Effectiveness of a Computerized Program in the Treatment of Dyslexia in a Sample of Fourth Grade Students

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Abstract

A neurobiological learning condition known as dyslexia manifests itself in reading difficulties that cannot be explained by impairments in intelligence, sensory processing, or brain function. The efficacy of computer programs in assisting dyslexic kids has been the subject of numerous studies, and this trend shows no signs of abating. The purpose of this study was to evaluate a computer program's efficacy in treating dyslexia in fourth graders from a cross-section of Jordanian schools. For the 2017–2018 school year, the research sample included ninety fourth graders. There were 35 pupils in the control group and 55 in the experimental group. To address the challenges of reading instruction, this study implemented a reading-skills program in schools. Since reading is an essential life skill, it was important to tailor the program to the needs of students with varying degrees of special education, including those who have learning disabilities and would benefit from individualized approaches to reading instruction. Consequently, the context of this study was the fundamental level of reading instruction for students with learning disabilities. Assist in meeting the educational needs of students with learning disabilities by equipping educators with the knowledge and skills to effectively utilize a computer program for reading instruction. This will allow for a more thorough understanding of the phenomenon of learning difficulties, particularly as they pertain to reading, as well as the factors that contribute to these difficulties and potential solutions.

Keywords: dyslexia, computer-based training, learning difficulties, school, learning of disabilities, effectiveness

1. Introduction

Computers and other forms of technology have improved education by facilitating better class planning and facilitating students' ability to stay up. Using word processors for work teaches students how to operate computers, which in turn helps them acquire technical jargon and improve their grammar abilities. Instead than carrying hefty textbooks around all day, students can simply look up lectures online or via email. Evidence suggests that pupils who have access to computers at school are more likely to show up regularly and do better academically than their non-computer using peers. Students reported greater engagement with both their coursework and their jobs when they used computers, in addition to improved test scores. Students are able to concentrate better on their personal work, group projects, and schoolwork when they use computers. In today’s corporate environment, computers are indispensable, and even the most fundamental tasks rely on some form of technology or computer. There is a wide range of potential occupations that students can be prepared for by learning how to use computers; furthermore, computer education curricula can become very specialized. Because they provide students with access to resources and ways of communication that aren't available offline, computers greatly simplify and expedite the learning process. Online tools like Blackboard and email make it easy for students to stay on top of their coursework and communicate with their instructors. In addition to completing assignments outside of class time, students can submit them in from anywhere, which helps them learn responsibility and avoid procrastination.

But having problems reading despite having average intelligence is a hallmark of dyslexia, often called reading disorder. Different people are affected to varying degrees. There could be issues with reading comprehension, spelling, speed, writing, "sounding out" words mentally, pronouncing words when reading aloud, and so on. Typically, these challenges are initially observed in the classroom. Alexia is the condition in which a person who was able to read before suddenly becomes unable to do so. Even though they have a typical curiosity and will to study, people with this disease experience involuntary challenges. One aspect of treatment is tailoring instruction
to the individual's needs. It may alleviate symptoms to some extent, but it won't fix the fundamental problem. Vision-related treatments do not work. People from all walks of life can experience dyslexia, making it the most prevalent learning disability globally. The third although about 3-7% of the population is affected, up to 20% may have symptoms to varying degrees. It has been proposed that dyslexia affect both sexes equally, despite the fact that it is more commonly diagnosed in males. Dyslexia, according to some, is best understood as an alternative learning style, complete with advantages and disadvantages. The purpose of this study is to investigate the efficacy of a computer software in helping a group of fourth graders who suffer from dyslexia.

2. Objectives of the Study
The present study aims to achieve the following objectives

1. Find out how well the suggested computer program helped fourth graders with dyslexia improve their reading comprehension, analytical, and composition abilities.
2. Evaluate the proposed computer education program's impact on improving fourth graders' reading abilities (comprehension, analysis, and composition) by controlling for the gender variable (male and female).

2.1 Study Hypotheses
The present study is based on the following two main hypotheses:

1. Statistical analysis reveals that the mean scores of students in the experimental and control groups on the post application, Computerized Tutorial, do not differ significantly at the 0.05 level of significance between the tests of achievement in reading skills (pronunciation, comprehension, analysis, and composition).
2. When comparing the post-test scores of male and female students in the experimental group on reading skills (pronunciation, comprehension, analysis, and composition), there is no statistically significant difference at the level ($\alpha = 0.05$) based on the students' gender.

