

Implications of Therapeutic Art in Learning Numbers Using Fine Motor Skills Among Students with Learning Disability

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Abstract: Interesting and effective student learning activities impact on fine motor skills through fine art therapy. Thus, a study was conducted with the objective of looking at the therapeutic impact of art on numeracy skills using fine motor skills after intervention. This qualitative research study uses Howard Gardner's Multiple Intelligence Theory and the ADDIE Model. The study participants selected purposive sampling involving eight seven year olds and two teachers from two primary schools in Sepang. Among the instruments involved in this study were teacher interviews, structured observations using a form adapted from the Kid Sense Child Development instrument entitled 'Fine Motor Development Checklist' and analysis of student documents. The results of the study were analysed descriptively and translated in percentages. The validity of this study is related to the accurate description of the actual situation of a social phenomenon. The validity of the type of generalization used involves internal validation and the triangulation process. The results showed that there was an improvement in pupils' fine motor skills after the therapeutic intervention. This study aims to help various stakeholders improve their student learning programs using systematic and effective art therapy.

Keywords: Therapeutic Art, Figures, Multiple Intelligence, ADDIE, Fine Motor

INTRODUCTION

By nature everyone loves something beautiful and interesting from their own visual point of view. Messages from the visual sensory are processed to the brain and signal to the individual physical senses whether involving the motor or the fine motor. Art is adopted as a therapeutic alternative that can positively impact a wide range of individuals disabilities. Exploring learning using art therapy gives students the opportunity to express their motor skills optimally. Thus, combining art subjects with other subjects helps develop the students diverse potential through aesthetic experiences where students are free to express their ideas and feelings (Ambar Wangi, 2013).

BACKGROUND

This study is based on the fine motor skills of students used in the learning of Mathematics subjects in numerical subjects. To identify problems related to fine motor learning disabilities learners study using art therapy methodology to identify students fine motor skills level and then find a teaching and learning method that is compatible with students fine motor intelligence. Teachers as an agent are important in helping students use their motor skills regularly and in fun to improve classroom control. Failure to address student behaviour in the classroom will hinder the smoothness and effectiveness of teacher teaching (Mohd Fadli et al., 2016). By applying Howard Gardner's Theory of Intelligence and ASSURE Models in student RPI construction, teachers have the opportunity to explore their teaching creatively using art therapy.

STATEMENT OF PROBLEM

Visual Arts Education is an elective subject in the national primary school which is seen as an exciting medium in helping to enhance the developmental process of children in the classroom learning routine. As such, teachers are the key agents in identifying the characteristics of students with multiple learning disabilities using Gardner's Theory of Wisdom and selecting effective teaching strategies using Art Therapy. The ability of the teacher to produce an individualized learning plan (RPI), the use of appropriate tools, the implementation of art activities according to the student's skill level, creating a safe, clean and conducive classroom environment are essential for teachers to be able to manage and control the room. degree efficiently and effectively. It enables students with learning disabilities to be in the same learning environment as other students and helps them to contribute to productivity in their daily lives (Baldwin & Baldwin, 1986).

RESEARCH OBJECTIVE

The objective of this study was to identify the therapeutic impact of art on numeracy skills using fine motor skills of students after the intervention.

LITERATURE REVIEW

Through a study entitled 'The Combat Paper Project' by Elisa M. Pamela (2015) she presents the community's experience of making artwork that expresses the magnitude and variety of collective effects on the community through the process of hand-crafted paper craft. Participants from a variety of backgrounds involved in the art project showcased their fine motor skills by using hands to produce paper art. The results of this study found that the project achieved great success as it was considered one of the therapeutic experiences of the arts participant.

In a study by Ruth M. Dannenbaum, MScA, Robert W. Dykes, (1988) entitled "Sensory Loss in the Hand After Sensory Stroke: Therapeutic Rationale" found that left parietal CVA patients had severe sensory deficits on the right side of the body. However, patients are found to be able to walk, reach, understand and retrieve objects using affected members. She successfully underwent therapy for a year and six months. During initial assessment, the patient is unable to feel pressure or vibration on the right side of the body. Because the patient had no experience using discrimination skills, the patient used the left hand to feed the food as the patient could only hold a spoon or fork with his right hand for more than ten seconds.

