

**SHE'S TWELVE AND SHE CAN'T WRITE:
AN ACTION RESEARCH EXPLORATION TO MEDIATE
SPECIAL EDUCATIONAL NEEDS PUPIL TO LEARN
TO WRITE**

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ABSTRACT

School's daily tasks typically require pupils to write their own names. However, for some special educational needs (SEN) pupils, the task of writing name is tough for them and it requires the teacher to impart the specific skills for the pupils. This action research investigated an intervention that was employed by the first author, who is a special education teacher, to assist a Down syndrome pupil in writing the letter "H" in her name legibly as well as to discover materials and resources that could be used to facilitate the intervention processes. The action research intervention was conducted in a Special Education Integrated Programme classroom of a primary school in the northern region of Malaysia. The research participant was a 12-year old female Down syndrome pupil. By adopting Vygotsky's notion of zone of proximal development and information-processing theory, a four-step intervention strategy involving fine motor warm-up, letter introduction, guided practice and paper-pencil practice was devised to facilitate the pupil's writing attempts. Writing samples were collected and analysed based on existing writing marking criteria which were adapted for the purpose of this study. Reflective journals were kept throughout the intervention period for continuous improvement purposes. The pupil was able to write the letter "H" legibly based on the four-step intervention strategy. The materials and resources used during the intervention were mainly derived from available resources in the classroom and were economically viable for the teacher to

construct. Reflections on the intervention process suggested that the teaching and learning of pupils with SEN were more interesting and meaningful when the intervention involved the application of learning theories together with the use of teaching strategies that were incorporated multi-sensory approach. The findings can serve as guidelines for special education teachers to overcome difficulties of Down syndrome pupils in name writing. Meanwhile, reflections from the process can serve to enlighten the current literature on facilitating handwriting skills among pupils with SEN.

Keywords: *handwriting, Down syndrome, special education, learning difficulties*

INTRODUCTION

Moop, the first author, is a teacher who works with children that have special educational needs (SEN). In this article, we explore Moop's attempts to facilitate a 12-year old girl with Down syndrome in learning to write her own name. Moop has a degree in biotechnology. However, she has undergone a postgraduate diploma in teaching which qualifies her to teach science for primary school children. Despite having the qualification of teaching science for primary school children, she has been assigned to work with SEN children since her first posting in 2010. Moop has not been formally trained in special education, except for a three-day compulsory training (Special Education Foundation Course or *Kursus Pendedahan Asas Pendidikan Khas*). It is an introductory course pertaining to special education whereby teachers who teach in special education program are required to undergo to be qualified for allowance (Payment for Teaching Disabled Children or *Bayaran Insentif Mengajar Kanak-Kanak Cacat*). She only attended the course a year after working with SEN children since the State Department of Education did not offer the course in 2010. Currently, Moop is pursuing a Master's degree in Educational Psychology and this has been a platform for her to continuously upgrade her understanding of learning.

This article is about Moop's academic and practitioner journey in understanding the learning needs of a Down syndrome girl, Hasnim. This journey required Moop to consider from various

theories of learning to cater and accommodate to Hasnim's learning needs. Moop's involvement in systematic classroom inquiry is similar to professional learning or reflective inquiry and this can be found in the literature which involve teachers learning about learning and becoming learners themselves (Wennergren, 2015).

From Moop's observation during instructional time, Hasnim was unable to write her own name. When she drew simple circles, multiple vertical or horizontal zigzag lines, she would claim that one of those figures was her name. In reality, she was unable to form any letters of the English alphabets and could not recognise them. She was the only pupil who had this problem in a class of seven pupils with multiple learning difficulties (LD) in Moop's self-contained Special Education Integrated Programme (PPKI) classroom. This could be due to the fact that she was not formally exposed to the alphabets since such exposure was not the main emphasis in Community-Based Rehabilitation (CBR) centre. She was only transferred recently to Moop's class after five years of placement in the centre.

As a special education teacher, Moop held the view that name writing skills are crucial even for pupils with SEN because daily tasks at school require them to write their own names. This is in agreement with Batchelder, McLaughlin, Weber, Derby and Gow (2009) who reported that teachers attest to the importance of name writing skills. Moore et al. (2013) stated that handwriting, which is a pre-skill for reading and written composition, is an important academic skill. Research has shown that children with Down syndrome who achieved high alphabet knowledge, print convention, comprehension, receptive knowledge and high phonological awareness (Ricci, 2011) will have a good handwriting skill during adulthood (Tsao, Fartoukh & Barbier, 2011).