2.2 Study Approach
One of the best research methodologies, the experimental technique was necessary for this study due to its design and aims. The definition of "experimental" is "to change something and note the effect of that change on something else"; in other words, to try out different adjustments and see what happens. In the end, the point of the experiment is to find out what happens or how much of an effect the modification has. In scientific inquiry, an experiment is a method for testing hypotheses about a relationship between a problem and what is known, typically involving the random assignment of a certain number of people to groups that focus on one or more independent variables. The researcher deliberately creates an experimental environment, which is the most important part of the investigation. Diverse groups of people have had various kinds of experiences. Here, the researcher would randomly assign students to groups in order to address independent study variables under circumstances dictated by the study's design.

2.3 Terminology of the Study

Through the current study procedures, the following procedural definitions have been developed:

2.4 Computerized Training Program
Is a strategy for teaching fourth graders with learning difficulties to read that incorporates a variety of activities, exercises, experiences, scenarios, and integrated Macromedia Flash Animation tasks? In collaboration with experts in e-learning and computer programming, the researcher developed and built the program, which was then implemented on computers using Adobe software (Adobe macromedia flash). This allows the student to view course materials on screen, which allows for easy recall, and to practice reading and comprehension skills through visual reinforcement, such as images of correct answers and other stimuli. Since it encourages the idea of self-learning and engagement and limits the teacher's role to that of a guide or supervisor, this program is well-suited for use in any setting where a device is accessible.

In addition, the researcher was incorporated into the process of programming the educational material that was evaluated. This is due to the fact that students who have difficulties learning frequently enter the learning resources room for two or three hours, where they learn reading and writing and "according to certain strategies." After that, they return to the classroom to combine with their classmates and follow the prescribed lessons. According to the reading book, for instance, he has learnt how to pronounce letters and words with the assistance of a computer while he was in the learning resources room. Additionally, he is able to follow his colleagues more
effectively than he was able to in the past, and he has learned to read by employing a new method.

Strategy of education Computer-aided design, and designed the program, which consists of a set of displays that included:

- Title screen and the row assigned to it.
- The program's theoretical description screen shows the Student Guide screen and includes instructions to help the student interact with the program.
- The Teacher's Guide screen and some instructions for the resource room teachers on the program include the program objectives screen and include the educational objectives of the program as described in the teacher's guide.
- The lessons of the lessons, including the required paragraphs of the students with their area and with the voice of the full content, and the student can repeat the listening so that he can master the skill of the word and words in the reading level.
- Question screens, containing a set of objective questions on the lessons, accompanied by images and sounds that reinforce the correct answer, or ask the student to try again if he makes a mistake.
- The training screens include training the students in the skills of analysis and composition, and the skill of the calendar as it appears in the expression exercises that ask the student to express his opinion on a subject.
- Expression screens, including images representing the content of the expression of the student's intention to form sentences expressing his understanding of the subject.

3. Learning Difficulties

There are many definitions in which scientists strive to describe the state of learning disabilities. One of the most popular definitions is the definition of children with learning disabilities by the Federal Government of America, which states that "children with learning disabilities are deficient in one or more basic psychological processes which require understanding or use of written and spoken language. The individual's incapacity to engage in activities such as thinking, speaking, reading, writing, spelling, or performing calculations can be attributed to an impairment in perception, brain dysfunction, dyslexia, or both. It is important to note that these learning difficulties are not necessarily the result of emotional disorders, mental retardation, environmental deprivation, economic hardship, or visual impairment.