The following is a study from Tiago H. Falk entitled "On the development of a computer-based handwriting assessment tool to objectively quantify handwriting proficiency in children" involving a combination of therapeutic and computer technology to improve the fine motor skills of students with difficulty write poorly. Assessments are made using standards such as the Minnesota Handwriting Assessment (MHA) that can identify interventions for handwriting problems that students in school often experience. This study explains that computer-based handwriting assessment as a tool for objectively measuring MHA quality scores while recognizing handwriting problems among students. Out of a total of thirty-five students one and two only nine of them had problems writing handwriting. The therapeutic activity of hand and finger movement exercises was performed on all students before they used 'Wacom' computer technology with digital tablets and wireless pens. The results of this study found that all respondents were able to write using the 'Wacom' application. However, this study also shows that there are still students who find it difficult to use the 'Wacom' application due to poor students holding a wireless pen. This is due to the very low motor skills of the students.

Based on a study by Etzel-Wise (2004) entitled 'Adapted Physical Education and Therapeutic Recreation in Schools.' It discusses activities used that involve fine motor skills. Goal setting and achievement begins before birth occurs where in the womb, an individual is involved in reflex movement which in turn prepares children for controlled movements (Gallahue & Ozmun, 2002). Through block playing activities, researchers found that students would focus on their fine motor skills by handing out wooden blocks to friends while saying 'Hi, my name ...'. The strategy aims to focus on the fine motor function of the fingers as well as the hand and lip function while also incorporating various aspects of the motor and communication. The researcher made the assessment based on the students' ability to hold the wooden block with their fingers and hands, and then transferred the wooden block to a friend who was within 3 feet of the student's original position and later the student was able to say 'Hi' to a friend.

Case studies conducted by Baroody (1987) and Ginsburg (1977) in Lim Chap Sam, Fatimah Salleh and Munirah Ghazali (2003) to promote meaningful learning for students, Mathematics teaching should begin with learning experiences involving objects of interest. Pupils who want to learn the number of objects for example will find it easier to remember the actual number of objects than to learn the number using a browser. This statement is found to be similar to the statement by Mok Soon Seng (2009) which stated that the introduction of Mathematical symbols should be associated with real, concrete and concrete examples.

In a study by Niu & Sternberg (2003) analysed two methods used to enhance the creativity of 96 students at a school in Beijing, China. All students are asked to produce a collage. All of these students were divided into 3 groups, the first group was not given creative instruction, the second group was instructed to create the collage creatively and the third group was taught in detail by the teacher to produce the most creative collage. All collage results from the 3 student groups were evaluated objectively and subjectively. The results showed that a group of students who were explicitly instructed by the teacher to produce the collage very creatively managed to produce a very creative and interesting collage. This shows that student creativity in the classroom can be enhanced if the instruction given by the teacher is clear and understood.

METHODOLOGY

The qualitative methodology involved case studies conducted in two classes of integrated special education programs at two primary schools in Sepang. Stake (1995), "Case study is the study of particularly and complexity of a single case, coming to understand its activity within important circumstances". This case study will enable researchers to understand the therapeutic phenomena of art to identify numbers among students with learning disabilities in Sepang's national school integration special education program. The models and theories used in this study are ASSURE Models and Howard Gardner's Theory.

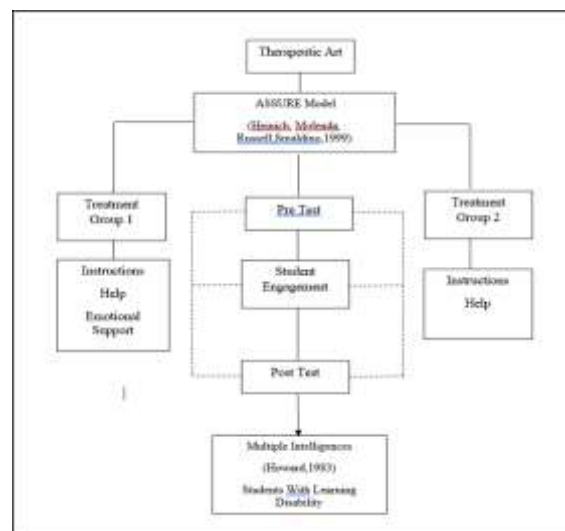


Figure 1: Theoretical framework of 'Discovering the Skills of Using Fine Motor Through Art Therapy Among Students with Learning Disabilities.'

