
Case Study of Diagnosis and Treatment Analysis of Mathematical Disorder of a Pupil with Reference to an Approximate Reasoning Approach

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ABSTRACT

Recent research has indicated that children suffering from specific learning disorders not only encounter a tragic fact of continuous separation in the educational system and in their classes but also face the peril of losing their self-confidence. Hence, such disorders may have a negative impact on children's mental health. These children often experience loneliness and inferiority complex, communication problems, lack of mental health, postponement of development, psychological problems as well as educational disimprovements. Therefore, such mental-educational problems along with other disorders form a cluster of mishaps in which children may not be able to meet their most superficial needs. The current research has been designed based on the case study model and approximate reasoning approach as an alternative for traditional approaches. The participant of the study is a second-grade pupil who had the primary symptoms of learning disorders in mathematics in Zakariaye Razi Primary School in Mashhad. He was, then, introduced to Baharestan Center of Learning Disorders in Mashhad. The necessary data were collected according to the Wexler Test of Children WISC-R, Bender Gestalt Visual Motor Test, Frastig Perceptive-Visual Discrimination Test, Wapmann Auditory Discrimination Test, Lincoln-Oseretsky Motor Development Tests and Laterality Test. Since the data of the current research were based on the individual pupil, the researcher utilized Rood-Kafman software to analyze them. The findings of the study indicate that the subject, in the diagnosis test phase, manifested as having operations in line with the pattern of the symbols of math disorder. Despite the fact that he was in the second grade, but the pupil did not meet the objective functions in test operations. Hence, he encountered cognitive obstacles encountered in the classification operations. With respect to the comparison of pre-test - post-test, the study found that he not only needed visual-motor integration and visual fixation skills but also he required spatial-visual skills and strengthening of the calculation skill. In accordance with the mathematical learning of Piaget's (1998) hierarchy system, the pupil under study will reach the sufficient cognitive scale in solving math problems.

Keywords: Mathematics, Disorder, Education, Diagnosis, Treatment, Approximates Reasoning.

Introduction

Recently, all our diagnostic tools are among the tools of research that seek to provide a clear definition of terms and to generate the hypotheses that can be tested through experience. Also, they require the utilization of the properties of comparability and mathematical accuracy. Nevertheless, past research has been seeking to probe into the hidden sides of our pupils which often remained unnoticed through traditional research methods. Therefore, we focused on subjectivity versus objectivity, multiple realities versus one reality, consensus and companionship versus truth, as well as the individual property versus the focused generalization aspect. Rather than outlining some inflexible questions, our aim in this study is to generate dynamic and flexible questions which lead to carrying out our study in the appropriate context. Therefore, the current study has tried to explore the methods of the mathematical disorder diagnosis with reference to the previous qualitative and quantitative analyses and to generalize the diagnosis to the outside of the school environment which in turn can be considered as the impact of social structures .

Review of theoretical literature

On the basis of mathematical ability in children and its relation to counting, a multitude of studies have been carried out Gallistel and Jolman (2002) argued that the primary mathematical abilities of children are formed based on a type of nonverbal counting. Moreover, they found that children utilize the accumulator (Mech, 1993). The term accumulator means that counting motivation is directly related to the number of objects. In other words, the more the number of objects to count , the more increase to motivate the

pupils. Another view that exists in the literature with respect to children's ability to count the number of objects is that children gradually move forward from guessing the number of objects through looking at them toward non-count guessing. The application of this approach is seen in adults as well, because they can usually recognize four objects without counting and looking at. Non-count guessing is directly related to the number of objects. Concerning the lower numbers, there occurs an increase in the time of counting with an increase in their size simultaneously. For example, for an adult, the detection time for three objects is 40 ms more than the detection time for two objects. However, determining the size of a set of seven is 380 ms more than a set of six. (Mandler & Shebu, 2002).The with respect to the judgments of children about numbers and non-count guessing of adults indicate that these two abilities are closely related. Gallistel and Jolman's (2002) Integration theory may be used that accumulator capacity is directly related with aging since accumulator capacity is at its lowest during childhood. Nunes and Bryant (2006) held that when a child uses math skills to count, he or she should move from counting the objects toward writing the numbers. Firstly, most children learn addition and subtraction through counting objects. Preschoolers acquire information about the numbers through numerical games. In a longitudinal study by Durkin, Shire, Reim, Gowther, and Rutter (2006) children primarily learn the number "two". This phenomenon usually occurs at the age of fifteen months old. Children under two years utter the numbers "one, two, three" in poetry and song words or phrases. At the end of the second year of their life, children along with their parents can utter larger numbers. Also, in the third year of

their life, they can utter the numbers consecutively.

Introducing the variables

Disability Specific Learning: This impairment includes one or more psychological processes in understanding or using written language, which may or may be shown in listening, thinking, speaking, reading and writing, spelling or doing mathematical calculations. Such disability shows a lack of success or failure in specific learning contexts in certain fields in comparison with those who have similar mental ability. Most of the definitions in relation to such disability revolve around one or more of the basic psychological process related to understanding and using language in either the spoken or written forms (see Lerner, 1996).

Hyperkinetic-activity : This kind of syndrome usually include sudden behavior, Alzheimer's disease, concentration disorder, mental faculties impairment, severe motor restlessness, extreme irritability, emotional instability, negativity, destruction, demolition and breaking things and sometimes anti-social behavior and learning disorders (Cook , 1999).

Dyscalculia: This syndrome shows loss of ability to perform mathematical tasks which are usually associated with brain injury or neurological dysfunction (Lerner, 2000).

Fine Motor: The use of hand and finger gestures to perform tasks that require precision (Martin Lerner, 2005).