Learning disabilities are also known as the problems that people face in acquiring knowledge and skills to reach the normal level expected of those of the same age, especially because of mental disability or cognitive disorder. The term learning disabilities became prominent in the 1980s; it is extensive, covering general conditions such as Down's syndrome, as well as special circumstances, such as cognitive or neurological conditions, such as difficulty in reading and attention deficit disorder. Dyslexia often have difficulty finding links between letters, sounds, and have problems with spelling, word recognition, and other symptoms of dyslexia: Failure to understand what others are saying Fully. Difficulty in organizing written and spoken language. Delayed speech ability. Weak self-expression. Difficulty learning new vocabulary, either through reading or hearing. Difficulty learning foreign languages. Slow reading, as well as giving up long reading tasks. Difficult to understand questions, follow directions. Poor spelling. Difficulty keeping serial numbers. The problem of distinguishing left and right. This type of disorder is characterized by writing problems. This disorder may cause the child to be tense and awkward when carrying the pen. Other signs of this condition include: great hatred of writing, drawing, or both. Problems with grammar. Difficult to write thoughts. Fast loss of energy, lack of attention as you write. The problem of writing ideas in logical sequence. Leave words incomplete, or delete them when you type sentences. Disagreement The signs of this difficulty include problems in understanding basic mathematical concepts such as fractions, numbers, positive and negative numbers, and may also include: problem in currency conversion. Chaos solved math problems on paper. Problem identifying the logical information sequence. Problem understanding the time sequence of events. Difficulty in describing math operations verbally. Dysfunction The person who has this difficulty has some problems with motor tasks that can affect learning. These symptoms include: (3) problems of self-regulation, and other things of the person. Problem with tasks that require hand-eye coordination, such as coloring in lines, assembling puzzles, and cutting accurately. Weak balance. Breaking things. Sensitivity to loud noise, or repetitive sounds, such as clock beats.

3.1 Reasons for Learning Difficulties

There is no specific reason for learning difficulties, but researchers have some theories about why they evolved,
including: Genetic influences: Experts have noted that learning disabilities tend to spread in families. They believe that heredity can play a role, but researchers are still debating whether learning difficulties are in fact genetic, or if they appear in families because of children’s learning, and their imitation of their parents. Brain development: Some experts believe that learning difficulties can be attributed to brain growth, both before and after birth, so problems such as low birth weight, hypoxia, or premature birth can be related to learning difficulties. Those who receive head injuries are also at risk of learning difficulties. Environmental impacts: Infants and young children are more vulnerable to environmental toxins; they may sometimes contribute to learning difficulties, and malnutrition at an early stage of life may also impede learning at a later stage.

3.2 Characteristics of Children with Learning Difficulties

There are a range of general characteristics of people with learning disabilities: Cognitive Characteristics: Significant decline in performance in reading, writing, or mathematics, or in all three of these foundational academic areas. Language characteristics: The child suffers from problems in receiving and understanding speech, and in expression, as well as may make mistakes in the composition of sentences, delete some words or make mistakes in grammatical formulation. Kinetic characteristics: A child with learning difficulties has problems with large movements such as running, jumping, picking up objects, and problems with fine movements such as scissors or writing. Social and behavioral characteristics: These include lack of self-control, rapid emotional changes, non-social behaviors, and social withdrawal. How to deal with children Learning difficulties Studies have shown the importance of the role of the family in dealing with the problem of learning difficulties in children and alleviate them, and showed that their role in influencing the child is much stronger than school, and that the family whenever the child is given appropriate attention, it achieves great successes in overcoming the problem, an overview of the family's function in the child's life can be provided by considering the following points: Child observation, it is essential that parents follow their child's development and development continuously from school age to school, research and the question about any disturbing observation in the development of developmental child. Assess the child, make the decision to undergo assessment tests by specialists to ascertain the existence of the problem of learning difficulties or not, and give the specialist accurate answers to their questions on the child's case to be accurate diagnosis. Making positive decisions that relate to the future interests of the child after obtaining an assessment and making sure the problem exists, and determined to take responsibility for helping the child. Accept the child and help him to overcome the problem patiently, and not punish him for default and load a burden of higher than his capacity and abilities. Research, learning and take courses related to learning difficulties to understand the means and methods that may help to solve the problem and understand the types of programs and assistance offered to this class of children and students. Cooperation between parents and teachers or specialists in special education and the implementation of its instructions in accordance with the interests of the child.

How to deal with children with learning difficulties there are some tips to help teach children with learning disabilities:

To show a positive attitude toward the child and accept him, and to recognize the difference between him and others and not compare with others. Choose the teaching methods that will be easy on the child, focus on his strengths and not on the weaknesses. Keep away from mockery, reprimand and threatening behavior while dealing with a child [4]. Follow the process of learning by means of pictures, etc., and rely on the concrete things as much as possible in the education of the child and stay away from indoctrination as much as possible. Restrained and calm while teaching the child, show the packets to control the educational process, not to give the child room to control the teaching time. Adopting a method that addresses questions that stimulate thinking in the child. Identify tasks that fit the child’s situation; do not be too large or too easy for him, and set a specific time to finish these tasks. You must choose a teacher who wants to work with children in this particular category, and be familiar with the methods of dealing and teaching. If the child fails to learn a skill, the method of teaching and other methods must be changed. If not, it should be replaced with a slightly simpler skill. Graduation must take place at the time of the dissolution of the duties. The tasks that require a little time are started, and this time is gradually increased for a longer time. Link new educational experiences with previous experiences. Make the child participate and participate in the selection of educational activities that he likes and starts with, for example [5]. Give the child sufficient time to answer or solve the exercise, etc. and not to rush him. Knowledge and knowledge of behavior modification methods to be used consistently with the child. Make daily plans ready for the child's application and follow up, and give him daily instructions and duties. When working with a kid who has learning impairments, VAKT is a crucial tool. It depends on making the child use all his senses together during his training. This method facilitates academic communication with the child and helps parents or teachers enrich the learning process to increase the comprehension. The child is more likely to learn, and this method is
applied in the following example: "The child tells the teacher a short story, written by the teacher, the teacher asks the child to look at her. (Hearing) B (pronunciation), written by the child (touch and movement) [7].

4. Learning Resource Rooms

The Resource Room is a separate remedial classroom in any school where students with learning disabilities, such as some learning disabilities, are given direct and special education, academic treatment, help with homework [1] and related tasks, whether they are individuals or groups. Where the resource room contains many activities to help students with learning difficulties to overcome them as well as contain activities that help both the resource room teacher and the normal classroom teacher to deal effectively with students with difficulties in education and to understand the needs and identify the strengths and weaknesses, including room Sources:

• Tools and tests to diagnose the shortcomings of the student and determine the nature of treatment required.
• Methods of teaching appropriate to the nature of the difficulties experienced by the student.
• Educational materials appropriate to the nature of methods and methods of teaching.
• Teaching students in differentiated groups based on their specific needs and the level of challenge they require.
• Educational activities and tools that interest the learner and thus ensure his cooperation, participation and interaction.
• The schedules of the duration of each student in the resource room and in the regular classroom.
• Collaborative planning between the resource teacher, the regular classroom teacher and the educational counselor.

Eligibility Test

Is the test related to learning resulting from experiences in organized learning situations where attention is focused on the extent to which a course or program has been learned? It may be locally developed by the teacher, or a standardized collection test. This study aims to ready the participants in the initial two phases prior to using the computer program and other tactics. The second is after the completion of the application to find and analyze the results. This test measures the reading skills of the course book in 2017/2018. And the test was applied to the control and experimental samples before and after learning the skills of reading both computerized and non-computerized.

The limits of the study

The current study was limited to:

1. Preparation of a computer program to teach reading skills for students with learning disabilities in the fourth grade, which includes three modules of the curriculum.
2. stop reading skills of the two main components; know the letters and words, and reading comprehension, and what falls within the skills of analysis, composition, application and evaluation, in students with learning disabilities, assisted by the computer, and using the software (macromedia flash animation, which is characterized by its coverage of different artistic aspects, as well as interactive. Because of the multiplicity of reading skills and their branches, the present study was limited to addressing the skills of comprehension, analysis and composition.

Limitations of study sample:

The study was applied to 90 students who were referred to specialized learning rooms for those with learning difficulties, male and female in the fourth grade, and were divided into two equal samples; experimental and control.

• Spatial Study Limitations: The study was implemented in the public schools of the basic stage, which includes specialized rooms for students with learning difficulties in the Amman region.
• Temporal study Limitations: The research was implemented during the second semester of the scholarly calendar 2017/2018

Study Tools:

The researcher used a set of tools to implement the following procedures:

Computerized software

Designed by the curriculum for the fourth grade, the program was implemented with the help of computer
programmers.

**Eligibility Test:** It is prepared by the researcher, and included the measurement of reading skills **Study plan and procedures:**

The researcher carried out the following procedures to complete the study:

1. Determine the theoretical framework for research through the study of educational literature, and previous studies related to the variables of the study
2. Building the test for reading skills, according to the curriculum for the fourth grade.
3. Computerized program design Education Reading skills, according to the curriculum for the fourth grade.
4. The preparation of the standards of trends and opinions, which were built according to the standards used in some studies after making adjustments to them in line with the purpose. And then presented to a group of arbitrators to determine the validity of the poor, and suitability to the current study.
5. Sample Study Sample: The study sample consisted of 90 students with learning disabilities identified in reading in the fourth grade
6. Conduct the implementation of the test for the academic achievement.
7. Application of the computerized program to teach the experimental group, and the non-computerized strategies of the control group.
8. Conduct the post-application to test the educational achievement.
9. Extract, analyze and process results to test the validity of hypotheses and answer their questions.
10. Interpret the results, submit proposals, and evaluate the study.