Participants in this study were purposive sampling (purposive sampling) among students with learning disabilities in two schools in Sepang namely School A and School B according to the priorities and specialties of the study and consideration of the study itself. The study sample consisted of four seven-year-old students, two boys and two girls and one art education teacher at School A and four seven-year-old students, two boys and two girls and one Math teacher at School B.

The study participants consisted of eight students with learning disabilities. Participants of the Study Group 1 study at school A were four participants, namely Student 1, Student 2, Student 3 and Student 4 (S1, S2, S3 and S4) will be given treatment through pre-test and post-test. During this treatment students were given clear instructions, teacher guidance and emotional support throughout the activity. Instead, four participants from Treatment Group 2 at school B were selected as Student 5, Student 6, Student 7 and Student 8 (S5, S6, S7 and S8) were given treatment through pre and post-test tests and were given instruction and guidance. teaching but they are not given emotional support throughout the activity.

The structured observations were conducted using a checklist instrument adapted from the Kids Sense Child Development instrument entitled 'Fine Motor Development Checklist'. Alternatively, researchers also obtained information from a structured face-to-face interview conducted on a randomly selected teacher from Integrated Special Education program classes in School A and School B. The level of bilateral communication needs to be maintained in a positive mood to enable more information to be gained throughout the study. The

researcher also analyses the student information documents, student work and academic assessment reports and other achievements to obtain the data needed in this study.

To test the validity of the instrument the researcher has used the validity presented by Maxwell which is a type of generalization. It is more an internal generalization, which refers to the extent to which background generalizations or groups of studies can be made. The process of triangulation of data, researchers, theory, environment is also carried out to enhance internal validity. Next to look at the reliability of the research instrument conducting the pilot study the findings from the pilot study will be compared with the findings of the previous study to determine whether the instrument used is reliable or not.

FINDINGS

The findings address the first research question of whether there is a smooth increase in pupils after intervention. Changes occur when students are able to write answers to numbers in the answer area and create a full collage. The reduction of the dyeing behaviour outside the response area and the lack of collage completion can be reduced.

Table 1: Comparison of pre- and post-test results for Treatment Group 1 (School A) and Treatment Group 2 (School B).

Groups	Treatment Group 1								Treatment Group 2							
Categories	SCHOOL A								SCHOOL B							
Tests	PRE	POST	PRE	POST	PRE	POST	PRE	POST	PRE	POST	PRE	POST	PRE	POST	PRE	POST
	S1	S1	S2	S2	S3	S3	S4	S4	S5	S5	S6	S6	S7	S7	S8	S8
Write	2		2		2		2		1		2		2		1	
Collage		3		2		4		4		1		3		4		2
Amount of difference	+1		-		-2		-2		-		+1		+1		+1	
Percent (%) Improvement in fine motor skills	25%		-		50%		50%		-		25%		50%		25%	

In table 1, the results of the pre-test and post-test results of the study made a comparative analysis of the percentage of skills upgraded by students with learning disabilities. The percentage of improved motor skills students in Treatment Group 1 involved three participants, S1, S3 and S4, respectively, with 25%, 50% and 50% increase respectively. While the improvement in the fine motor skills of the Treatment Group 2 students also involved three participants, the S6, S7 and S8 respectively, with a 25%, 50% and 25% increase respectively. The significant increase in fine motor skills for Treatment Group 1 was due to the additional emotional support provided by the teacher during the test. The students' emotional control skills with learning disabilities enable students to continue to work on tasks by minimizing students disruptive behaviors using praise.

