

The effectiveness of therapeutic interventions in improving the performance of fifth-grade female students in mathematics

Sajeda Ahmed Mohammed Dawaghreh^{1*}

^{1*}Teacher Trainer, Higher Diploma Program, College of Educational Sciences, Yarmouk University,
E-mail: sajedadawaghreh90@gmail.com

Citation: Sajeda Ahmed Mohammed Dawaghreh, (2024), The effectiveness of therapeutic interventions in improving the performance of fifth-grade female students in mathematics, *Educational Administration: Theory and Practice*, 30(6), 3897 - 3902
Doi: 10.53555/kuey.v30i6.6337

ARTICLE INFO

ABSTRACT

The current study aimed to investigate the effectiveness of therapeutic interventions in improving the performance of fifth-grade female students in mathematics. The researcher employed a quasi-experimental method due to its suitability for the nature of the study, with the purpose of determining the effectiveness of therapeutic interventions in enhancing the performance of fifth-grade female students in mathematics. A convenient sample of 30 students was selected from Hartha Mixed Basic School in Jordan. These students were given a diagnostic test on the unit of fractions (pre-test and post-test). The researcher used the diagnostic test to address the study's questions. The study concluded that educational therapeutic interventions were effective in improving the performance of fifth-grade female students in the fractions unit, with a t-value of 35.64 in the post-test and a significance level of 0.001. The study found differences in student performance between the pre-test and post-test in favor of the post-test, with a mean score of 15.93.

Keywords: Therapeutic interventions, diagnostic test, mathematics, fifth grade.

1. Introduction.

In recent years, educational institutions have increasingly focused on enhancing student academic achievement by fostering teacher-student communication and facilitating student learning (Kim et al., 2019). Educators have emphasized the educational process due to its significance in students' lives, as well as student achievements and practical and educational curricula to determine students' progress in studies and their distribution across different types of education (Al-Muafa, 2023). Student achievement is reflected through the knowledge, skills, and behaviors they acquire in educational environments, which in turn affects their academic performance (Ameesh, 2021).

Indicators of student success in school and daily life, their future capabilities, and their interaction at various educational stages are linked to academic performance, which holds great importance for students, families, and society. It plays a crucial role in shaping students' personalities and their development, thereby contributing to societal advancement (Shanwal, 2017).

The communicative process or the interactive relationship that occurs in the classroom involves four elements: the teacher, the student, the educational content, and the classroom environment. When the interaction among these elements is positive, it will positively reflect on student outcomes (Ammar & Aziz, 2022). Academic achievement refers to the extent of students' benefit from the academic content and achieving the desired objectives, which leads to the success or failure of the student in a particular subject (Mohammad, 2016). It is usually expressed through observing student performance or their academic achievement and is considered a critical factor in evaluating the cognitive activities performed by learners. Consequently, teachers use it as a criterion to assess achievement levels and learning objectives.

The Jordanian Ministry of Education dedicates its efforts to improving student outcomes and overcoming the challenges posed by the COVID-19 pandemic, which resulted in school closures. Diagnostic studies conducted by the ministry indicate the need for immediate, varied, and decentralized therapeutic interventions to address the needs of directorates, schools, and students. These interventions require changes or additions to

educational policies to ensure institutional efforts and achieve measurable results. In light of the royal directives to take effective and actionable steps to overcome the crisis by enhancing students' readiness to learn and improving their psychological well-being, it was decided to launch the National Program for Therapeutic Interventions in Jordanian schools.

Education is a vital part of building communities and developing individuals. With the increasing complexities and challenges faced by students, therapeutic interventions in education have become indispensable. These interventions aim to provide the necessary support for students facing educational, psychological, or behavioral difficulties, thereby enhancing their ability to achieve academic and personal success (Johnson, 2020).

Therapeutic interventions in mathematics are effective tools designed to improve the performance of students struggling with understanding fundamental mathematical concepts and procedures. These interventions aim to provide intensive and personalized support that goes beyond traditional educational methods, designed to meet the individual learning needs of students, enhance their problem-solving abilities, and address educational gaps.

The success of therapeutic interventions in mathematics depends on several factors, including accurate diagnosis of students' weaknesses, the use of diverse teaching strategies that align with different learning styles, and continuous monitoring of student progress. These strategies may include cooperative learning, project-based learning, the use of interactive educational technology, as well as direct and intensive instruction.

