although there are many explorations and studies with regards to learning aids, however, existing learning aids for the dyscalculia condition have been found insufficient and seemingly noneffective for dyscalculia children. Following a literature review, this paper proposes a definition, meaning and history on dyscalculia, children, learning aids and learning disabilities. The methods chosen for this investigation were literature analysis, observation, brainstorming and usage of the KJ Method. This paper will also show a conceptualize design of learning aids together with summary of findings and conclusion.*

## 1.0 INTRODUCTION

In this world, despite the individuals who are blessed with having a basic or good level of intelligence, some, on the other hand are experiencing difficulty in acquiring academic skills. Those skills are imperative for the success in writing, listening, speaking, calculating and reading. These difficulties may be the result of learning disability. There are children who struggle with learning on how to read, some in speaking and there are those with problems in arithmetic known as Dyscalculia. As stated by Kosc (1970), developmental dyscalculia affects mathematical ability in an individual. This condition is the result of a genetic or congenital disorder affecting the anatomicophysiological substrate of mathematical abilities maturation adequate to age, not the disorder of general mental functions. Individuals with dyscalculia will face challenges in performing calculation or arithmetic. Sadly, they currently face this disability with insufficient product or learning aids to overcome their condition. Product design is a process which a designer approaches problem solving with the guidance of analysis of a problem statement for the improvement on quality of life for the targeted end users. It is about visualizing, solving problem and providing a solution for the needs of users. According to Elsbach (2018), designers utilizes traditional tools to solve problems in the design thinking process. Design thinking is adopted as an approach for problem solving in the daily lives of consumers.

In this research, the early phase shall comprise of understanding study issues or problems statement that Dyscalculia children face in their learning pertaining to mathematical tasks. From those

statements, research questions were developed while the objectives of this research creates a focus for researcher to come out with developing a conceptual framework.

## 2.0 RESEARCH AIM

The aim of this paper is to explore and present a development of the conceptual framework.

## 3.0 OBJECTIVE

To identify the conceptual framework and execution through the KJ Method process.

## 4.0 LITERATURE REVIEW

According to Manalo & Trafford (2004), literature review is the analysis of a related study collected from journals, articles, books and any source relevant and related to the study. A literature review is meant for researchers in the same field of study on derivation of a definition, meaning, characteristics and features of related studies. In this study, the researcher focuses on two major key components which are learning aids and dyscalculia. In this chapter, definition meaning, features and examples has been reviewed through books, journal, articles and internet.

## 5.0 LEARNING AIDS

According to Paull (1976), learning aid are additional tools developed to aid teaching. Teaching aids are constantly being developed and they are a means to an end, not definitive. They are most effective and better justified when a need for them has been demonstrated and shown to clarify the teaching of points and problems which students have formerly found difficult to understand. The best teaching aids are developed with the combination of imagination and enthusiasm. Aids should always be evaluated to determine whether the cost of production equates the improvement in learning. Learning aids are an important aspect in any classroom and come with many benefits. According to Sudhakar (2017), beneficial aspects of teaching are:

a) To assist learners in the enhancement of reading skill, calculation skill, illustrative skill, or introducing a skill or concept, and relieving anxiety or disinterest by making a presentation in a fresh and exciting way.

b) To elevate students' engagement because aids can be used in a multitude of ways when teaching a lesson.

Nowadays, children are identified to be less participative in reading and solving calculation. According to Sudhakar (2017), teaching aids are assisting teachers or educators to minimize the gap and facilitate skills improvement in children. Examples of popular teaching aids in the market are flashcards, magazine, graph, videos and charts.

## 5.1 EXAMPLE OF LEARNING AIDS



*Figure 1 Flashcard used by educators.
www.teachingenglish.org.uk*

According to Budden (2018), Flash cards are useful in at every stage of a class and is a helpful medium for educators. However, according to Cohen (2017), flash cards despite being a less interesting way to learn, they have been proven as a preferred study method for hundreds of years. Therefore, the researcher found that flash card is the most or frequent teaching aids used by educators as a medium for them to teach dyscalculia children in the classroom.
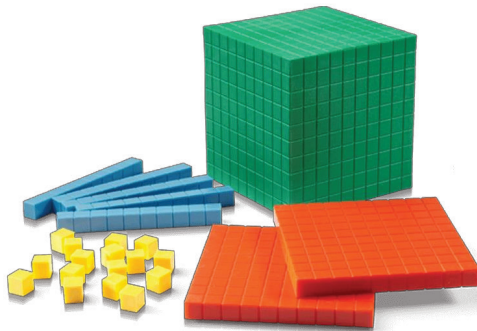