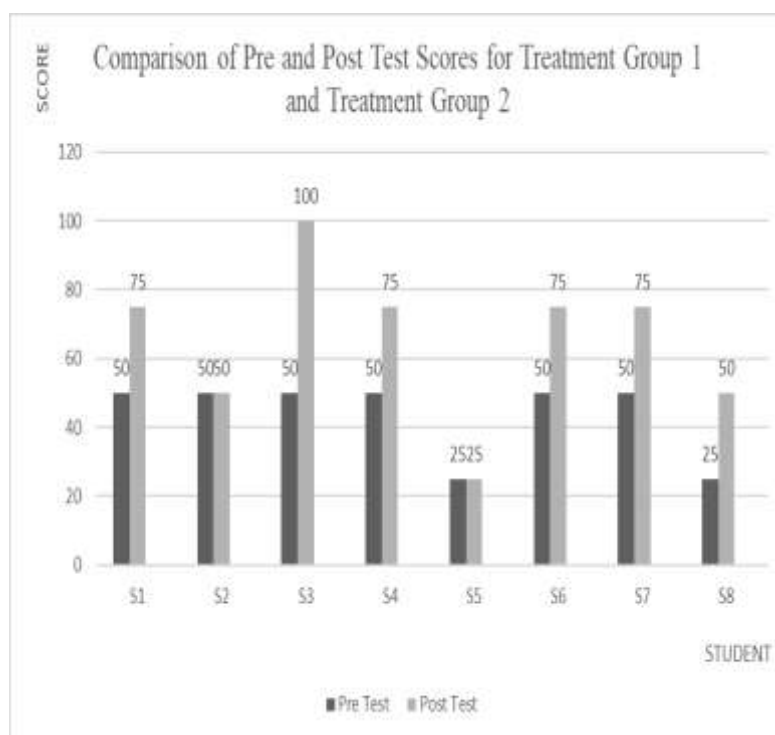


Figure 2: Comparison of Pre- and Post-test scores for Treatment Group 1 and Treatment Group 2.

From Figure 2 it clearly shows that the fine motor skills of the pupils improved after the Post-test. This trend of skill development is positive. However, these skills improvements did not make any difference to S2 and S5 skills as they were identified as students with clinical syndrome down and Mild Global Developmental Delay (GDD). This increasing trend also indicates that pupils' involvement in their learning is also positive despite the challenges teachers may have to deal with the contingency of participants. The differences are not so significant due to the differences in student learning and student age. Ernie (2008) in his paper entitled 'Fine Motor Skill Performance and Gross Motorcycle Learning in Children' used the 'Movement Assessment Battery for Children' instrument on children. The results show that differences in age and the types of learning problems affect test results.

DISCUSSION

Based on the findings from the student fine motor checklist instrument, teacher interviews and analysis of student documents especially student work, it was found that the therapeutic implementation of art on numerical teaching using the fine motor strength of students had a positive increase. Structured observation uses a checklist that includes four skills areas, namely hand motor skills, object manipulation skills, fingerprinting and manual dexterity in the implementation of Pre-Test and Post-Test. Pre-test uses art therapy in testing students writing skills using pencils and colour pencils. After the Pre-Test the researcher conducts the Post -Test by increasing the difficulty of the activity through the production of collage by the students. This finding further addresses the research question of what is the therapeutic impact of fine motor art on numeracy skills in teaching students in the classroom?

1. Improve student's fine motor skills.

From the findings of the study there is an increase in the fine motor skills of students while learning to recognize numbers. The results of the pre-test and post-test results of the study made a comparative analysis of the percentage of skills upgraded by students with learning disabilities. The percentage of improved motor skills students in Treatment Group 1 involved three participants, S1, S3 and S4, respectively, with 25%, 50% and 50% increase respectively. While the improvement in the fine motor skills of the Treatment Group 2 students also involved three participants, the S6, S7 and S8 respectively, with a 25%, 50% and 25% increase respectively. The significant increase in fine motor skills for Treatment Group 1 was due to the additional emotional support

provided by the teacher during the test. The students emotional control skills with learning disabilities enable students to continue to work on tasks by minimizing students disruptive behaviours using praise.

2. Increase student interest.

As a result of the analysis of the observational checklists, the researchers found that students were more likely to engage in collage activities than writing numbers in boxed or underlined notebooks. Students try to use scissors initially after the help of teachers and students are also free to tear the coloured paper into smaller pieces. To get the pieces of paper that students need, they should use their fingers to tear the paper where the focus of eye coordination is needed. Pupils also need to point fingers with the teacher's instructions to repeatedly paste coloured paper to obtain a clear figure. Thus, students' fine motor skills can be improved through repeated exercises such as pasting paper repeatedly to produce collages. In addition, environmental influences are a factor in children's fine motor skills development (Magill, 2001).