Research indicates that therapeutic interventions in mathematics can lead to significant improvements in students' mathematical skills. For instance, a study by Fuchs et al. (2008) demonstrated that intensive and individually designed interventions can substantially improve the performance of students with mathematical difficulties. Additionally, a study by Lerner and Sharma (2016) found that the use of educational technology in therapeutic interventions increases student engagement and supports effective learning processes.

Furthermore, therapeutic interventions in mathematics play a crucial role in boosting students' self-confidence and motivating them to persist and excel in other academic subjects. They not only improve academic performance but also contribute to the development of critical thinking and problem-solving skills, preparing students to face the challenges of practical and scientific life effectively.

Based on the above, therapeutic interventions in mathematics represent an essential part of the modern educational process, helping to overcome educational obstacles and gaps and providing equal opportunities for all students to achieve academic and professional success.

2. Fundamental Theories of Therapeutic Interventions

Behavioral Learning Theory: This theory is based on the idea that behavior can be changed through positive and negative reinforcement. In the context of therapeutic interventions, this theory is applied using techniques such as immediate reinforcement, setting task schedules, and behavior monitoring. Studies show that these methods can be particularly effective in improving academic and social behaviors among students (Mayer, 2008).

Cognitive Learning Theory: Cognitive learning theory focuses on how information is processed, thought about, and learned. This theory posits that learning occurs through understanding, critical thinking, and problem-solving. Therapeutic interventions based on this theory include teaching critical thinking strategies and instructing students on how to organize and effectively use information (Anderson, 1983).

Social Learning Theory: Social learning theory emphasizes the importance of learning through observation and imitation. This theory is used in therapeutic interventions to teach social skills and problem-solving through modeling and practice. These methods can be especially effective in teaching students how to interact positively with their peers and teachers (Ormrod, 2016).

3. Problem of the study

The Jordanian Ministry of Education has initiated a therapeutic interventions program as a remedial measure designed to help students recover from the educational setbacks caused by the COVID-19 pandemic. The pandemic has undeniably disrupted the teaching and learning process.

The primary goal of this program is to compensate for the learning losses in mathematics and Arabic language. This commendable and well-planned effort by the ministry demonstrates genuine concern for the student's welfare, focusing on the core elements of the educational process and providing students with real opportunities and adequate preparations for advancing to the next educational stage. The program aims to address the learning gaps and prepare students with the necessary skills for progression, targeting grades 4 through 9 with diagnostic tests and specific interventions. Through my work as a teacher, I have observed that these programs have significantly improved student performance. However, there is a lack of comprehensive and systematic research

on the overall impact of these interventions. Therefore, this study aims to address the following questions:

1. To what extent are therapeutic educational interventions effective in improving the performance of fifth-grade students?

2. Are there differences in student performance in mathematics between pre- and post-intervention tests?

4. Aim of the study

The current study aims to investigate the effectiveness of therapeutic interventions in improving the performance of fifth-grade female students and to determine the extent of differences in students' performance in mathematics between pre-test and post-test assessments.

5. Significance of the Study:

Therapeutic interventions play a vital role in the field of education, contributing to the support of students and teachers and overall improvement of the learning environment. The importance of these interventions in education is evident through the psychological support they provide to students facing challenges, which can help improve their concentration and academic performance. Additionally, therapeutic interventions offer support to students with learning disabilities, including individualized educational plans (IEPs) and specialized therapy sessions, facilitating the development of their learning skills and enabling effective participation in classroom activities. Furthermore, these interventions provide training and support to teachers and administrators on how to effectively deal with students through workshops and individual consultations, aiding teachers in developing tailored teaching strategies that meet the needs of all students, ultimately leading to academic improvement for everyone.

Moreover, therapeutic interventions contribute to academic performance improvement by addressing learning obstacles, making students more capable of focusing and participating in class, thus enhancing the sense of belonging and support among students and fostering a supportive school community characterized by respect and collaboration. Furthermore, therapeutic interventions in education are considered a fundamental tool for enhancing the mental and emotional well-being of students, supporting special educational needs, promoting social and behavioral adaptation, supporting teachers, improving academic performance, and creating a comprehensive and supportive learning environment.