As a result, Moop is eager to help her pupil but one question puzzled her "How am I going to do that?", hence she needed to learn how to help her Down syndrome pupil to write her name. The involvement of teachers in systematic inquiry in the classroom is known as professional learning or in other words, teachers as the learners themselves (Wennergren, 2015). Moop was interested to make a strong foundation for her current Down syndrome pupil by building

strong literacy emergent skills even though she was already twelve. This paper reports Moops' attempt to help Hasnim write the "H" letter in her name through an action research study. This paper reports Moops' attempt to help Hasnim write the "H" letter in her name through an action research study. The primary objective was to find out intervention strategies that could relatively employed by a special education teacher during instructional time in order to assist Down syndrome pupils in forming the letter "H" legibly. The second objective was to discover the learning materials and resources that could be used by a teacher to facilitate the intervention processes.

Down syndrome is known as a genetic cause of intellectual disability (Bittles, Bower, Hussain & Glasson, 2007) that is affected by the presence of extra genetic material on the 21st chromosome (Bauer, Jones & Feeley, 2014). Down syndrome children predominantly demonstrate greater or lesser motor impairments while delay can also be perceived in fine motor skills (Tsao et al., 2011). As mentioned by Datchuk (2015), fine motor skills are related to the ability of children to form a legible handwriting. Thus, Down syndrome children also have difficulties in handwriting (Tsao, Moy, Velay, Carvalho & Tardif, 2017).

Handwriting is the formation of letters that is associated with fine motor movement, visual motor coordination and orthographic coding, thus is counted as indispensable as it served as a basic functional skill for school children (Datchuk, 2015; Duiser, van der Kamp, Ledebt & Savelsbergh, 2014; Schwellnus et al., 2012). Typically, the daily handwriting task for school children is name writing (Arslan, 2012). As children with SEN are also school children, the ability to write one's own name is therefore crucial for pupils with severe disabilities (Batchelder et al., 2009).

The previous studies already demonstrated that various intervention techniques confirmed to be effective in terms of handwriting acquisition. Such method includes the use of a multimedia player (Lorah & Parnell, 2014). Lorah and Parnell (2014) evaluated the acquisition of handwriting skills by using iPod Touch®, stylus pen and application of *Letter School* for three preschool children who are diagnosed with autism spectrum disorder (ASD) and developmental

delays (DD). The results indicated that all the participants acquired the ability to write letters using paper and pencil that are generalised from the iPod Touch® and stylus pen. Besides that, the application of point-of-view video modelling (POVM) with explicit instruction and token economy was also effective in teaching ASD children to write their names (Moore et al., 2013). Furthermore, a study conducted by Park, Weber and McLaughlin (2007) showed that fading, modelling, prompting and direct instruction were also successful in teaching two preschool children with physical and developmental delays to write their names legibly.

Apart from focusing directly on the handwriting, some researchers attempted to facilitate the writing by implementing an intervention that focuses on pencil grip. For example, Rashidah and Ephraim (2015) applied the pencil grip intervention to two preschool children while Yen, Mohd. Yasin and Tahar (2012) employed the intervention of pencil grip among LD children. Conclusions from both studies indicated that the correct pencil grip indeed influenced the legibility and neatness of the handwriting.

Nevertheless, most of the interventions for handwriting which are published are mainly focused on ASD, DD, preschool, and LD pupils (Lorah & Parnell, 2014; Moore et al., 2013; Park, Weber & McLaughlin, 2007; Yen, Mohd. Yasin, & Tahar, 2012). Thus, handwriting interventions for Down syndrome are scarcely available. Therefore, a practical handwriting intervention along with the economically viable teaching materials for Down syndrome pupil is warranted.

Theoretical Framework

The current action research was guided by two main theoretical frameworks which were Vygotsky's zone of proximal development (ZPD) and scaffolding as well as information-processing theory. The significant application of Vygotskian theory is the recognition of the role of social interaction between a teacher and a pupil in promoting cognitive development (Zuckerman, 2007). Vygotsky's theory stresses guided discovery learning where teachers use prompting to develop learning while information processing theory emphasises cognitive

strategies (Krause, Bochner & Duchesne, 2003). Thus, both theories will enhance the learning processes.

