

THE EFFECTIVENESS OF A TRAINING PROGRAM IN DEVELOPING THE MATHEMATICS SKILLS OF STUDENTS WITH LEARNING DISABILITIES

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Abstract

The current study aimed to design a training program, in the development of Mathematics skills, for students with learning Disabilities, in Irbid Governorate, and measure its effectiveness. To achieve the objectives of the study, the semi-experimental curriculum was used, and the study tools represented in the Mathematics skills scale and the proposed training program were built. The study community consisted of students with learning Disabilities in Irbid Governorate in the fourth grade who are in schools, 130 male students. The study sample was chosen in an intentional way and consisted of 30 students with learning Disabilities, and divided into Experimental group groups of 15 students, A control group of 15 students were randomly distributed. The data were analyzed and quantitative results were extracted through the Mann and They test to estimate the significance of the differences of the two independent samples, and the Wilcoxon test to estimate the significance of the differences of one sample. The results of the study on the effectiveness of the training program in Mathematics skills indicated that there were statistically significant differences at the level of ($\alpha \leq 0.05$) between the average grade levels of the experimental and control group on the scale of Mathematics skills in favor of the experimental group. In light of the study's findings, it recommended that the training program be circulated to teachers of students with learning Disabilities, and recommended that studies be conducted to different groups. of the special education categories.

Keywords: math skills, Training program, learning disabilities.

Introduction

Science is the basis for building civilizations, in which the country is adopted. Therefore, education is an essential field for the care of the state. The teacher is also the basis of the educational process and its leader. He is the one who opens our small eyes to the horizons. The Ministry of Education in Jordan works to develop the teacher and help him develop his abilities and potentials, in order to move the educational process forward in order to achieve the desired goals and the expected hopes. A truly educated generation is emerging.

The first years of education are especially important in the lives of students in general and those with learning Disabilities in particular. At any stage of education, there are almost no students with learning Disabilities whose academic level is lower than their peers in Mathematics skills. Therefore, teaching them Mathematics skills in the

Manuscrito recibido: 05/06/2024

Manuscrito aceptado: 18/06/2024

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early stages of education is of great importance. Many students with learning Disabilities finish the third grade and are unable to calculate. Therefore, the recommendations of the Fifth Scientific Conference of the Egyptian Reading, Writing and Numeracy Association came to emphasize the need to diagnose academic Disabilities among students with learning Disabilities (Al-Batayna, 2021).

Mathematics learning Disabilities are a learning difficulty that weakens the ability of students to learn concepts related to numbers, make accurate mathematical calculations, and individuals with Mathematics learning Disabilities face noticeable challenges in all areas of Mathematics. These Disabilities are not explained by lack of appropriate education, mental disabilities, or other disabilities. These Disabilities also complicate daily aspects of life, which include mathematical concepts such as: telling time, counting money, and performing mental calculations. Students with Mathematics learning Disabilities find it confusing and frustrating, difficult to learn; their brain need more educational efforts, and more targeted learning experiences (2020 ,Fryemedically).

The problem of the study and its questions

Al-Azmi, 2021, Al-Batayneh, 2021, Al-Amri and Braima, 2020, Mustafa, 2016) pointed out that learning Disabilities are a category of special education spread in all countries of the world in different proportions between one country and another, and there is a continuous increase in the number of students with learning Disabilities.

Through a review of previous studies, such as the study of Muhammad, 2020; Abdullah, 2020, Khudair et al., 2020, daily observations and the constant complaint of parents about the lack of skills of their children with learning Disabilities in various skills, especially with regard to Mathematics skills, which are considered one of the basic characteristics of students with learning Disabilities.

1. Are there statistically significant differences at the level of significance ($\alpha \leq 0.05$) between the mean scores of the control and experimental groups on the scale of math skills in post measurement attributed to the variable of the training program?

Objectives of the study

Detecting the differences between the means of the scores of the control and experimental groups on the scale of Mathematics skills in the post-fayas.

Importance of the study

This research focuses on the development of Mathematics skills among students with learning Disabilities and increases the importance of research that it takes place in the classroom environment to have an opportunities to make it the subject of experiences and advancements and development because it lacks such research and field studies, and the importance of the age group that it deals with, which is characterized by flexibility and form ability, which are students with learning Disabilities at the basic stage. The results of this study contribute to finding solutions to some of the problems associated with the category of learning Disabilities and contribute to building an educational strategy in improving the Mathematics skills of students with learning Disabilities.