*Figure 2 Base Ten Blocks
www.hand2mind.com*

Blocks, rods and flats or known as base ten blocks is one of highly anticipated in the market for mathematical tasks. According to Jenkins (2018), base 10 blocks is a teaching aid which helps children to see what number looks like and better understand addition, subtraction, multiplication etc. With this aid, children can better "see and touch" numbers. Interestingly, during the researcher's attendance at a Dyslexia seminar held in UUM, one of the facilitator exhibited this teaching aid as a medium to assist Dyscalculia children understand numbers better. Therefore, the researcher found that blocks, rods and flats are used by educators as a medium for dyscalculia children learning in the classroom.
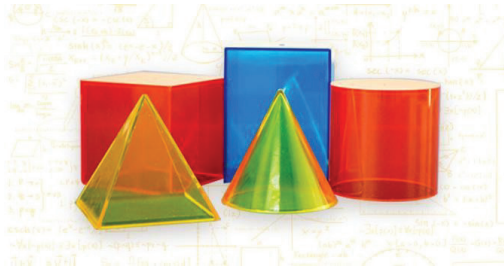
*Figure 3 3D shapes*
*www.pixy.org*

According to Hua (2016), 3D Shapes promotes a better learning experience as the approach of learning can be indirect. The experience of "learn through play" with using 3D Shapes will provide students with a longer impression in their memory. However, Zaleha (2015) stated that knowledge and skills acquired from 3D shapes activities in the classroom could lead to the success into their understanding in only one activity. Therefore, researcher found that the usage of this learning aid is able to assist Dyscalculia children understand and learn better by using see and touch activities.



*Figure 4 Mathematics Games*
*www.pixy.org*

According to Zawawi (2016), the method of 'playing while learning' shows and expose students' interest in learning. While doing so, they shall too seek to explore mathematics with the guide from educators. Indirectly, this fun filled activity can improve students understanding with the ability to help others in learning education. Ruttherford (2015), stated that playing while learning further embed strategic mathematical thinking as students explore and deepen their problem solving ability and understanding of numbers. Therefore, researcher found that Dyscalculia children will explore more in understanding numbers using 'playing while learning' method with the assistance from learning aids in Figure 4.

### 5.2 DYSCALCULIA

According to Gina ( 2017 ), learning disabilities is a generic term for a wide variety of learning challenges. Learning disabilities do not necessarily stem from intelligence or motivation. Children with learning disabilities are not necessarily idle or unintelligent. Most of them are similar with normal children, only that their brain are simply wired differently which affects how they receive and process information. According to Geary etc al ( 1991 ) a learning disability could be a result from the inability to represent or process information in multiple calculations task which is variable between individual competencies. According to Butterworth (2013), learning disabilities influence the brain's capacity to receive, process, analyze and store information. These processing issues can interfere with fundamental learning abilities, for example, reading (Dyslexia), writing (Dysgraphia) and math (Dyscalculia).

According to DfES ( 2001 ), Dyscalculia is a condition that affects the ability to acquire arithmetical skills which means that the learners may have difficulty understanding simple number concepts, lack an intuitive grasp of numbers and have difficulty learning number facts and procedures. Even if they produce a correct answer or use a correct method, they may do so mechanically or without confidence. Kardosh ( 2002 ) mentions that the term Dyscalculia is from the Greek word 'dys' and latin word 'calculia'. Combined, the term Dyscalculia literally means to count badly and it is used to describe people who have difficulties with numbers. Compared to other learning difficulties such as dyslexia, dyscalculia has received little attention, and the familiarity of the general public with it as a problem is relatively low.
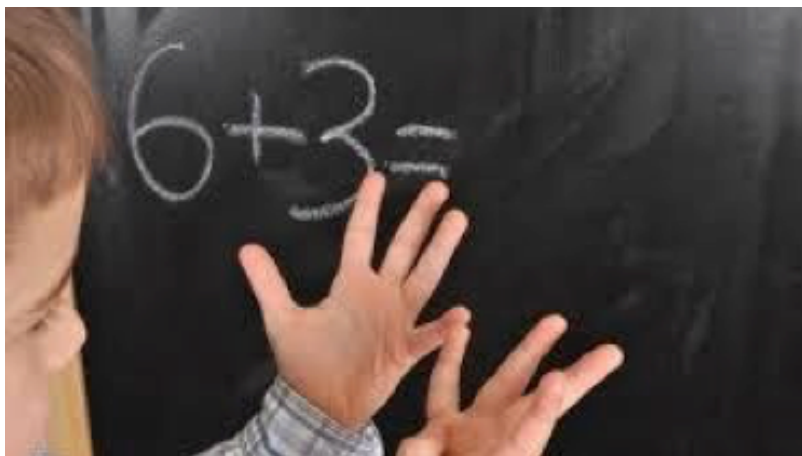