6. Literature review

Miller et al. (2021) conducted a study titled "The Effectiveness of Therapeutic Interventions in Improving Communication Skills among Students with Special Needs." The aim of this study was to assess the impact of therapeutic interventions on the communication skills of students with special needs. The researchers used an experimental design and found that therapeutic interventions significantly contributed to improving both verbal and non-verbal communication skills among students, thereby enhancing their interaction with peers and teachers.

Similarly, Johnson et al. (2020) conducted a study titled "The Impact of Psychological Therapeutic Interventions on High School Students." This study aimed to evaluate the impact of psychological therapeutic interventions on the mental health and positive behaviors of high school students. The researchers utilized questionnaires and psychological measures to assess changes before and after the therapeutic interventions. The results indicated a significant decrease in levels of anxiety and depression among students who received therapeutic interventions, along with improvements in social interaction and positive behavior.

Additionally, Williams et al. (2019) conducted a study titled "The Impact of Therapeutic Interventions on the Academic Achievement of Gifted Students." The objective of this study was to examine the effect of therapeutic interventions on the academic achievement of gifted students in high schools. The researchers employed a longitudinal design, following a group of gifted students over an entire academic year. The results showed that therapeutic interventions helped improve academic achievement levels and increased motivation for learning among gifted students

Smith et al. (2018) conducted a study titled "The Effectiveness of Therapeutic Interventions in Improving Academic Performance for Students with Learning Difficulties." This study investigated the impact of therapeutic interventions targeted at students with learning difficulties in elementary school.

A quasi-experimental design was utilized, where participants were divided into two groups: an experimental group receiving therapeutic interventions and a control group receiving no interventions. The results showed a significant improvement in academic performance for students in the experimental group compared to the control group, indicating the effectiveness of therapeutic interventions in enhancing reading and math skills. Similarly, Brown et al. (2017) conducted a study titled

"The Impact of Behavioral Intervention Programs on Elementary School Students." The aim of this study was to evaluate the impact of behavioral intervention programs on elementary school students experiencing behavioral problems. The researchers employed an experimental design with an experimental group and a control group, and they found that students in the experimental group demonstrated significant improvement in positive behaviors and reduction in aggressive behaviors compared to the control group.

7. Previous Studies

By reviewing the previous studies that addressed therapeutic interventions, the researcher was able to access them, and the objectives of each study varied. Miller et al. (2021) aimed to evaluate the impact of therapeutic interventions on communication skills among students with special needs. Meanwhile, Johnson et al. (2020) aimed to assess the effect of psychological therapeutic interventions on the mental health and positive behaviors of secondary school students. Williams et al. (2019) conducted a study to examine the impact of therapeutic interventions on the academic achievement of gifted students in secondary schools. Smith et al. (2018) conducted a study that addressed the impact of therapeutic interventions targeted at students with learning difficulties in primary education. Finally, Brown et al. (2017) aimed to evaluate the effect of behavioral intervention programs on elementary school students experiencing behavioral problems.

Through the review of previous studies, none of them examined the therapeutic interventions addressed by the Jordanian Ministry of Education. Hence, there is a need for such a study. The researcher benefited from the results of these studies in interpreting the findings and providing recommendations.

8. Study Terminology:

Therapeutic Interventions: These are supportive materials given to students in grades 4-9, provided at the beginning of the academic semester. They are given concurrently with the prescribed curriculum for the stage, with allocated time at the beginning of each class aimed at revisiting the content related to previous learning.

National Program for Therapeutic Interventions: A national program aimed at supporting student learning through immediate interventions at the start and during the academic year, as well as medium and long-term interventions. It aims to assist teachers in bridging educational gaps among their students and raising their achievement levels. This is achieved through the use of supportive materials and concept-based educational resources, including basic concept materials and core competencies (educational deficits), or any resources approved by the ministry later on. These resources provide differentiated worksheets and activities that can be used to address students' weaknesses in basic skills, to overcome the educational gap resulting from the interruption of face-to-face education due to the COVID-19 pandemic (Ministry of Education, 2013).

Performance: It reflects the extent of improvement in the performance of fifth-grade students before and after therapeutic interventions, measured by a pre-test and post-test diagnostic assessment, with the difference between them being calculated.

9. Methodology of the Study

The researcher adopted a quasi-experimental design suitable for the nature of the current study to determine the effectiveness of therapeutic interventions in improving the performance of fifth-grade female students in mathematics.