Limits of the study

- Spatial Limit: Public schools for the basic stage in Irbid Governorate/
- Time limit: The second semester 2023/2024. The duration of the training program was 5 weeks and consisted of 7sessions with 2 weekly sessions.
- Human Limit: Students with learning Disabilities in Irbid Governorate who are enrolled in the Resource Room at Irbid School
- Objective Limit: Designing a program in developing the Mathematics skills of students with learning disabilities and ensuring its effectiveness.

Terminology of the study

The training program is procedurally defined as: A set of activities and tasks that students with learning Disabilities are trained on. These activities are provided through training sessions during a specified time. This session is carried out in a private classroom Equipped with the means and tools to implement the program inside the school.

Procedurally, learning disabilities are defined as: students who have been diagnosed with learning disabilities and receive special education services in the resource room of the Ministry of Education who are in the fourth grade in Irbid Governorate.

Mathematics skills are procedurally: defined: It is the score obtained by students with learning Disabilities on the scale of numeracy skills prepared for the purposes of this study.

Theoretical literature and previous studies

Learning Disabilities

A disorder that hinders the normal learning process, and this disorder is in the processes that enter the learning process such as memory, perception, attention, thinking, and learning strategies. Reading and writing (spelling, editorial expression, calligraphy) as well as Mathematics are affected by these disorders (Al-Ghazawi, 2020).

Some theories explaining learning Disabilities

As he interpreted it (Abdullah, 2022).

- 1. Speech Delay Theory:** The authors of this theory go on to interpret learning Disabilities as reflecting the slow maturation of visual, motor, and linguistic processes, and the attention processes that characterize cognitive development. Since each individual with learning Disabilities has different manifestations of slow maturation aspects, each of them differs in the rate of passing through the stages of development.
- 2. Behavioral theory:** This theory is due to learning Disabilities because the reasons for low academic achievement are wrong, which may be due to the use of inappropriate teaching methods due to the lack of educational means and appropriate educational activities and the large number of learners, and their lack of motivation to learn and study, in addition to the existence of inappropriate environmental conditions in the family, school and society. Therefore, the owners of this trend believe that it is necessary to study environmental conditions and socialization factors.
- 3. Psychological theory:** This theory focuses on the mind's processing of information based on cognitive processes, attention abilities, memory, and basic psychological factors represented in sensory perception, memory, conceptualization, language, and its role and use in thinking and learning.
- 4. Information processing theory:** The basic psychological processes are due to the special abilities in processing information, and these abilities are: listening, looking, touching, through which we acquire information, as well as the special abilities to process information such as attention, excellence, memory, information representation, concept formation and problem solving.

Definition of arithmetic difficulty: It is defined as difficulty in understanding and perceiving numbers and their order, understanding, deciphering and interpreting arithmetic symbols, and difficulty in performing arithmetic operations such as addition, subtracting, multiplication and division. It also includes difficulty in understanding geometric shapes and their properties, so that each student who exceeds 25 degrees on the applied scale is considered to have Disabilities learning arithmetic (Mansouri and Kohloul, 2016).

Indicators of Calculation Disabilities

Difficulty in linking the number and its symbol, difficulty in distinguishing numbers in the inverse form, writing numbers in the inverse form, reversing numbers written in the form of digits, an difficulty in mastering some concepts of basic arithmetic operations (Zumra, 2018).

Previous studies

Hanashi (2022). Also conducted a study aimed at the effectiveness of differential teaching in improving the mathematical performance of third-year primary students with learning Disabilities. The study sample consisted of (30) students, distributed into two groups: the experimental group consisted of (15) students and the control group consisted of (15) students. The study used the semi-experimental approach. The study also used the test, and the results resulted in the positive impact of differential teaching in improving the mathematical performance of students with learning Disabilities.

Zumra (2018). In a study aimed at identifying the effectiveness of an educational program based on learning strategies to reduce the Disabilities of learning sports, the study sample consisted of 40 students, who were distributed into two groups: the control group and its number (20), and the experimental group and its number (20). The study also used a test of numeracy skills, and also used the semi-experimental approach, and the results of the study resulted in the effectiveness of the educational program based on strategies to develop Mathematics skills

Muhammad (2018). In a study aimed at improving some academic skills and adaptive behavior in children with non-verbal learning Disabilities through a training program, the research sample consisted of (5) fifth grade primary students with non-verbal learning Disabilities, (2males, 3females), the study used a measure of academic skills, and the study used a semi-experimental approach, and the results of the study indicated the achievement of all its hypotheses, which indicates the effectiveness of the proposed training program in improving some academic skills and adaptive behavior in children with non-verbal learning Disabilities.