Gross Motor: Movements that is required for its optimal functioning of the body and weight transfer and adaptation of the body (Ahadi, 2007).

Describe the current status of student

Reminder

Since code compliance and ethical considerations in social and educational research are sensible and inevitable, hence, at the beginning of the study, the participant and his parents were aware of the main research question and the degree of sensitivity. Furthermore, with respect to the Research Model, the researchers made themselves responsible to provide physical and mental health and welfare of their students. Also, the researchers respected the privacy of the living individuals who were well-aware of the fact that they are under study for research purposes. This right is given to students and their families about their life, such as aggression and impulsivity, emotional or any other items with their own volition not to reveal for researchers. Meanwhile, the right to anonymity and confidentiality of participants are considered as the accepted principles of the current study.

The pupil was studying in the second grade of primary school of Zakariya Razi in Mashhad in the 2012-2013 school year. Two months later, according to his teacher, he was found to have difficulty in mathematics. Hence he was introduced to Baharestan Rehabilitation Center of Learning Disabilities. Rotter's summarized form set by the class teacher demonstrated that he was weak in math. He had major difficulties in solving math problems. Nonetheless, he performed better in solving equivalences which required the use of mathematical symbols.

On his arrival at the rehabilitation center, the pupil took four initial assessments. Also, their parents took a clinical interview based on DSM standards. The results of this evaluation indicated that his speech, hearing, vision, physical - motor, and attention states were reported as normal. Wechsler test results demonstrated that the pupil's verbal IQ was 94; his practical

IQ was 105; and his total IQ was 99. Also, no clear pathological differences were reported between his verbal and practical subtest scores based on damage to his brain. Therefore, introducing him to a neurologist was ruled out.

Data on diagnostic sessions

In the first meeting, it was attempted to justify the pupil for his meeting with us. Hence, he researchers did their best to justify him that nothing wrong had happened on his behalf. Then, some methods were used to facilitate the child's feelings such as asking the child to draw a person, draw his family members (based on Malvnysky's model), and draw the shape of a house. Later, the participant was asked to make three wishes to express himself, to tell the worst and most pleasant memories of their own school, and if he has to live in a deserted island, whom he would have preferred to be with him.

In the second session, we explained the Wechsler test. In a way that he might not get tired of answering after each verbal subscale, we followed to the next stage and explained to him the practical subscale. At the end of the session when he completed 50% of small-scale Wechsler Intelligence Test, since a 45-minute session time was not finished, we asked him to draw zigzag lines with us simultaneously based on the Danldvyn Cut's (1998) model. After, both the child and we agreed to tell each other what we have drawn. Undoubtedly, this type of drawing facilitated the process of the current research.

The third session began with the Wechsler Intelligence Scale residues. However, through careful observation of the meetings, functions as a child, I would scrutinize his general condition. I think the variables included child's height and shape, adornment, despite the bruising, head dimensions, physical symptoms of

anxiety and her facial expressions. Also how interactions between the child and his parents and both my call quality was important and emotional state.

Kim began at the fourth session of the test. Since the differences between the verbal and practical scores in the Wechsler test were not a pathological difference, the Bender-Gestalt test was not run by the researchers. Meanwhile, it was evident that understanding the differences between expressive language and receptive language test was important to us. I quickly tried in this session to note down the child's discipline and hesitation in answering, spontaneous speech, tone of the voice, and utterance of speech. I noted down the pupil's verbal echoing, stereotyped and repetitive phrases, as well as abnormal syntax. In the last part of the session, we devoted our time to observations of his level of activity, motor co-ordination, abnormal movements, tremors, excessive movements, and any asymmetry in body movements .

Carrying out the Project (educational intervention)

The pupil under study gradually utilized the response recollection and recovery in memory for both subtraction and addition. The most important reason behind such a condition was his inability to perceive the relationship among the columns of numbers and their relationship to mathematical operations. Therefore, he must first learn the spatial value which is the most important rule for writing the numerals in Indian - Arabic system. The student must learn that in Persian the most right digit shows (0-9), the second left digit indicates the decimal, the third left illustrates the hundred, and so forth.

After learning the digit zero and its spatial value, the child needs to understand addition, subtraction, multiplying, and

dividing of more than 2-digit numbers. At the beginning of the experiment it was found that he could not even understand the spatial value of the double-digit numbers. For example, the number 16, he could not understand that the number 1 represented a decimal. The researchers provided him with some homework that dealt with his perception of spatial value of numbers. Such exercises involved reading and writing the numbers from one to three digits and also easy and rounded numbers like 10-60-100-200-900.

Another problem concerning the writing of numbers for the pupil was due to lack of appropriate understanding of the spatial value of the digit zero. In an experiment, I asked him to write the number 108, but he used double zero for writing the digit 'one hundred and eight' or instead of writing 2569 he wrote, "200050069". The reason is obvious, in front of the thousand digit and the hundred digit, he wrote zeros to indicate for the researchers the characteristic of them. The problem that made him confused about the numbers was that he did not know the fact that whenever the spatial lower values are empty, there is a need to place zero. In his words, he did not understand the concept of spatial value which he should have learnt when he had been in the first grade of primary school. Hence, we decided to teach him the concept again. After re-teaching him, significant differences were observed between his earlier and later competences so that he could distinguish between when he writes correctly and vice versa. When the pupil under study wrote appropriately, he had a better understanding of addition and subtraction of numbers.

Assessment of the new operations impact

1 - The impact of educational programs such as the quantity and quality of math instructional programs .

Attention to the educational preliminaries of each concept.

Understanding the proper sequencing of material.

Understanding the terms mentioned in the book.

Understanding the instances about every mentioned concept.

Requesting for sufficient time for utilizing the acquired skills.

Avoiding dispersal of the material in time of response.

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