*Figure 5 Children tried calculating www.pixy.org*

Mathematics is a one of the core subjects to be studied in school. People use mathematics as an element in daily life. For example, making purchases will need some mathematics calculation. According to Bisanz(1999) mathematics is a complex subject which integrate language, space and quantity. Research has shown that the development of mathematical skills are focused upon relatively basic numerical abilities such as arithmetic or counting. In this context, the complexity of numerical processing which resulted in a learning disability is identified as dyscalculia.

Dyscalculia features to differentiate between children with the condition and normal children is provided by Geary (1993) shown as below :

1. Difficulty in learning and memorizing arithmetic facts.

2. Difficulty in executing calculation procedures, with immature problem solving strategies, long solution times and high error rates

.

3. According to Yamashita & Aram (1992), No disassociation between arithmetic fact ability and procedural ability in children with numerical processing difficulties.

4. According to Russell & Ginsburg (1984) defines dyscalculia as children with difficulty and struggles with remembering both written calculation and arithmetic fact.

## 5.3 CONCEPTUAL FRAMEWORK DEVELOPMENT

According to Fink (2014), data derived from books, surveys, scholarly articles and others which are relevant to an issue or scope of research is a literature review. They provide a description, summary and evaluation which works in connection to the research problem. Literature reviews or LR is an overall of sources that the researcher has explored to arrive at a research on the relevant topic. This is also to show the readers on how a research fits or gap in the field of research. According to Anson etc al (2010), a literature review is a summary which has an organizational pattern with a combination of two elements which are summary and synthesis. A summary is a recap of information, while synthesis is a reshuffling of information. Therefore, the researcher concluded that a literature review is an important aspect in this research. With a wide study field, literature review narrows down according to the relevance and related study from the research. Literature review consists of data derived from journal, articles, books as well as internet resources. The following figure is a literature review stage of this study.
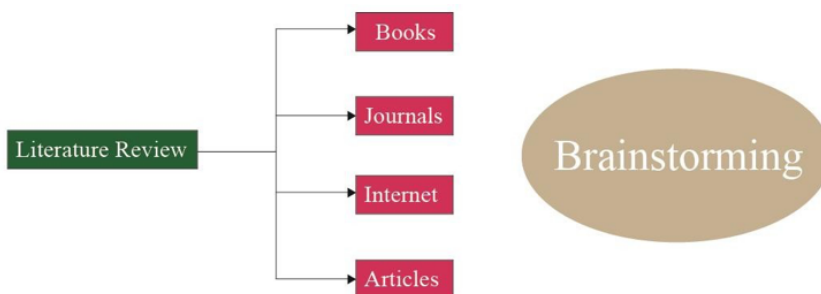


*Figure 6 Stage of Literature Review*

From the figure illustrated, all data from books, journal, internet and articles were the resource of studies the researcher used for brainstorming. According to Zhao, brainstorming is a technique where a group of people use their collective intelligence to approach a problem. This approach inspires people to come up with creative ideas. Brainstorming session is used during the literature review stage.

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However, Osborn stated that the originality of brainstorming is for development, to inspire employees to produce creative ideas.