ZPD is defined as the distance between the tasks that a pupil can accomplish without any assistance and the tasks completed with the teacher's assistance (Murphy, Scantlebury & Milne, 2015). What pupils can do with the assistance of others is more emblematic of their actual developmental status rather than what they can do alone (Kleinspehn-Ammerlahn et al., 2011). Scaffolding, on the other hand, is the support provided to pupils in order for them to successfully complete the task independently (Dix, 2016). Scaffolding techniques such as modelling, reducing choices and guiding can be used by the teacher in a child's ZPD (Quinn, Gerde, & Bingham, 2016). Once the pupil masters the task, the scaffolding can be removed and they will be able to perform the task by themselves (Cabell, Tortorelli & Gerde, 2013).

In addition to ZPD and scaffolding, information processing theory helps to explain how the information from the surrounding is being processed (Krause et al., 2003). Learning is the process by which learners acquire knowledge while memory is the process by which learners retain it (Sousa, 2007). One of the studies that helps to shed some light on the issue is the study conducted by Krause, Bochner and Duchesne (2003). They concluded that learning should incorporate learning strategies such as rehearsal and elaboration to enhance and assist pupil's ability in learning and recalling information that involves memory (e.g., sensory, short term and long term).

By considering both Vygotsky's ZPD and scaffolding as well as information processing theory, children with LD can learn through imitation, adapted materials, collaborative learning and the use of a variety of teaching aids (Sousa, 2007). However, Hebbeler and Spiker (2016) stated that they usually need instructional practices that are more intense and longer in duration than those typically developing (TD) peers. However, Sousa (2007) argued that multi-sensory approach of the teaching and learning method is the most appropriate way of learning. But it was suggested by Keller (2001) that active learning which involved "hands-on" and "minds-on" tasks is even more meaningful as it allows the learners themselves to be active in their own learning.

METHODOLOGY

Setting

The study was conducted in a primary school in the northern region of Malaysia. There are 567 pupils enrolled in the school, consisting of pupils who enroll in Special Education Integrated Program and pupils who go through education from pre-school to Year Six. All the pupils in this school are Malays from rubber-tapper families. There are seven pupils (four males and three females) in Moop's self-contained PPKI classroom. Among the seven pupils in her classroom, one is diagnosed with ASD, one with speech delay, one is a slow learner, two with specific LD (dyslexia) and another two are diagnosed with Down syndrome and all of them are of age from 7 to 14 years old. During instructional time, all of them are placed and considered as one whole class. The total hours of schooling days for them are 23 hours per week which include 10 subjects and one period for a school assembly.

Participant

The focus of the study was on a 12-year old female pupil, Hasnim, who was diagnosed with Down syndrome. Hasnim attended CBR since she was 6 years old. She was recommended by the centre's supervisor to attend this school since a few years back but her parents were unable to send her to the current school due to certain circumstances. Despite learning the correct way of gripping pencil, she was unable to form any letters in her name. When she wrote, she tended to place her face closely to the paper and her eyes always became watery. Her mother even brought her to see the doctors but no recommendation was given in relation to her vision difficulties. As a teacher, Moop was not sure whether her eyes were problematic. When teaching, Moop tried to test Hasnim's vision but she was unable to make any conclusion. However, research showed that Down syndrome children tend to have vision problem (Bull, 2011).

Nevertheless, from Moop's observation and informal conversation with Hasnim's parents and neighbours, Hasnim was a friendly and happy person and she was able to communicate with friends and adults accordingly. Thus, in agreement with Martin, Klusek, Estigarribia

and Roberts (2009), Down syndrome children are typically described as highly social, engaging and affectionate even though some may encounter the impairment of social skills. So, Hasnim seemed to fall under the former category of Down syndrome children as suggested and defined by Martin et al. (2009).

