

A Review of Multisensory Theory on The Learning of Students with Special Education Needs with Visual Impairment

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Abstract

This study aims to examine the effectiveness of the multisensory learning approach in teaching reading to normal dyslexic primary school students in Bamenda III sub division, Mezam North West region of Cameroon. The design of this study is quasi-experimental. A pre/post test was conducted to identify students' performance in phonological awareness skills. The content of the test consists of twenty items. All dyslexic students in Bamenda III sub-division are the study population. While the study respondents consisted of 24 fifth grade students with dyslexia selected from two schools: Educare Bilingual Nursery and Nkwen Bamenda Primary School and All Saints Bilingual Nursery and Bayelle Nwen Primary School, Respondents were divided into four groups, (two experimental groups and two control groups, each with 6 students). The experimental group was guided with the application of multisensory learning methods while the control group was guided using traditional teaching methods. The data analysis process uses the statistical package SPSS version 25. The findings of the study show a high increase in the phonological awareness of students with dyslexia with the application of a multisensory learning approach.

Keywords: Multisensory Theory, Learning Process, Students with Special Education Needs, Visual Impairment, Special Education

Introduction

A study entitled the effectiveness of teaching and learning through colored vs black teaching aids in reading and remembering verses 1-3 of surah al-Fatihah for students with autism. This study was conducted to examine the effectiveness of VAKT teaching and learning through colored and black teaching aids in improving the achievement of students with learning disabilities in reading and remembering verses 1-3 of Surah al-Fatihah. The design of this

study is a quasi-experimental study. The study respondents were four autistic students at an al-Quran Education Center, Bangi. Data collection is carried out using a research instrument in the form of a checklist. Data were collected over a six-week period through a pre-test and post-test and entered into a brief checklist. The results of this study show that there is an increase in the achievement of two autistic students A and B in terms of reading sentences 1-3 more smoothly without the help of the teacher and being able to remember sentences 1-3 through the evaluation of the correct arrangement of black sentences and sentences without the help of example sentences and sentences. Next, two more autistic students showed different achievements, namely students C and D were able to read with the help of the teacher, saying the ranks of verses 1-3 of Surah al-Fatihah. While the achievement of remembering students C and D is that they can only master sentences, that is, student C can match colored sentences with example sentences and student D can compose sentences 1-3 in color without example sentences only.

A study by Mosbiran et al (2021) tried to identify the influence of a combination of multisensory approaches on the counting skills of children with special needs. This study was conducted to identify whether there is an influence from the sensory integration approach using brain gym treatment and bead stringing activities on counting skills among children with special needs. In addition, the researcher also describes the effect of the sensory integration approach through brain gym treatment and meronce activities on counting skills among children with special needs. This study uses a mixed design with a sequential explanatory design. The respondents involved in this study were 3 students from Philea Therapy Center, Batam. The data analysis process uses quantitative data analysis methods with SSR (single subject research) with an A-B-A design and qualitative data analysis with data reduction, data display, as well as drawing conclusions and verification. while the process of collecting data is from the results of observations, interviews, tests, field notes, and documentation.

The results of the study were found to show positive results for the sensory integration approach through brain gym treatment and rocking activities applied in counting skills among children with special needs where the mean level in the pre-test (A) was 50, treatment (B) was 83, 33, and post-test (A) is 86.66, each. Sensory integration methods with brain gym treatment and rocking activities positively affect counting skills among children with special needs.

Nordin et al (2022) conducted an observational study to identify the results of multisensory integration observational experience on the continuous focus of special education students. The study sample consists of 50 students with multiple (severe) disabilities aged between eight and eighteen years old who were selected for observation in a public school environment representing four student classifications: TMH (trainable mental retardation), PMH (mentally retarded), autistic students and students with multiple disabilities were randomly selected in a stratified manner. A research instrument in the form of an observation form was developed from the description of the literature. The instrument contains 24 identifiable behavioral items (facial expressions, vocal cues and body language) that have been pilot tested to obtain construct validity and reliability. Through the study, four appointed assessors underwent specific training and also went through reliability analysis between assessors before conducting the observational study. Evaluators completed individual student observation instruments three times of 20 minutes each (in the regular classroom, in the multi-sensory center and after returning to the regular classroom). High concentration is measured by combining specific types of observed data showing student engagement and current behavior as defined in the literature. Data were analyzed using

ANOVA. The results of the study support the implementation of multisensory integration in an effort to improve the high focus of students with special needs.