3. Increase teachers knowledge of fine art and motor therapy.

The findings from the interview with the teacher found that the teacher understood the therapeutic meaning of the art after being briefed by the researcher. Teachers read and refer to research topics and discussions to enable teachers to carry out their activities with the right strategies. Data from the activities will be analysed to answer the research question. Therefore, Gangi (2011) proposes that teachers be guided so that teaching is encompassing the intelligence of various pupils and that teachers take into account the determinants of student learning in the design of the teaching (Dunn, 2000). With the information provided by the researcher, teachers can focus more on students' fine motor skills in helping them identify numbers. In addition, teachers can also choose methods that fit their own teaching style (Armstrong, 1994) where their implementation is flexible (Lockwood, 1993).

Referring to the interview with teacher A, the researchers found that there was an effect on students' fine motor skills. Teacher A states:

"... they can hold scissors and cut scissors I look at but uh hum maybe parents don't always hold scissors for scars, it's a child who doesn't know how to scissors ..."

Teacher B stated:

"... Kids love scissors and they like scissors. But it's ok they can hold scissors and scissors instead of scissors on the shirt. It looks like they have to scissors to show you how to scissors first ..."

IMPLICATIONS FOR THE THEORY BUILDING

The therapeutic application of art depends on the extent to which teachers' knowledge and skills are in the field of art to enable teachers to plan teaching based on the theory used. This ability helps teachers to be more prepared and use creativity in teaching. The Intelligence Theory Approach through the ASSURE Model can serve as a reference for teachers to identify effective teaching strategies for students with multiple intelligences. This is supported by the approach of Multiple Intelligence Theory through the Comprehension Path Model (Baum et al., 2005) and can also be a tool for subject teachers to adapt each topic in the curriculum to meet different student intellectual levels.

IMPLICATIONS OF THE THERAPEUTIC IMPLEMENTATION OF ART ON STUDENTS FINE MOTOR SKILLS

The therapeutic implementation of art can reinforce student (internal) emotions and fine motor skills (external). Students fine motor skills will be able to increase their confidence indirectly through simple daily routines such as holding a pencil, editing and tearing paper giving students confidence that they can do the same activities as other typical students. Poor fine motor skills disrupt the daily routine of students such as wearing clothes (Muhammad Syafiq, 2011).

PROPOSAL

Based on the research conducted it can be concluded that students with learning disabilities can be implemented using interesting and effective teaching strategies. The researcher suggests some practical suggestions including:

1. Teacher's ability to identify effective teaching strategies.

Taking into account the number of years teaching teachers the effectiveness of teaching will focus more on the active learning activities. According to Abdul Rahim (1998) in Nadia Syahida (2015) the failure of teachers to use appropriate teaching and learning strategies resulted in students losing interest. It encourages students to get bored quickly, sleepy and tired compared to student-centered learning approaches that encourage student engagement in classroom learning. The skills and achievements of the students will be further enhanced.

2. Diversify hands-on activities in student learning.

Students need to be given more opportunities to hands on the materials, media that teachers provide in their learning activities. Mary Tan (2012) argues that the influence of hands-on activities in classroom PDP has been proven to be effective when researchers use numerical art form activities using collage techniques. Learning to recognize numbers in the numerical system in Mathematics is conducted by teachers with careful preparation of teachers after taking into account students' fine motor skills and adapting ASSURE style in building RPI. Teacher readiness is one of the factors contributing to student achievement in their learning objectives.

3. Develop the Therapeutic Art module in learning for subjects other than Mathematics.

The creation of this module enables new teachers especially for senior teachers to understand and understand a subject better. This module should be in line with inquiry-based learning (Ayob et al. 2015) that can serve as a teacher reference resource. According to Sidek Mohd Noah & Jamaludin Ahmad (2005) stated that teaching using modules has the potential to be a material and a reference that has a positive impact on teachers and students.