Research Procedures

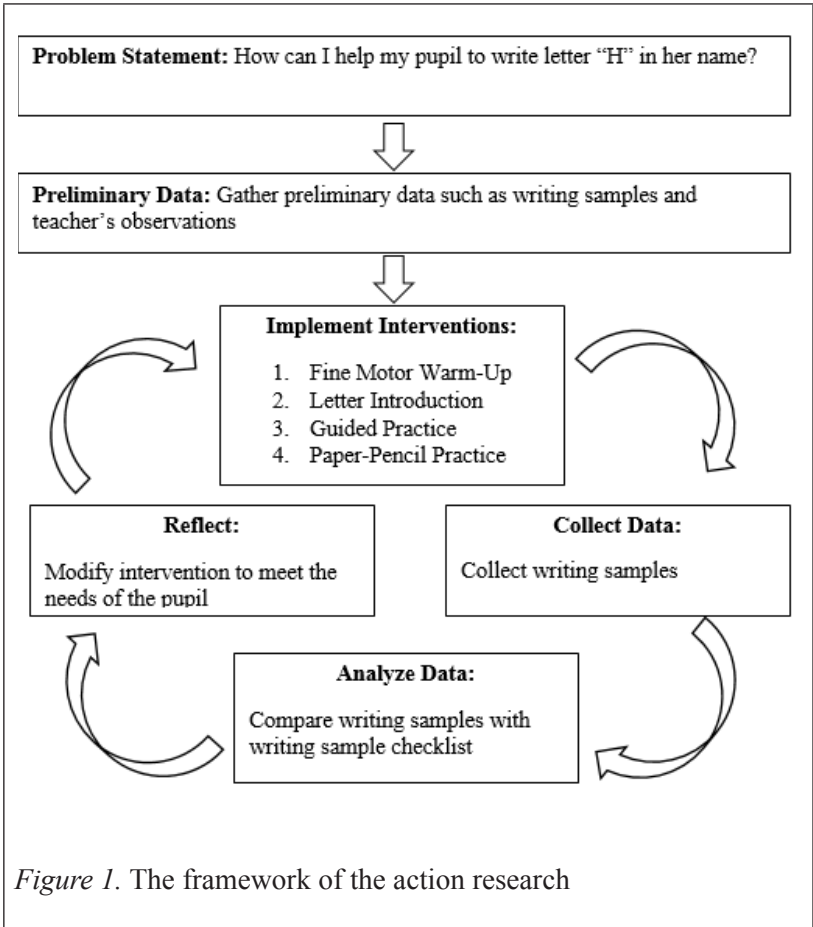


Figure 1 shows the overall framework for the action research. During Hasnim’s first day of school (7th March 2017), Moop began to observe and collect her handwriting samples during instructional time in order to plan for Individualised Education Plan (IEP) or *Rancangan*

Pendidikan Individu (RPI). Actually, the current research is part of the IEP for Hasnim. The upper case letter “H” was chosen because it is the first letter of Hasnim’s name. By using the preliminary handwriting samples, Moop created the first cycle of the intervention for her action research.

Cycle 1 and 2 of the intervention consist of six sessions with the duration of about 30 minutes for each session (3 sessions for one completed cycle). Each session consists of four sequential steps, namely fine motor warm-up, letter introduction, guided practice and paper-pencil practice (Table 1) which were adapted from Keller (2001). While she was working with Hasnim, the rest of the pupils worked on their designated tasks pertaining to the current subjects. During each session, Moop recorded her observation regarding the Hasnim’s behaviour and her feedback during the processes. After cycle 1, she collected and analysed Hasnim’s handwriting samples in order to modify her intervention for cycle 2 so as to meet the participant’s needs. Cycle 2 was the same as cycle 1. The only difference was that she incorporated the pencil’s weight to enhance the participant’s proprioceptive (deep pressure onto muscle and hand) so as to make her realise the presence of the pencil which helped her to press the pencil onto the paper during writing (Keller, 2001).

Firstly, the participant “woke up” her finger muscles by performing fine motor warm-up activities. The activities included rolling modelling clay and stringing hollow shape toys. Secondly, salt was used to stimulate the sense of touch of the formation of the letter “H” during the letter introduction step. Thirdly, guided practice session was implemented by using a tablet with *Writing Wizard* application which was downloaded from Google Play Store. Finally, the last step of the intervention was paper-pencil practice. During the implementation of this step, the participant practised functional handwriting skills by writing the letter “H” in the square-space provided. A typical mathematics exercise book was used when implementing this step. Letter introduction, guided practice and paper-pencil practice were related to information processing theory. Rehearsal facilitates the movement of the information from sensory memory to short-term memory and retains in long-term memory (Sousa, 2007). During

cycle 2, Moop incorporated the pencil's weight during paper-pencil practice.

Letter introduction, guided practice, and paper-pencil practice steps of the intervention were based on Vygotsky's ZPD and scaffolding and information-processing theories. The use of scaffolding and modelling throughout each steps by Moop together with the emphasised on the reception of the information regarding the letter "H" by repetition demonstrated the application of both learning theories. Besides, the implementation of teaching and learning strategy that caters to the pupils' interest will make the learning fun which will indirectly facilitate the learning processes.