Kassi and Sakra (2022) conducted. A study aimed to identify the most common academic learning Disabilities (reading, writing, arithmetic) among primary school students, and the pedagogical methods used to help this group. To achieve this endeavor, a questionnaire was applied to a sample of (20) students from the fourth year of primary school who began to have learning Disabilities in reading, writing, and arithmetic. They were selected intentionally based on the observations and estimates of their teachers. The descriptive approach was used. The study found that the most common academic learning Disabilities, among these students, were the difficulty of learning to write, then reading, while arithmetic was in the last place. The results indicated the effectiveness of pedagogical classes in the development of academic skills.

From the above, it is clear from previous studies that they focused on different aspects, without other important aspects, and the current study is an attempt to fill the gaps, and complete the successive Construction process over the years.

The researcher benefited from the previous studies in writing the theoretical framework of the current study, identifying the problem of the study and formulating it in a scientific research method, enriching its theoretical literature, developing the study methodology, building the study tools, and discussing and interpreting the results.

The current study differs from its counterparts from previous studies, in that it may be the first study conducted in Irbid Governorate within the limits of research science, to reveal a training program in the development of Mathematics skills among students of learning Disabilities in Irbid Governorate, where the results of the study are circulated to the study community.

Despite the above, the current study has been distinguished from the previous studies, in its purpose, society, sample, place and time in the educational field, which dealt with the effectiveness of a training program in the development of Mathematics skills for students with learning Disabilities, and the results of this study are expected to draw the attention of students to research in this field.

Method and Procedures

Study community: The study community consisted of students with learning Disabilities in Irbid Governorate, who numbered (130) students who are diagnosed by the Ministry of Education and receive part of their education in the learning resource rooms.

Study sample: The study sample was selected in the intentional way with low Mathematics skills on the scale, and it consisted of 30 students distributed in an experimental group of 15 students and a control group of 15 students.

Study approach: A quasi-experimental approach was chosen that enables us to identify and determine the magnitude of the impact between the variables of the study problem, as well as collect and prepare data and lay the foundation for classifying them and reaching and interpreting the results.

Study Tools

First: The training program: By referring to previous References and studies, including the study of (Ronimus, 2019; Aqoun and Abdul Qadir 2018; Zumra, 2018; Hijazi, 2018; Muhammad, 2018; AINU and Khallaf 2020; Khoja 2019), a training program was developed aimed at developing the Mathematics skills of students with learning Disabilities.

Validity of the program: The validity of the training program was confirmed by presenting it in its initial form to a group of (10) arbitrators with experience and specialization in special education in Jordanian universities in order to verify in terms of the general and sub-objectives of the program, and the clarity and comprehensiveness of the statements. The amendment was made in the light of the views of the arbitrators and their suggestions.

Program Objective: The general objective is to reveal the effectiveness of the training program in developing Mathematics skills when requesting learning Disabilities.

Program contents: The program contains (7) training sessions for a period of one and a half months, each session lasts from (30-45) minutes, according to two weekly sessions (Table 1).

Second: Mathematics Skills Scale

By referring to previous studies, including the study of (Franceschini, 2017; Zumra, 2018; Mohammed, 2018; Qasi and Sakkar, 2022; Mustafa, 2016; Al-Amshawi, 2020; Najia, 2013), the researcher developed a mathematics skills scale to ensure the effectiveness of the training program in developing mathematics skills among students with learning Disabilities.

Validity of the study tool

Virtual validity: The validity of the study tool was confirmed by presenting them to a group of (10) arbitrators with experience and competence in

Table 1. Program Content.

Math Skills	Skills to be developed	User Style	Number of sessions: (4)	Total Sessions
Mathematics	Distinguish between the largest and the smallest	Active learning	1	
	Distinguishing between geometric shapes	Lecture, Cooperative Learning	1	
	Distinguishing between mathematical symbols	Discussion, case study	1	
	Proficient in calculations (+,-,/,*)	Active learning, discussion	1	
	Distinguishes the concept of time, date and hour	Lecture, Discussion	1	7
	Multiplication tables.	Collaborative learning, discussion	1	
	Creates a series of calculations	Collaborative learning, discussion	1	

Table 2. Cronbach Alpha Internal Coefficient of Consistency and Repeat Constancy for Fields and Overall Score..

Area	Repeat stability	Internal consistency
Math Skill	0.86	0.88

Table 3. The results of the Mann-Whitney test to find the significance of the differences between the mean ranks in the control and experimental groups in the mathematics skills in post-measurement.