CONCLUSION

Multiple Intelligence Theory and ASSURE models can be linked to this study as a process of improving the fine motor skills of students with learning difficulties in numeracy. The findings of this study discuss aspects of active learning through hands-on learning activities such as writing numbers and collating numbers. Using the instrument assessment methodology, interviews and student work document improvement of fine motor skills students were measured using pre-test and post-test findings of the two schools involved. Therefore, the potential for students fine motor skills to be improved and efforts to improve teacher teaching strategies using art therapeutics in a variety of other subjects have encouraged students to actively engage in learning activities with the assistance of minimal teachers as well as emotional support for students.

REFERENCES

- Ayob, A. Ishak, N., Ong, E.T., Ibrahim, M.N, Adnan, M. Sherif, J. (2015). Laporan projek penyelidikan STEM untuk Permata Negara. Jabatan Perdana Menteri, Kementerian Pendidikan Malaysia.
- Baldwin J. D. and Baldwin J. I., (1986). Behavior principals in everyday life (2nd Edition). Engle Wood Cliffs, New Jerseys: Prentice Hall.
- Baum, S., Viens, J. & Slatin, B. (2005). Multiple Intelligences in the classroom: A teacher's guide. New York, NY: Teachers College Press.
- Elisa M. Pamelia., (2015). 'Therapeutic Art-making and Art Therapy: Similarities and Differences and Resulting Framework.' Indiana University.
- Ernie Sulianan Md. Shariff (2008). Prestasi Kemahiran Motor Halus dan Kasar Kanak-Kanak Bermasalah Pembelajaran Menggunakan Instrumen Movement Assessment Battery for Children (MABC). Universiti Teknologi Malaysia.
- Etzel-Wise, D. (2004). Adapted Physical Education and Therapeutic Recreation in Schools. *Intervention in School and Clinic*, 39(4), 223-232.
- Jabatan Pembangunan Orang Kurang Upaya, Jabatan Kebajikan Masyarakat, (2013). Garis Panduan Pendaftaran Orang Kurang Upaya 2012. Batu Caves, Selangor: Percetakan Selaseh Sdn. Bhd.
- Khairunnisa, (2017). Peranan guru dalam Pembelajaran. Sekolah Dasar Binjai.
- Lim Chap Sam, Fatimah Salleh & Munirah Ghazali (2003). Siri pembangunan perguruan: Alat bantu mengajar Matematik. Pahang: PTS Publications & Distributors Sdn Bhd.

- Mary Tan Muyee (2012) Kesan Penggunaan Aktiviti 'Hands On' Dalam Proses Sains Tahun 4. Koleksi Artikel Penyelidikan Tindakan PISMP SN amb Jan 2009. Seminar penyelidikan Tindakan IPG KBI. Tahun 2012:ms180-194.<http://www.ipbl.edu.my/portal/penyelidikan/BukuKoleksi/2012/SN/>
- Mok Soon Sang (2009) Siri pengajian profesional: Murid dan alam belajar. Selangor: Penerbitan Multimedia Sdn Bhd.
- Muhammad Syafiq Azfa Mohd Azli (2011). Aplikasi Aktiviti Seni Dalam Meningkatkan Kemahiran Motor Halus Murid Pendidikan Khas Bermasalah Pembelajaran. Institut Pendidikan Guru Kampus Kota Bharu.
- Niu, W., & Sternberg. R. J. (2002). Contemporary studies on the concept of creativity: The East & the West. *Journal of Creative Behavior*, 36(4), 269-288.
- Ruth M. Dannenbaum, MScA, Robert W. Dykes. (1988). Sensory Loss in the Hand After Sensory Stroke: Therapeutic Rationale. *Arch Phys Med Rehabil*. Vol 69:833-839
- Sidek Mohd Noah & Jamaludin Ahmad (2005). Pembinaan modul bagaimana membina modul latihan dan modul akademik. Serdang: Universiti Putra Malaysia.
- Sri Ambarwangi. (2013). Pendidikan Multikultural Di Sekolah Melalui Pendidikan Seni Tradisi. *Journal of Arts Research and Education (HARMONIA)*. 13(1), 78-85
- Vaughn, S., Bos, C. & Schumm, J. S., (2003). Teaching exceptional and diverse at-risk students in the general education classroom. Edisi ke -3. Needham Heights, MA: Allyn & Bacon.
- Yasmin Hussain (2013). Terapi dalam pendidikan khas. Selangor: Pekan Ilmu Publications Sdn. Bhd.