Table 1

The four steps of intervention strategy

Intervention Steps	Activities	Teaching Aids	Duration (minutes)
Fine Motor Warm Up	Rolling modelling clay, stringing hollow shape toys	Modelling clay, hollow shape toys	7
Letter Introduction	Letter introduction and formation practice onto a tray of salt	Tray, salt	3
Guided Practice	Letter formation practice by using <i>Writing Wizard</i> application	Tablet, <i>Writing Wizard</i> application	10
Paper-pencil Practice	Functional handwriting practice	Pencil (with weight during cycle 2), squared-box exercise book	10

Data Collection Methods and Analysis

Both preliminary handwriting samples and writing samples at the end of cycle 1 and 2 were collected and analysed based on existing writing marking criteria rubric. The marking criteria rubric used for coding letter attempts was adapted from Moore et al. (2013) for the purpose of the study (Table 2). Reflective journals throughout the intervention process were kept for continuous improvement purposes.

Table 2

The marking criteria for coding letter attempts

Criteria	Recognisable (1 mark)	Executed correctly (1 mark)	Consisted of the correct components (no additional components) (1 mark)	Components positioned in the right place (1 mark)
	Could be recognised as “H” and was not be seen mistakenly for any other letter		Three straight lines	One vertical straight line on the left-hand side, one vertical straight line on the right-hand side, one horizontal middle straight line that connected both vertical lines

Ethical Considerations

Strict ethical guidelines for educational research (BERA, 2011) were implemented throughout the study. Consent, confidentiality and

anonymity, and data security were ensured throughout each steps of the study. Informed consent is obtained from parent and participant (Cohen, Manion, & Morrison, 2007). The participant's individual assent was also being secured before each intervention sessions by using their receptive language (Oliver, 2003). Thus, the participant was eligible to participate or withdraw as she wished without any consequences. If participant decide not to take part, her choice was respected and will be asked to be involved later based on her decision and this is an important process to ensure that there is no misuse of power (Nutbrown, 2010). The using of pseudonyms for all parties that involved in the current study was implemented in order to ensure confidentiality and anonymity (Cohen et al., 2007). The scan of handwriting samples was stored in a password protected folder on first author's computer while hardcopies also being stored in a locked cabinet.

RESULTS

Two-cycle of the action research was conducted in the two-week time frame. The participant's ability to form the letter "H" improved along the intervention processes. During the processes, both the participant and Moop played their parts. Scaffolding, which is also known as prompts, together with the rehearsal attempted were important in the teaching of handwriting.

Intervention Processes

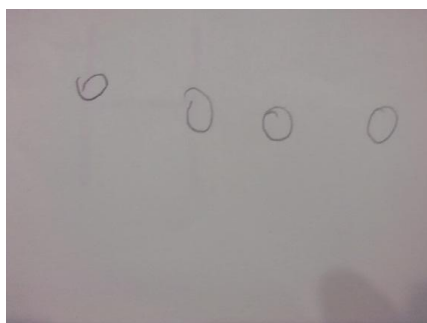


Figure 2. Preliminary handwriting's sample

The preliminary score for letter “H” formation was zero as the participant was unable to form any components of the letter (Figure 2). The participant was asked to write the letter “H” and was physically prompted (held her hand to the space provided). However, she could hardly respond to the instruction provided. Positive feedback such as “Good because you try Hasnim, but not yet correct” and praise was given to her due to her limited response to the instruction after being prompted.

Fine Motor Warm-Up



Figure 3. Fine motor warm-up activities

Throughout cycle 1, the participant struggled during the first session of the intervention procedure (warm-up session), especially if the task was rolling modelling clay to form sphere shape. She displayed a lot of frustration by saying “difficult” or “tired” most of the time (Figure 3). Hence, the development of fine motor skill was quite challenging for the participant as it might be due to the lack of muscle strength in her fingers. This condition is commonly known as hypotonia and it is typical among Down syndrome children (Gaili, Rigoldi, Brunner, Virji-Babul & Giorgio, 2008). Moop also used prompting techniques and these techniques depended on the response provided by the participant. She used gestural prompt or model (showed how to roll) if the participant did not understand when she said

“Roll the clay into sphere form” or full physical prompt (held the participant’s hands to perform rolling movements). It depended upon the participant’s response during that moment. There are six types of prompts: Physical, verbal, model, gestural, visual and positional (Alberto & Troutman, 2003). Additionally, Moop also incorporated verbal reinforcement such as “Good Hasnim. You can do it” in order to enhance the participant’s motivation when she responded correctly. After each successful attempt, the participant was very pleased.