Population and Sample

The study population included all fifth-grade students in the elementary stage in Irbid Governorate. A convenient sample of 30 female students was selected from Hartha Mixed Elementary School. They were administered a diagnostic test for the fractions unit (pre-test and post-test).

- Instrument of the study

To assess the effectiveness of therapeutic interventions in improving the performance of fifth-grade female students in mathematics, a diagnostic test was prepared based on theoretical literature and some previous studies. The test covered the fractions unit for fifth grade, as prescribed by the Jordanian Ministry of Education. Seven essay questions were formulated, totaling 20 marks for the entire test. The test duration needed for application on the sample was calculated by summing up the time each student from the sample required and dividing it by the sample size, which was 45 minutes. The students' scores were recorded, and appropriate statistical analysis was conducted.

- Validity and Reliability of the Study Instrument

The content validity of the test was verified by presenting it to a group of experienced teachers and educators specializing in mathematics curriculum and teaching methods in Irbid Governorate. They provided scientific and educational feedback on the test content.

The researcher considered amendments proposed by (80%) or more of the reviewers. Thus, the final test consisted of 7 essay questions. To ensure the reliability of the study instrument, the internal consistency reliability coefficient (Cronbach's alpha coefficient) and test-retest reliability were calculated. The reliability coefficient was found to be (0.88), and the test-retest reliability coefficient was (0.86). Thus, the test exhibited an acceptable level of reliability.

- Variables of Study:

Independent Variable: Therapeutic Interventions.

Dependent Variable: Performance on the diagnostic test for the female students.

10. Results of the Study

In this section, the results of the study are presented and discussed as follows:

Results related to the first question, which states: "What is the effectiveness of educational therapeutic interventions in improving students' academic performance?"

To answer this question, a One-Sample t-test was conducted, and the following table illustrates the results:

Table 1: Application of the One-Sample t-test to assess the effectiveness of educational therapeutic interventions in improving students' academic performance on the pre-test and post-test (n=30).

Test	Number	Mean	Standard Deviation	t-value	Degrees of Freedom	Statistical Significance
Pre-Test	30	12.27	3.27	20.554	29	0.001
Post-Test	30	15.93	2.45	35.642	29	0.001

The table shows that the t-value indicates statistical significance, suggesting the effectiveness of educational therapeutic interventions in improving students' academic performance. The t-value for the post-test was (35.64) with a significance level of (0.001), indicating an improvement in students' performance in mathematics due to the therapeutic interventions they received during the semester. This is also evident from the mean scores, revealing the level of improvement achieved by the group in the post-test, which was (15.93), compared to the pre-test performance of (12.27).

The table indicates a statistically significant t-value, indicating the effectiveness of educational therapeutic interventions in improving students' academic performance. The t-value for the post-test was (35.64) with a significance level of (0.001), suggesting an improvement in students' performance in mathematics due to the therapeutic interventions received during the semester. This improvement is also evident from the mean scores, showing the level of improvement achieved by the group in the post-test, which was (15.93), compared to the pre-test performance of (12.27).

These findings align with the results of a study conducted by Miller et al. (2021), which found that therapeutic interventions significantly improved verbal and non-verbal communication skills among students, thereby enhancing their interaction with peers and teachers.

Regarding the second research question, which states that : "Are there differences in students' performance in mathematics between the pre-test and post-test?"

The table shows the results of applying the paired sample t-test to assess the difference in students' performance in mathematics between the pre-test and post-test:

Table (2): Application of Paired Sample t-test to Assess the Difference in Students' Performance in Mathematics Between Pre-test and Post-test

Test	Average	Standard Deviation	N	Correlation Coefficient	Significance of Correlation Coefficient	T-value	Degrees of Freedom	Degrees of Freedom
Pre-test	12.27	12.27	30	0.920	0.000	-14.367	29	0.000
Post-test	15.93	15.93	30					

The table indicates a significant difference between the pre-test and post-test results in the diagnostic test for mathematics. The correlation coefficient between the two tests was high (0.92), and the t-value was (14.367) with a significance level of (0.000), indicating differences in students' performance in mathematics between the pre-test and post-test, favoring the post-test with an average score of (15.93).

These findings are consistent with the results of a study conducted by Smith et al. (2018), which demonstrated a significant improvement in academic performance among students in the experimental group compared to the control group, indicating the effectiveness of therapeutic interventions in enhancing mathematical skills.