From brainstorming of relevant topic on this study, the researcher found 140 keywords has been collected from brainstorming. So, from the brainstorming keywords, a most frequent keyword will be used for the KJ Method stage. The following table below shows all the keywords from brainstorming stage.

| Children | Kids | School | Classroom | Teaching | Mathematics | Numbers | Learning | Disabilites | Stress |
|---|---|---|---|---|---|---|---|---|---|
| Performing | Depression | Dyscalculia | Dyslexia | Malaysia | Formula | Aids | Learning Aids | Color | Environment |
| Visual | House | Study | Explore | Arithmetic | Addition | Summary | Dizzy | Cannot Focus | Concentration |
| Brain | Symptoms | Tasks | Playing | Angry | Learning Disorder | Society | Education | Educators | Parents |
| Problems | Lying | Understanding | Weakness | Product | 7-12 Years | Primary | Exam | Calculators | Effectiveness |
| Innovation | Creative | Visual Aids | Conceptual | Research | Ability | Confused | Durable | Cost | Materials |
| Development | Child Development | Listening | Writing | Focus | Individual | Person | Class | Seminar | Tease |
| Boys | Girls | Teaching Aids | Math Board | Fun | Happy | Colouring | Identify | Principle | Activity |

*Table 1 Tabulation of Keywords*

From the tabulation of keywords, the researcher shall use frequent and related keywords for further research in the next stage.

## 6.0 METHODOLOGY OF RESEARCH

According to Polit @004), data which been analyzed, obtained and organized refers as methodology. Methodology depends on the research question. In this research, the researcher need to understand the area of research before go into method such as KJ Method. The main focus of this study is to form a conceptual framework and to get that, the requirement is to do research methodology.

### 6.1 UNDERSTANDING RESEARCH AREA

According to Wan Nur Faaizah (2015), to understand and develop the conceptual framework, the process of understanding the scope of research is prime. By understanding the research area, the search of needed theories become less complicated and more focused. In this study, the researcher determine the research area. The main focus of this research is the knowledge of design which has three main aspects which are people, process and product.

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To develop the conceptual framework, the three main aspects are leads for a conceptual framework. In this research, a lot of consideration will be used into developing the understanding of research area and conceptual framework. Based on this theory, the conceptual framework will be formed through the KJ method process.
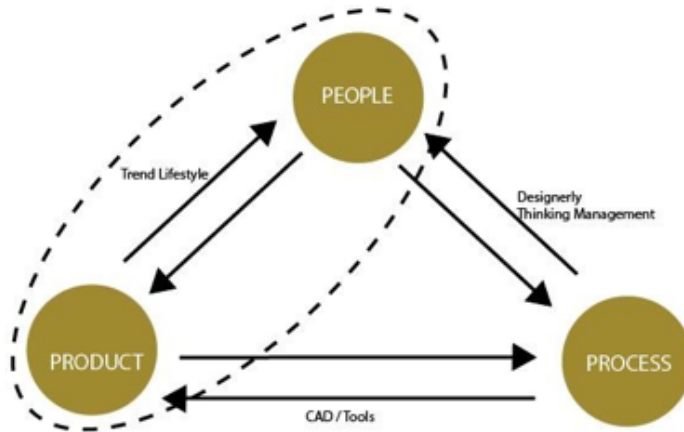


*Figure 7 Understanding Research Area*

### 6.2 KJ METHOD

The KJ Method was developed by Kawakita Jiro and it was also known as "Affinity Diagram" (Ulrich, 2003). According to Lucero (2015), the Affinity Diagrams is a method used to embody, find meaning and organizing large amounts of far-ranging, unstructured data. The KJ Method or Affinity Diagram is used as a tool to synthesize observation of raw data of results from fieldwork to find new hypothesis. However, according to Wan Nur Faaizah et al (2015), this method is a technical innovation known to be the most systematic of brainstorming for the focus of research. This study was conducted through an understanding and search for keywords that was developed earlier on from brainstorming sessions. Following by brainstorming, keyword collected from reading material and ideas from student design, the researcher found out that the KJ Method or affinity diagrams are a big sized paper based presentation of data. This method is also suitable for collaborative data analysis, helping parallel work and a shared interpretation of data created through this technique. Having many participants in a session promotes people to discuss, sharing of opinion and thought which can lead the research to bear better result relevant to the study. The researcher also found out that it is simple to organize a session with basic utensils needed, for example big wall board, sticky notes and pen shows. This is proof that the KJ Method is an easy and approachable way to collect complex data.

### 6.2.1 KJ METHOD PROCESS

According to Wan Nur Faaizah (2015), the important process of the KJ Method is particularly on searching keywords. As much as understanding the focus area of research is important, knowing the right and suitable keywords are just as important. There are several techniques in the KJ Method such as brainstorming, reading, discussion and many more. However, according to Lucero (2015), this process for the early stages of the design process and every stage of this process is important, because the keywords will appear during this session. Therefore, in this study the researcher found out that the first stage of this study is literature review process.