Letter Introduction



Figure 4. Letter introduction activities

Salt was used during the letter introduction stage (Figure 4). Multiple sources of input (e.g., vision and touch) will increase the chance of the information (letter “H” formation step) to be specifically attended by the pupil. As argued by Iarocci and McDonald (2006), the use of sensory integration method helps to enhance the reception of information by sensory memory. The participant was introduced to the letter “H” and the name of the letter by modelling, prompting and verbal reinforcement where applicable. Moop showed the participant how to form the letter “H”. She drew one vertical straight line on the left side, one vertical straight line on the right side and one horizontal straight line in the middle that connected both vertical lines on the left

and right on a tray of salt. She modelled the steps until the participant was able to form the letter “H” independently. When the participant did not know where to start, Moop held her hand and placed it where she was supposed to start writing. By writing on salt, the participant could feel the formation of the letter “H”, thus helping to ease the transfer of the information of letter “H” formation from her sensory-memory to short-term memory as the sense of touch increases her awareness of the information (Iarocci & McDonald, 2006). The participant was very excited, proven by her saying “wow” when she successfully formed the letter “H”. However, she still complained during the letter introduction stage in both cycle 1 and 2. In addition to the introduction of the letter, Moop also frequently reminded the participant to sit straight when writing onto the tray as she seemed to lean forward until her face was too close with the tray.

Guided Practice

The participant practised to write the letter “H” by using the *Writing Wizard* application which was downloaded from Google Play Store (Figure 5). The application was incorporated with sounds and effects that were able to catch the participant’s attention. This could be proved as no complaints was heard from her when using the application. It seemed that the use of a teaching strategy that caters to the pupils’ interest make them to be interested in learning, thus facilitating the learning processes. This was in agreement with Sousa (2007) that information processing theory emphasises learning strategies that facilitate the reception of information by capturing one’s attention. Nevertheless, Moop still had to model and prompt the participant to respond. Both physical (held her hand to write) and verbal prompts such as “Look. What is the finger of the person doing?” were used during the activities. Apart from that, she also applied verbal reinforcement such as “Ha..you can do it, good”. As the participant went through the processes, Moop noticed that the participant preferred to use the tablet and the participant would even ask if Moop would allow her to use it during the other time. As usual, each successful formation of the letter “H” was a victory for the participant.



Figure 5. Guided practice activities

Paper-pencil Practice



Figure 6. Paper-pencil practice (Cycle 1)

During the paper-pencil practice, Moop frequently reminded the participant to sit straight and avoid facing too close to the paper (Figure 6). She had to frequently correct the participant's sitting posture and

hand position. Modelling, prompting and verbal reinforcement were still applicable where needed. Sometimes Moop held the participant's hand when writing and pointed to the space where the participant was supposed to write the letter "H". The score for the participant in the formation of "H" letter at the end of the cycle was four out of four (Figure 7). However, it seemed that the letter "H" was written too lightly. From Moop's observation, she found out that this was due to the lack of paper-pencil pressure and weak pencil grip (Pollock et al., 2009). Hence, she decided to apply the pencil's weight for paper-pencil practice in cycle 2. The use of pencil's weight would alert the participant that there was a pencil in her hand (Pollock et al., 2009).



Figure 7. End of cycle 1 handwriting

Pencil's Weight

Cycle 2 was supposed to start the week after the end of Cycle 1, but due to the participant being sick, Cycle 2 was conducted only one week later. Before Moop began Cycle 2, she assessed the participant's information retrieval capability on the formation of letter "H". Sadly, the participant was unable to form the letter "H" even though the score of the assessment after Cycle 1 was four out of four. This might

be due to the lack of ability in recalling the information of “H” letter formation (how to form letter “H”) from her long-term memory. The situation is common among LD learners (Swanson, 1987). She just wrote a vertical straight line (Figure 8). During Cycle 2, Moop decided to use a pencil’s weight. She noticed that the pencil-paper pressure of the participant was not sufficient since the letter “H” was written too lightly. Moop used a do-it-yourself pencil’s weight by attaching small pieces of stones to the pencil in order to make the pencil heavier (Figure 9). It was intended to make the pencil heavier so as to help in stabilising the uncontrolled movements, providing sensory feedback to the hand when writing and strengthening the fingers when writing or for writing on a vertical surface to strengthen the arm and shoulder (Cooley, 2013).