Dimensions	Group	Number	Average Ranks	Total Ranks	Mann-Whitney U	Wilcoxon W	Calculated Z Value	Level of Significance
Math Skill	Experimental	15	20 4 73	311.00	34	000	3	FS-001
	Officer	15	27	154.00				

Jordanian universities. And to take into Mathematics their observations and amendments, in terms of language, the belonging of the paragraph to the field, and the appropriateness of the para graphs, in addition to proposing any appropriate amendments. Based on the unanimity of more than (90%) of the group of arbitrators, the instrument was approved in its final form.

The stability of the study tool: To ensure the stability of the study tool, the test-retest method was verified by applying the scale, and reapplying it after two weeks to a group from outside a sample and its community consisting of (20) students, and then the Pearson correlation coefficient was calculated between their estimates in both times (Table 2).

Variables of the study

The study consisted of the following variables

Independent Variable: Affiliate Variable Training Program: Mathematics Skills
 Statistical treatment used in the study

The (spss) program was used to answer the study questions, the Mann-Teny test and the Wilcoxon test (wilcoxon w) were used to answer the study questions

Study Procedures

1. Refer to the previous literature in the design of programs and the scale of the study.
2. The study population was identified and assigned..
3. The study used the appropriate statistical equations in order to determine the size of the study sample
4. The study applied both the scale and the training program
5. Interpreting the results, discussing them, linking them to previous studies, and submitting recommendations and proposals in the light of the results.

Presentation and discussion of findings

The second question states: Are there statistically significant differences at the level of significance ($\alpha \leq 0.05$) between the mean scores of the control and experimental groups on the scale of Mathematics skills attributed to the training program?

To answer this question, the Mann and Whitney test was used to find the significance of the differences between the average grade levels of students with learning disabilities in Mathematics skills in post measurement, and the table below shows this (Table 3).

It is clear from Table No. (3) that there are statistically significant differences ($\alpha \leq 0.05$) attributed to the experimental group in the skill of mathematics, where the calculated value of Z was (-3.264) and with a statistical significance of (.001), and the differences came in favor of the experimental group.

That is, the members of the experimental group to which the training program was applied in the development of Mathematics skills have better Mathematics skills than the control group who were taught Mathematics skills in the traditional way.

This result confirms the effectiveness of the proposed training program to develop the Mathematics skills of students with learning Disabilities. This result is due to the fact that the training program included a set of integrated training, activities and methods that encourage students to learn Mathematics skills in a simple way and suit their educational needs. Mathematics skills are one of the necessary and basic skills for students to help them accomplish the academic tasks assigned to them by the teacher, increase their level of academic achievement, help them in the ability to accomplish daily tasks, and independence in dealing with others.

Through the application of the training program sessions in order to develop the Mathematics skills of students with learning Disabilities, which included a set of methods, including discussion, lecture, active learning and other strategies used in this study, which contributed significantly to the learning of students with learning Disabilities of Mathematics skills and their integration with the surrounding environment. This result is also attributed to the training program and the techniques used in the method, including the repeated practice of basic Mathematics concepts such as counting, addition, subtraction, multiplication and division, and the use of small groups of students.

It is a result consistent with many previous studies that focus on students with learning Disabilities, as this result is consistent with the findings of the study of Muhammad (2018), which indicated the effectiveness of training programs in developing the numeracy skills of students with learning Disabilities, and it is also a result consistent with the study of Hijazi (2018); Qasi and Sakra, (2022); Hanashi, (2022); Zumrah, (2018); Nasaireh, obeidat (2022) in improving the Mathematics skills of students with learning Disabilities in the experimental group attributed to the training program.

Recommendations: In light of the results of the research, the researcher recommended the following:

- Conducting training programs in the development of independent and social skills for students with learning disabilities
- Conducting training programs for Mathematics skills in another category of special education
- Conducting training programs to develop the Mathematics skills of children with learning Disabilities in the first basic stage.