For this stage, a collective data of journals, books, articles and internet sources were used and read for brainstorming of keywords. From brainstorming, most frequent and selected keywords used for KJ Method will be taken into consideration for usage. In this phase, keywords will be clustered into three aspects which is education, product and dyscalculia. In obtaining these three keywords, one hundred eighty keywords were derived from literature review.

For the next stage, a workshop session was prepared comprising of 18 students from the diploma level. Their experiences as a primary school student is the topic chosen for this workshop. The explanation on the phase of the KJ Method is shown in below.
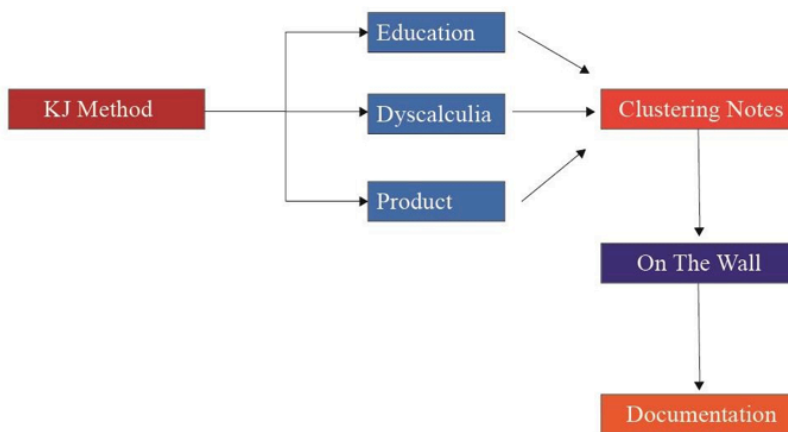
*Figure 5 Understanding KJ Method*

*Figure 8 KJ Method Stage*

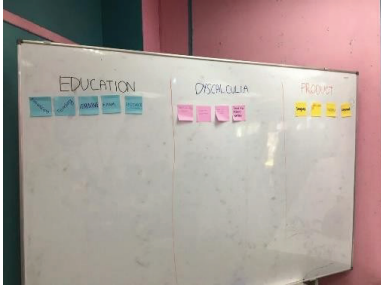| 1. Explanation | |
|---|---|
| *Figure 6&7 Explanation by Researcher* | The researcher started the session with an explanation to the participants on the problem statement of the study, the objective and the questions which has been raised for the researcher to explore for this study. The participants were informed on what is the expected outcome from this method. Sticky notes were used as a medium for them to express their ideas on this study. |

| 2. Clustering The Notes  Figure 8 Group Division | The next step is dividing the group to focus on subjects which are : 1. Education 2. Dyscalculia 3. Product Different color sticky notes were used to identify the groups. |
| 3. On The Wall  Figure 9 Organizing Keywords | All the ideas or keywords from the participants were placed on the white boards them into education, dyscalculia and product. All the keywords will tabulate the main structure of a conceptual framework. |

*DOCUMENTATION (ORGANISING KEYWORDS ACCORDING TO GROUP)*

| EXAM | LEARNING | TEACHING | DISCUSSION | EXPERIENCE | RESEARCH |
|---|---|---|---|---|---|
| HABITS | TRAINING | KNOWLEDGE | SKILLS | EXPLORE | INFORMATION |
| MATH TEST | COUNT 1 UNTIL 10 | LEARNING MATH | MEMORIZED WHEN STUDYING FOR TEST | YEARS OF PRACTICE | POORLY IN MATHEMATIC |
| PRACTICE | QUIZ | POORLY MATHEMATIC | BACKWARD COUNTING | TEST | SUPPORT |
| WRITING | COUNTING | TUITION | PLAY | VIDEO GAMES | MUSICAL NOTES |
| SING | QUIZ | COMIC | APPS | TEXTBOOK | NOTES |
| COLOURING BOOK | | | | | |