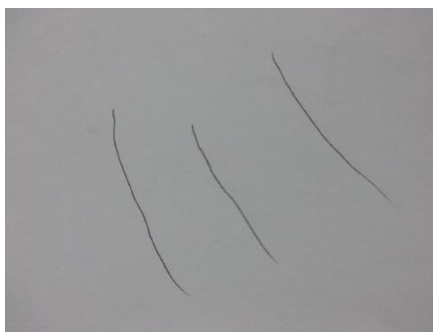


Figure 8. Before cycle 2 handwriting’s sample

In Cycle 2, Moop still applied different types of prompts depending on the response given by the participant. Finally, after undergoing the intervention processes for cycle 2, the participant was able to form the letter “H” legibly (Figure 10). However, it seemed that the letter “H” was still written too lightly (low pencil-paper pressure). Although the participant’s score at the end of cycle 2 was four out of four, the pencil weight seemed ineffective in increasing the pencil-paper pressure. This might be due to the incorrect placement of the pencil’s weight. Moop later realised that she placed the weight too high, causing the

top of the pencil to be weighed down rather than helping to press the pencil onto the paper (Cooley, 2013).



Figure 9. Paper-pencil practice with pencil's weight (Cycle 2)

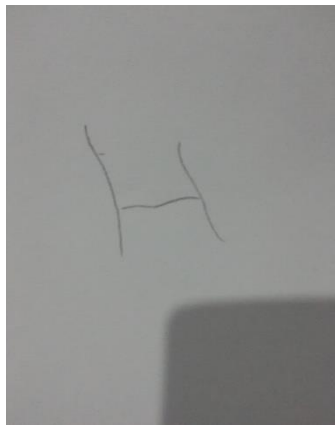


Figure 10. End of cycle 2 writing's sample (light handwriting)

DISCUSSION

Over the course of the research, the participant's ability to write the letter "H" legibly had improved. The participant was able to form the letter "H" correctly as compared to the earlier situation where she only wrote "O oo O" which could be found in the preliminary writing samples. This is in agreement with the research conducted by Park et al. (2007) which confirmed that prompting, modelling and direct instruction are effective strategies to teach cerebral palsy (CP) and dyslexia (physical and developmental delays) pupils to write their names. The intervention strategy employed in this action research (fine motor warm up, letter introduction, guided practice and paper-pencil practice) was easily implemented in a typical self-contained PPKI classroom. This was due to the fact that Moop only implemented the intervention during her typical classroom timetable (either Manipulative Skills or English period) and it only took 30 minutes. Unfortunately, she was unable to improve the paper-pencil pressure of the participant due to the unsuitable position of the pencil's weight that only came to her realisation after she finished 2nd cycle of the intervention.

The best part of this action research was that the materials and resources used during the intervention processes were easily accessible for the teacher. The materials used in the study were hollow shape toys for stringing, modelling clay, salt and tray (letter introduction stage), tablet, *Writing Wizard* application from Google Play Store (downloaded for free) and squared-box exercise book. All materials were available in a typical PPKI classroom and were economically viable for the teacher to construct.

What was Learnt from the Action Research?

As a Teacher

Moop learnt that pupils were unable to write their own names or form any letters if the basic skills of handwriting (how to form letters) were not exposed to them. The combination of fine motor skills and intervention of the letter formation steps is crucial for the acquisition of

letter writing (Rashidah & Ephraim, 2015). Additionally, coordination of the body, hand and head also affects the handwriting (Yen et al., 2012).

Throughout the processes, she facilitated the learning processes of her pupil through modelling, prompting and direct use of instruction or scaffolding. Without the use of scaffolding within her pupil's ZPD, her pupil might not be able to form the letter 'H' in her name. From the perspective of information processing theory, the role of the teacher is to mediate and provide learning strategies that facilitate the reception, processes and retention of the information in memory (Sousa, 2007). In this study, she realised that this is important, especially for the LD learners.

About Learners

The study was certainly beneficial to the pupil. At the beginning of the study, the pupil was only in the scribbling stage (2 years old) as mentioned by Lorah and Parnell (2014). Her ability to form the letter "H" increased from 0% to 100% in just one cycle (3 sessions). So, it revealed that Down syndrome children can be taught to write and read as claimed by Ricci (2011).

It was observed that the pupil was an active learner throughout the intervention processes as "hands-on" and "minds-on" activities were incorporated during the intervention processes (Keller, 2001). Consequently, this in turn provided engaging and meaningful learning experiences which enhanced the retention of the information (Sousa, 2007). From Moop's observation, she noticed that her pupil was more expressive and was able to communicate as well as to express her emotions and feelings during the learning processes as compared to another Down syndrome pupil in her classroom. This might be affected by her home environment (the way her family treated her at home). This was in line with the study conducted by de Falco, Esposito, Venuti and Bornstein (2008) which claimed that parent-child interaction enhances cognitive functioning of children with Down syndrome.