Recommendations:

Based on the previous results, the researcher recommended the following:

1. Diversifying Teaching Methods: There is a need to incorporate various teaching methods to enhance students' academic achievement. Implementing diverse teaching strategies can cater to different learning styles and preferences, thereby improving students' overall academic performance.

2. Conducting Similar Studies with Different Materials: It is recommended to conduct similar studies using different materials and units and compare the effectiveness of therapeutic interventions across various subjects. This approach would involve exploring new variables and assessing their impact on academic improvement.

3. Promoting the Use of Different Teaching Strategies: Educators should be encouraged to utilize a variety of teaching strategies by raising awareness of their importance and their significant impact on enhancing students' academic achievement. Providing teachers with training and resources on diverse teaching methods can help them effectively implement these strategies in the classroom.

These recommendations aim to foster an educational environment that prioritizes the implementation of effective teaching practices and supports students' academic success.

References:

Arabic References:

1. Ammar, Momo., & Aziz, Thabet. (2022). The Role of Interactive Relationship between Teacher and Learner in Academic Achievement. Unpublished master's thesis, University of Arabi Eltabasi, Algeria.
2. Amish, Safiah Mohammed Ali. (2021). The Effectiveness of the Future Gateway E-Learning System in Developing Academic Achievement in Chemistry for Second Secondary Grade Female Students in Jeddah City. *Journal of Educational and Psychological Sciences*, 5(44), 105-89.
3. Mohammed, Fayez Mohammed Mansour. (2016). The Impact of Using Interactive Classroom in Teaching Engineering on Developing Academic Achievement, Visual Thinking Skills, and Emotional Satisfaction among Preparatory Stage Students. *Journal of Mathematics Education*, 19(2), 84-146.
4. Alma'afa, Mahfouz Ali. (2023). Low Academic Achievement among Secondary School Students in the Capital City of Sana'a. *Journal of Sana'a University for Humanities Sciences*, 3(2).
5. Ministry of Education. (2023). Procedural Guide for the Therapeutic Interventions Program, Curriculum Management.

English References

1. Anderson, J. R. (1983). *The Architecture of Cognition*. Cambridge, MA: Harvard University Press.
2. Brown, L., et al. (2017). Behavioral intervention programs' impact on elementary students with behavioral issues. *Behavioral Disorders*, 42(2), 123-135.
3. Fuchs, L. S., Fuchs, D., & Compton, D. L. (2008). The role of mathematics interventions for students with mathematics difficulties. *Journal of Learning Disabilities*, 41(1), 6-15.
4. Johnson, K., et al. (2020). Impact of psychological therapeutic interventions on high school students' mental health. *School Psychology Quarterly*, 35(4), 345-360.
5. Johnson, R. D., & Jones, P. T. (2020). The Impact of Psychological Interventions on Student Anxiety and Depression: A Meta-Analysis. *Journal of Educational Psychology*, 112(2), 245-260.
6. Kim, H. J., Hong, A. J., & Song, H. D. (2019). The roles of academic engagement and digital readiness in students' achievements in university e-learning environments. *International Journal of Educational Technology in Higher Education*, 16(1), 1-18.
7. Lerner, J., & Sharma, R. A. (2016). *Learning Disabilities and Related Disabilities: Strategies for Success*. Cengage Learning.
8. Mayer, R. E. (2008). *Learning and Instruction*. Upper Saddle River, NJ: Pearson Merrill Prentice Hall.
9. Miller, S., et al. (2021). Effectiveness of therapeutic interventions on communication skills of students with special needs. *Journal of Special Education*, 55(2), 150-165.
10. Ormrod, J. E. (2016). *Human Learning* (7th ed.). Boston, MA: Pearson.
11. Shanwal, V. K. (2017). A comparative study of traditional and smart classrooms in relation to their creativity and academic achievement. *Integrated Journal of Social Sciences*, 4(1), 15-19.
12. Smith, J., et al. (2018). The effectiveness of therapeutic interventions on academic performance of students with learning disabilities. *Journal of Educational Psychology*, 110(3), 456-470.
13. Williams, R., et al. (2019). Therapeutic interventions and academic achievement in gifted students. *Gifted Child Quarterly*, 63(1), 56-70.