*Table 2 Education*

| MATH STICKER | BOARD GAMES | NUMBER SENSE | SMART PEN | MEMORISE GAMES | MATH TALK |
|---|---|---|---|---|---|
| TALKING CALCULATOR | DYNAMO MATH | TALKING CALENDAR | MATH TYPE | DYNAMO MATH | SMART PEN |
| MOBILE GAMES | WALL CHART | SMART PEN | MUSIC BOOK | FISHING NUMBER | JUTARIA |
| SAIDINA | MONOPOLY | CROSSWORD | DOMINO | VOICE CHART AUDIO | NUMBER CARD |
| TABLET | NUMERIC LEGOS | EDUCATION TOYS | WATCH | NUMERIC STICKER | BOOK |
| NUMERIC PUZZLE | UNO | SEMPOA | CALCULATOR | SUDOKU | KEYBOARD |

*Table 3 Product*

| HARD TO MAKE A CALCULATION | STRUGGLE WITH WORKING MEMORY | TROUBLE WITH MANY ASPECTS OF MATH | HARD TO DETECT NUMBER | BOYS & GIRLS | PROBLEMS MATHEMATICS |
|---|---|---|---|---|---|
| CAN'T MASTER BASICS | SLOW TO PERFORM CALCULATION | MATH DYSLEXIA | CHILDREN | DIFFICULTY COUNTING BACKWARD | WEAK MENTAL SKILLS |
| DIFFICULTY | CONFUSION | SLOW LEARNER | IDENTIFY | MEMORIZE | MISUNDERSTAND |
| DISABILITIES | ARITHMETIC | VICTIMS | DON'T RECOGNIZE NUMBER | UNSURE | BLURRY |
| SLOW | RECALL | STRUGGLES | TROUBLE | LEARNING DISABILITY | LACK CONFIDENCE |
| BRAIN DISORDER | DIFFICULT | LAZY | MATH PROBLEM | MISUNDERSTAND | TOUGH |

*Table 4 Dyscalculia*

## 6.3 DYSLEXIA CHILDREN TEACHING & LEARNING SKILL WORKSHOP
## (BENGKEL KEMAHIRAN P & P KANAK-KANAK DISLEKSIA)

To strengthen the conceptual framework, the researcher attended a workshop related to the field of study which was held at the University Utara Malaysia. University Utara Malaysia or UUM is a university with incubator facilities providing the teaching dyslexia children as with an aim to improve their learning ability in 3 months. This workshop assisted in enhancing literature review and provided further explanation on this study from experts and educators who are extensively experienced in handling learning disabilities cases.
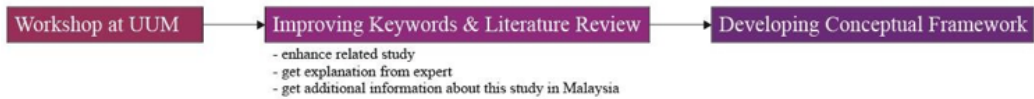


*Figure 9 - Stage of Validation Conceptual Framework*

At this workshop, the researcher was provided with a lot of knowledge and situation on this learning ability in Malaysia. The one day workshop provided five tables to which at each table, in depth explanation and additional information were provided and shared by experts and participants. The details at each table are shown in the tables below :

| | |
|---|---|
| **TABLE 3**<br>- By Pn. Nor Bibi Maslina Jusoh<br> | **KAU SEMPURNAKAN KERJAYA GURUKU**<br><br>In this table, the researcher has been provided information such as :<br>a) First time teaching special needs children<br>b) First time stay in same roof<br>c) Primary data sources<br>d) Ten questions test children |
| **TABLE 4**<br>- By En Mohamad Hafiz Bin Mohamad Khayapi<br> | **THE IMPORTANCE PHYSICAL ACTIVITY IN DEVELOPMENT OF DYSLEXIA CHILDREN**<br><br>In this table, the researcher has been provided information such as :<br>a) Latest statistics<br>b) Central nervous system pyramid of learning<br>c) Pre-writing activity<br>d) Hands-on activity |
| **TABLE 5**<br>- By Pof Madya Dr Zakirah Othman<br> | **SANTAI BERSAMA IBU BAPA**<br><br>In this table, the researcher has been provided information such as :<br>a) Introduction<br>b) Case 1- experience of children can't read<br>c) Interaction and sharing session with parents<br>d) Case 2- experience of children don't want to school<br>e) The role of parents according to islam<br>f) Q&A |

## 6.4 SUMMARY OF WORKSHOP

From this workshop, the researcher obtained information with regards to the study which consists of the characteristics of dyslexia children and how to overcome the weaknesses that the children face in their study. The children involved will need special attention because their brain is not wired as the same with normal children. In the introduction segments, the speaker stressed on the importance of early intervention for dyslexic children. This is important because late or delayed intervention may cause depression in children which may lead to bigger personal or family issues.