About Learning

The compliance of the learner to perform the tasks is important for the learning processes to occur successfully (Moore et al. 2013). In addition, prompting and verbal reinforcement is appropriate in order to further enhance the learning processes and to encourage the pupils to perform at their maximum level (Banda, Dogue & Matuszny, 2011; Moore et al. 2013; Park et al., 2007). The most important aspect is learning theories. The learning processes are more effective when they are planned properly based on learning theories (Khalil & Elkhider, 2016). However, there is no one learning theory that fits all learning processes. Hence, two theories of learning were applied in this study in order to maximise learning processes.

Meaningful learning experiences (fun learning activities) can enhance the learning processes, especially for Down syndrome learner because they are visual learners (Ricci, 2011). Ricci (2011) mentioned that the adaptations of teaching materials that enhance learning processes are important as individuals with Down syndrome perform better on tasks that require visual memory.

CONCLUSION

The most important lesson that Moop had to adopt in her teaching career was to become aware of how learning could occur through using learning theories as guidelines. By doing so, her lesson would become more interesting and meaningful. The use of teaching aids that were able to capture the pupils' attention was crucial in order to capture the attention of the learners with SEN (Down syndrome pupils in her case). The use of tablets and interactive applications that are available for free is a good alternative as the education is currently moving towards the 21st century learning era.

Besides using tablets and interactive applications, she could try to incorporate multiple sensory approaches in teaching handwriting (instead of directly “jump” to teach how to form letters) in order to overcome the difficulty of pupils in forming legible handwriting. This method was effective in order to make learning meaningful

and to enable the information to be retained longer in the memory. Furthermore, the learning experience was more engaging in this way. However, she was unsatisfied with her failure to notice the incorrect position of the pencil's weight during the intervention processes. Moop realised that it was because she was in a rush and did not study carefully before implementing the strategy. In future, she would have to put more effort in order to ensure that the same mistakes would not repeat.

The process of conducting her action research was quite challenging. The planning part of the action research required a lot of reading and understanding of the underlying learning theories. By keeping in mind how the learners learn the best, she tried to come up with the most beneficial and engaging intervention. Down syndrome is a visual learner but lack of communication skills and vocabulary may inhibit a pupil's ability to understand the instructions (Gaili et al., 2008). That was the reason that guided Moop to include scaffolding or prompts in the intervention. In Moop's opinion, praise was just an automatic feedback in her typical day-to-day response towards the response showed by her pupil. However, it was still crucial to motivate the pupil in completing the task. Before this, she already imagined that it might be difficult to complete this action research. Now, she absolutely realised that it was difficult if she did not come up with a proper plan.

She realised that this action research was practical and could be conducted by teachers; however, it required a lot of planning in order to make the intervention took place. As a special education teacher, she realised that she needed to make action research as part of her teaching routine. This could be done as she planned for IEP of her pupils. Actually, she already practised the culture of action research without noticing it. By using the experience gained from this action research, Moop could incorporate the knowledge gained in her teaching career.

The current study shall contribute to the knowledge about interventions in improving the handwriting of Down syndrome pupils and the processes involved. The results from the study will benefit stakeholders (learners, teachers, policymakers and future researchers)

in PPKI. Learners will be able to write letter legibly if an appropriate intervention is implemented by the teacher. If the intervention is effective for a Down syndrome pupil, the method may also be effective for other pupils who are diagnosed with LD. Policymakers may use the findings of the research to train teachers to implement this particular handwriting intervention in teaching Down syndrome pupils.

Due to time constraints, the intervention was used only for the formation of letter “H”. It would be interesting to determine whether the formation of other letters of the pupil’s name could be learnt during the short period of time (one cycle of intervention for the letter “H”). Additionally, further research could be conducted to determine if the skills taught can be retained beyond the scope of the instructional period. In other words, it would be possible to determine the capability of SEN pupils to recall the information that has been stored in long-term memory after a long period of time. For example, after learning to form the letter “A”, the pupil should be tested if she can still remember how to form the letter “H”.

The use of pencil’s weight was not effective after conducting the 2nd cycle of the intervention. This might be due to the incorrect position of the weight that was not noticed by the teacher. Further research could be conducted to study the use of other techniques in increasing the pencil-paper pressure when writing. The problem-solving approach would also be interesting to be used by future researchers. Datchuk (2015) recommended the problem-solving approach in order to determine the exact handwriting problems of pupils. Problem-based approach specify specific steps such as problem identification, problem analysis, determination of a solution as well as implementation and evaluation of progress in order to exactly solve the specific handwriting problems (Datchuk, 2015).

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