References

1. Fryemedically, D. (2020). What Is Dyscalculia? Math Learning Disability Overview. Scientific Reports,11.(5),11-58
2. Ouherrou, N., Elhammoumi, O., Benmarrakchi, F., & El Kafi, J. (2018). A Heuristic Evaluation of an Educational Game for Children with Dyslexia. In 2018 IEEE 5th International Congress on Information Science and

- Technology (CiSt) (pp. 386-390). IEEE.
3. Qasi, S & Sakreh, A (2021). Common academic learning difficulties among a sample of primary school students and ways of pedagogical support, *Journal of Intellectual Excellence for the Social and Human Sciences*, 6, (91), 81-92
 4. Ronimus, M., Eklund, K., Pesu, L., & Lyytinen, H. (2019). Supporting struggling readers with digital game-based learning. *Educational Technology Research and Development*, 67(3), 639-663.
 5. Aino, A., & Khilaf, A. (2020). Diagnosis of a list of indicators for reading learning difficulties among fourth-grade students, *EL – HAKIKA Journal*, 19(95), 200-250.
 6. Nasaireh, M. A., & Obeidat, K. A. (2022). The Level of School Bullying and Its Relationship to Self-Esteem among Students with Learning Difficulties. *Educational Research (IJMCER)*, 4(2), 201-206.□
 7. Al-Aazmi, T. (2021) The challenges facing seventh-grade students with learning difficulties in studying mathematics remotely from the perspective of their parents in the State of Kuwait. *Journal of the Faculty of Education*, 37(3), 340-374.
 8. Al-Amashawi, A. (2020). A proposed program to improve reading and writing skills among students with learning difficulties, *The International Specialized Journal*, (91), (2), 122-155.
 9. Al-Ameeri, S., & Brama, R. (2020). The role of the teacher in overcoming learning difficulties for primary school students, Master's thesis, University of Mohamed Seddik Benyahia, Algeria.
 10. Franceschini, S., Trevisan, P., Ronconi, L., Bertoni, S., Colmar, S., Double, K., & Gori, S. (2017). Action video games improve reading abilities and visual-to-auditory attentional shifting in English-speaking children with dyslexia. *Scientific Reports*, 7(1), 1-12
 11. Al-Batayneh, K. (2021). Reading difficulties among a sample of students with learning difficulties in the first grades and their relationship to academic achievement from the point of view of their teachers, *Journal of the Islamic University for Educational and Psychological Studies*, 29(5), 272-293.
 12. Al-Ghazawi, H. (2020). Learning difficulties in children, *Scientific Journal of the Faculty of Early Childhood Education, Mansoura University* 1 (7), 222-242.
 13. Hamadneh, B.M & Alqarni, T.M. (2023). The use of cartoons in developing awareness of environmental protection from pollution among students with learning disabilities. *International journal of education in mathematics, science, and technology (IJEMST)*, 11(4), 913-926.
 14. Hijazi, Z. (2018). The effectiveness of a training program based on resource room activities to develop reading and writing skills for students with learning difficulties, *Journal of Special Education and Rehabilitation*, 6(25), 188-205.
 15. Khadir, A. (2020). Early detection of learning difficulties (reading - writing - arithmetic) among second-grade primary school students, Master's thesis, University of Eloued, Algeria.
 16. Khanfour, H., & Issa, E. (2018). The relationship between reading learning difficulties and academic self-concept among fifth-grade students, *Journal of Educational and Psychological Sciences*, 4(4), 151-266.
 17. Khoja, A. (2019). Reading learning difficulties among primary school students, *Journal of the Jaame of Studies in Psychological and Educational Sciences*, 4(1), 122-145.
 18. Markoon, H. (2021). Educational technology programs as an approach to dealing with learning difficulties, Master's thesis, Jillali Bo-Naama University, Algeria.
 19. Masoud, H. (2022). The effectiveness of differentiated instruction in improving the arithmetic performance of Third-Grade Primary School Students with Learning Difficulties, Doctoral Thesis, University of Algiers, Algeria.
 20. Mohamed, A. (2018). A training program to improve some academic skills and social adaptation among children with nonverbal learning disabilities, Master's thesis, Ain Shams University, Egypt.
 21. Mohamed, A. (2020). Using the text analysis strategy to develop reading skills in Arabic for second preparatory grade slow learners. *Journal of the Faculty of Education*. 36(8), 121-144.
 22. Mustafa, A. (2016). The effectiveness of a training program based on active learning strategies in developing reading comprehension skills among a sample of students with reading learning difficulties in the primary education stage, Master's thesis, University of Dammam, Saudi Arabia.
 23. Zomra, N. (2018). Towards the effectiveness of an educational program based on learning strategies to reduce learning difficulties in mathematics, Master's thesis, University of Mohamed Boukhadir, Algeria.
 24. Nasaireh, M. A., & Obeidat, K. A. (2022). The Level of School Bullying and Its Relationship to Self-Esteem among Students with Learning Difficulties. *Educational Research (IJMCER)*, 4(2), 201-206.□