At Table 1, the speaker introduced a learning aid (sintok) as a medium in teaching. The researcher discovered a product which children can feel and touch as the best medium for them to learn through experience in the classroom. Meanwhile, at Table 2, the speaker made a point on using a relaxing mood and one on one teaching method as a crucial method in handling dyslexic children. Next, at Table 3, the researcher experienced a situation of teaching a student who has learning disabilities. The researcher realized that when handling special needs children, extra attention and a different presentation or method is a must for the students to maintain their focus and attention. At Table 4, physical activity such as writing, sensory circuit and many more (hands- on activity) should be introduced and highlighted for the benefit of the researcher in his better understanding on how the

children's sensory and brain work. Lastly, at the last table, the researcher made a find about cases of children feeling left out, refuse going to school due to being teased by other children, and many more big cases which can pose and lead to serious problem in their future. Early intervention is imperative to prevent more serious occurrences in the future.

This workshop proves to be a much influential platform for the researcher due to experts and educators explanation on actual situation with learning disabilities children. Their input has strengthen the researcher's study on literature review and on how to develop a meaningful conceptual framework.

## 7.0 FINDINGS

### 7.1 CONCEPTUAL FRAMEWORK

According to Cynthia Grant (2014), conceptual framework is a systems of beliefs, concepts and assumptions that guide a research plan. Conceptual framework is a progression of a study in an explanation structure. The conceptual framework gives a structure to concepts by providing a picture or display on how ideas in a study relate to one another in conceptual framework. However, the specification and definition concepts within the problem is the best way to describe a conceptual framework (Luse, Mennecke, & Townsend, 2012).

Conceptual framework in this study has been developed from brainstorming keyword in the previous stage. These conceptual framework was build from a collection of keywords during workshop implementation and reading resources to explore the needed process in developing conceptualize learning aids design. It will lead the research area in this study and contribute to selected knowledge to keep this research on the right track.

### *7.2 FORMATION OF CONCEPTUAL FRAMEWORK*

According to Wan Nur Faaizah (2015), the editor is an excellent tool to record the thinking process as it depends on the amount of recorded information. For idea sharing method, all the data from the participants which is large may need some data reduction to be done. However, some ideas may not be recorded as participants may not share their thoughts. Using the KJ Method or affinity diagrams is far better as the analysis process can be accelerated since the record can be read and processed by machines. From all the keywords which researcher managed to find through this method, some were shortlisted as important keywords for conceptual framework building.

Next, from the shortlisted keywords, the editor analysis would assign names to the appropriate groups. These groups will be analyzed based on the effectiveness and significance in the study when it is used in conceptual framework. In literature review, only selected keywords will be chosen to be included as keywords in conceptual framework.

After that, the conceptual framework will start with three main key components which are education, dyscalculia and children. The main aspect in the framework of this concept is Dyscalculia in children. Among selected keywords based on suitable concepts are conceptual, learning aids, visual, environment, activity, numbers, identify, principle, and product.
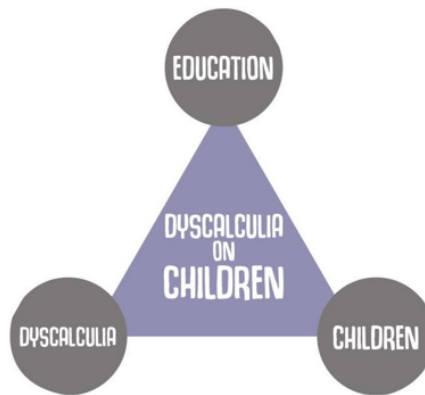
*7.2.1 PHASE ONE*



*Figure 10 – Conceptual Framework ( Phase one )*

In the beginning, the main aspects which is dyscalculia in children narrows down to three main key components which will be used during the KJ Method / Affinity diagrams. After the formation of phase one framework (as figure), the first step is to use it within the KJ Method. The test was administered to a group of design students. The main purpose of this test is to enhance and getting new ideas to better understanding related to dyscalculia in children.