Literature Review

Most theories related to the Multisensory Method in guiding reading skills involve MBPK in the dyslexic category. This theory will be linked to MBPK learning that has various categories. The classic theory of the multisensory method approach pioneered by Orton. In the mid-1920s at the "Mobile Mental Health Clinic" in Iowa, USA, Orton and his friends Bessie Stillman and Anna Gillingham began the application of the multisensory method approach. Orton innovated the kinesthetic method pioneered by Grace Fernald and Helen Keller. Orton went on to present his opinion which is to combine visual and auditory elements with the application simultaneously with the kinesthetic approach to produce a multisensory method (Jaya et al., 2021). The simultaneous combination of these three elements is able to guide children with dyslexia who face difficulties and confusion in skills such as writing letters upside down. The children who are guided go through a phase of skill improvement through this approach. They begin to be able to interpret sight, hearing, touch and spoken sound so that they are able to improve their mastery of word reading skills and so on. The letters will be written on the movement of the hand muscles in the form of writing (Bin Shafie et al., 2022). Studies related to learning using the multisession method have been conducted by many researchers. Alwi & Nordin (2022) have conducted a study related to the use of audio book multisensory equipment in increasing the interest of students with learning problems in reading. The research was conducted to identify teachers' perceptions of the use of audio books which are one of the multisensory tools in increasing the interest of students with learning problems in reading. The study used a quantitative approach to collect data. The data collection instrument used is a questionnaire. A total of 80 integration special education program teachers from eight primary schools in Alor Star, Kedah were selected as the study sample. The findings of the study show that 96.2% of respondents gave a positive response to the use of multisensory equipment, i.e. audio books. The study showed that respondents found that audio books can improve student performance. Respondents also agreed that the use of multisensory materials facilitates the teaching of MBPK reading skills. Overall, based on this study, it was found that teachers have a positive response to multisensory equipment, i.e. audio books in the PDP process.

The next study was conducted by Nordin & Alwi (2022) related to the effectiveness of VAKT in improving the mastery of reading digraphs and consonants combined in the Malay language of Malayan students in remedial classes. This study aims to examine the effectiveness of the VAKT Method in improving mastery of reading skills involving graphs and consonants combined among second year students. The respondents consisted of four Melanau students from a special remedial class. They were selected because they still did not master basic reading skills well. This study analyzes the level of student mastery in the skills tested after applying the VAKT Method in learning. Testing and screening methods were used to collect research data. Meanwhile, descriptive statistics were used to analyze the data. Data is reported in the form of frequency and percentage showing an increase in the mastery of reading digraphs and consonants by applying the Visual, Auditory, Kinesthetic and Tactile (VAKT) method, also known as the multisensory method. Respondents have followed early reading skills that focus on digraph words and consonants combined in the Malay language. These students have difficulty in spelling syllables and pronouncing words. They are confused like the sounds 'ng', 'ny', 'kh' and 'sy'. Difficulty in mastering these skills is detected through

literacy screening and Malay oral diagnostic tests. This study uses test and screening methods to collect data and data analysis using descriptive analysis. Referring to the research findings from the post-test, showing an increase in student achievement in this skill. The applied VAKT method successfully increased students' interest to be more focused and active throughout the pdp process.

Theories in Multisensory for SENS Learning

At Scottish Rite Hospital, Dallas in the 1960s, he began to apply multisensory teaching methods adapted from the Orton-Gillingham theory to teach dyslexic children. The method known as "Alphabetic Phonics" also uses the visual, auditory, and kinesthetic senses that act as information conveying agents. The term "Alphabetic Phonics" refers to "a structured system of teaching students the coding pattern of the English language". Dyslexic children who are taught using the "Alphabetic Phonics" method are taught vocabulary before being referred to the terminology of this program.