*7.2.2 PHASE TWO*
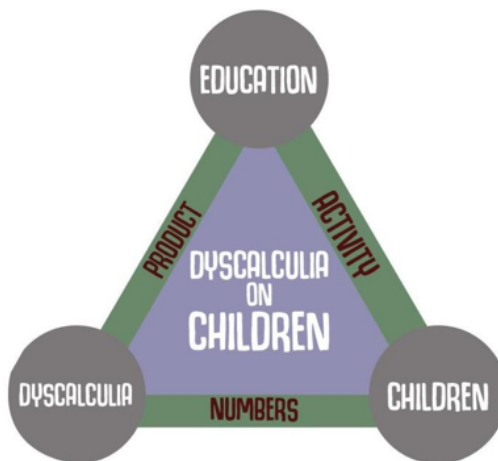


*Figure 11 – Conceptual Framework ( Phase two )*

In this phase, the conceptual framework is developed with three main keywords which are product, activity and numbers. The keywords came out with related connection between two main key components. For example, connection between Dyscalculia and education is product. To assist learning in education for dyscalculia children, products is used a catalyst. The same goes between education and children. Children will want to be involved in education with learning (activity). These keywords came from the literature review and determine with the KJ Method.
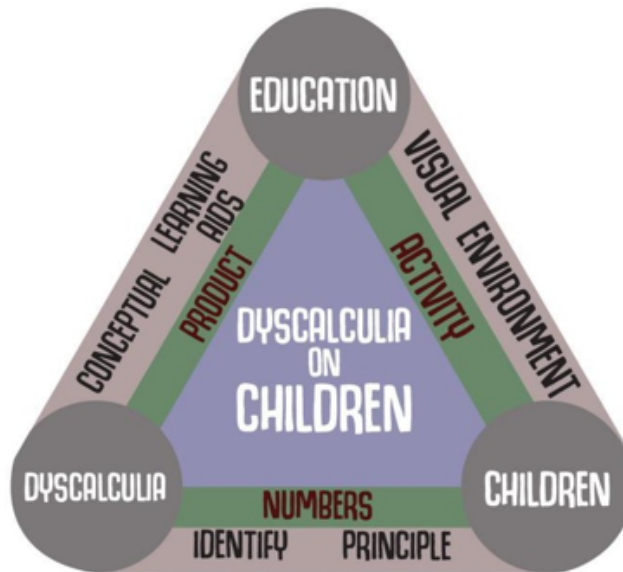
*7.2.3 PHASE THREE*



*Figure 12 – Conceptual Framework ( Phase three )*

In phase three, the completed conceptual framework was developed from six keywords which are conceptual, learning aids, visual, environment, identify and principle. The same theory or situation has been used to determine the keywords which are related with first and second phase of the conceptual framework.

There are three aspects between three main key components and among the attributed functions are :

**Product** (Conceptual – Learning aids)

In this aspect, the researcher will further research on the product based on two sub aspects which are conceptual and learning aids. In this area, the researcher will distribute questionnaires to educators and parents to find out what concept of learning aids for dyscalculia children is preferred.

**Numbers** (Identify – Principle)

In this aspect, the researcher will research on the numbers based on the factors Identify and Principle. The functions of Identify and Principle of numbers are references for the function of conceptual learning aids. Identify in this study is used to identify mathematical problems faced by dyscalculia children. Principle means general idea of numerical problems and how to identify and solve the problem that dyscalculia individuals face in their life.

**Activity** (Visual – Environment)

In this aspect, the researcher will further the research activities based on visual and environment. The functions of sub-aspect references are for the function of conceptual learning aids in

the next steps. Visual in terms of this study is an establishment of what dyscalculia sees and prefers in a product. Visual such as colour combination, materials etc are need for the researcher to study more in detail. Meanwhile, environment in this study define the kind of environment that dysacalculia children face in the classroom or in study.

## 8.0 CONCLUSION

In general, all the data in this research indirectly could assist the researcher in terms of exploration to induce filed work and conceptualization of appropriate teaching aids for educators to use in assisting Dyscalculia children overcome their impairment. With the development of conceptual framework, the researcher discovered that data can be easily collected following each phase carefully in the conceptual framework.

Based on this research by using the KJ method, keyword generation helps promote and widen process for conceptual framework development. In other words, the KJ method is applied to determine the preferred keywords in a few group in this study.

This research is hoped to be able to increase different efforts and can be used as a useful guide for future studies. Hopefully, by understanding the KJ method and how to edit it will produce more research and studies with full utilization of this thinking application (Wan Nur Faaizah et al. 2015).

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