Children really need to learn the process of mapping between written letters (orthography) and corresponding sounds (phonology) for the mastery of reading skills (Mizan et al., 2021). There is evidence showing that dyslexia can be characterized by one of several phenotypic manifestations of phonological deficits such as Phonological Awareness, Phonological Short-Term Memory, and Rapid Automatic Naming. This situation also involves MBPK other learning. These factors involve phonological representation, but each in its own way. Poor phonological awareness: This is the conscious ability to access, pay attention to and manipulate speech-level phonemics (Bin Nordin et al., 2022). Studies explain that dyslexic children perform poorly on rhyming tasks, syllables, word onset awareness and also decline in various phonemic awareness skills such as blending, deletion, division and substitution of sounds in words. Impaired phonological awareness may be associated with perceptual deficits in speech. Impaired phonological short-term memory (PSM): Assumptions of representational formation based on written sound symbols are temporarily stored in the posterior parietal cortex of the left brain. According to studies, functions multiply storage functions for the short term, either briefly copied in the phonological buffer and/or actively recycled between the input and output of sub-lexical representations. Efficient phonetic recoding in Broca's brain area appears to be an important tool for early reading skills.

Table 2.1

Multisensory content

Content Components	
1. Phonology	Learning about phonemes, which are the smallest sound units that can distinguish the meaning of words
2. Mastery of Phonology	Understand the internal linguistic structure of words.
3. Sound-Symbol Mixing	Knowledge of the combination of sounds and symbols of a letter.
4. Recognize syllables.	The ability to identify syllables as a unit in pronunciation and writing through the joining of vowel sounds
5. Morphology	Learning about Morphemes, which are the smallest units in language that have a specific meaning or function.
6. Syntax	Knowledge of word order in sentences.
7. Semantics	Knowledge of the meaning of words in writing and speaking.

Source: IMSLEC 2001

Table 2.2

Multisensory principles

Principle Components	Definition / Description
1. Concurrent Teaching	The pdp process that applies multiple senses namely visual, auditory, and kinesthetic simultaneously. Aiming to expand and improve memory about learning into memory.
2. Systematic and cumulative	The application of multisensory methods is necessary with rational, simple and easy instructions. Progress and achievements in the learning process are evaluated based on each topic or subject breakdown. The concept of systematic repetition needs to be implemented to increase and maintain the memory of children who face learning problems.
3. Direct and Precise Directions	The multisensory approach focuses on the direct teaching process in all concepts based on student-teacher interaction
4. Diagnostic Teaching	Teachers need to be skilled in implementing individual teaching sessions and providing guidance or regulations in teaching and learning. The teaching plan of teachers who use multisensory methods must be complete and thorough and linked to the assessment process based on individual needs.
5. Synthesis and Analysis	Pdp using the multisensory method has two instructions namely synthesis and analysis. Synthetic instruction focuses on components that are formed into words and teaching activities using the senses simultaneously. While the analytical instruction is aimed at the teaching process

of a single word that is broken down into certain components.

Source: IMSLEC 2001

Conclusion

Studies related to multisensory effectiveness were also conducted to develop the visual perception of children with learning disabilities in the context of Arab students. This study was conducted to evaluate the effectiveness of a program based on multi-sensory strategies in developing visual perception for primary school students with learning disabilities. This study uses a quasi-experimental method on a group of experimental students. A training program based on multi-sensory strategies was used on a group of third and fourth grade students ($n = 30$) using sensory integration. While 30 students of the control group used traditional methods. Many respondents gave positive feedback and showed evidence that they were fully aware of visual stimuli. All thirty participants identified the presented visuals from their multisensory experience. The level of attention of students increases significantly because this stimulus shows a significant effect on their learning. The difference in pre-to-post test data is analyzed from the perspective of students' visual perception to evaluate the effectiveness of teaching. The findings of the study show that the effectiveness of the visual perception skills of the experimental group students is higher than the control student group. This study suggests that students need to be given exposure to connect multisensory experiences with reading texts or other materials.

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