**5. Related Work**

Problems with fast temporal processing of auditory information affect both spoken and unspoken language (Tallal & Stark, 1981) and non-speech sounds (Breier et al., 2001; Cantiani et al., 2009), such as music (Huss et al., 2011). Brain regions responsible for processing the features of auditory speech and non-speech signals share a lot of similarities, according to neuroimaging research (Joanisse & Gati, 2003; Brown et al., 2006; Musacchia et al., 2007; Schön et al., 2010; Abrams et al., 2011; James, 2012; Jantzen et al., 2014).

Examining the results of treatment programs, reviews of international dyslexia intervention studies uncovered the essential components of a successful dyslexia treatment program: phoneme awareness training, subword level language relations between spoken and written language, and explicit tutored instruction (Foorman, Breier, & Fletcher, 2003; Goetz, Nossent, & Hecke van, 2006; Lin et al., 1999; National Reading Panel, 2000; Torgesen, 2005). The Dutch National Protocols for Dyslexia Diagnostics and Treatment (Blomert, 2006) incorporate all of these elements, which form the basis of a highly organized reading and spelling program at the subword and word levels. This program includes training on phoneme awareness in conjunction with grapheme-phoneme connection.

Music and reading comprehension have been linked in numerous research. Even in typically developing readers, musical proficiency improves language and literacy skills. (Hurwitz et al., 1975; Douglas & Williams, 1994; Anvari et al., 2002; Forgeard et al., 2008; Moreno et al., 2009; Dégé & Schwarzer, 2011; Brandt et al., 2012). In addition, the ability to distinguish between melodic and rhythmic pieces of music is a predictor of phonological and reading abilities in children with and without Down syndrome (Forgeard et al., 2008). The cumulative effect of these results is that children with DD may benefit from interventions that target their fundamental auditory perception skills, which may in turn affect their reading and language development.

Clinical settings may make strides towards reading and spelling standardization, according to two Dutch effect studies. (Gerretsen, Vaessen, & Ekkebus, 2003; Tijms, Hoeks, Paulussen-Hoogeboom, & Smolenaars, 2003). Phonological representation dysfunction is associated with difficulties in dynamic and rapidly changing auditory information processing (Tallal & Stark, 1981; Tallal et al., 1985, 1993; Farmer & Klein, 1995; Breier et al., 2003; Tallal, 2004; Corriveau et al., 2007; Huss et al., 2011). It is still debatable which lack is the main cause of DD. A number of factors are probably at play here. (Ramus, 2003; Pennington, 2006; Menghini et al., 2010). Many substantial research have validated the widespread assumption that DD is caused by a basic weakness in phonological processing. (Goswami, 2000; Snowling, 2000; Lyon et al., 2003; Ramus et al., 2003; Démonet et al., 2004; Ramus and Szenkovits, 2008; Fraser et al., 2010).

Prosody is also insensitive in children with DD. (Corriveau et al., 2007; Goswami et al., 2010), pitch perception
(Baldeweg et al., 1999; Goswami et al., 2011) and rhythm (Overy et al., 2003; Thomson & Goswami, 2008; Corriu & Goswami, 2009; Huss et al., 2011; Goswami et al., 2013; Flaugnacco et al., 2014), which are characteristics of sound that are indicated by changes in the acoustic signal's amplitude, duration, and frequency. One hallmark of Down syndrome is a deficit in phonological representation of words; these fundamental issues with timing and auditory perception may play a role in this (Leong & Goswami, 2014).

6. Method and Procedures

This section includes the study Approach, its variants, its society, the method of selecting its sample, the study tools and its design, the statistical treatments, and the application procedures, which are as follows:

6.1 Study Approach

The present study aimed at identifying the change in the sample of the students after exposure to a computer-aided learning program, comparing it with the non-computerized education strategies, and then comparing the results to the effect of applying the computerized program, which is the main experiment in the present study. Therefore, the researcher used the experimental method to prepare the necessary study tools and to select the sample of the study from the schools in which he will be tested. Therefore, my sample chose the experimental and control students with learning difficulties in the schools chosen to complete the steps of the experiment, by conducting the Pre test, and applying the experiment, which in the current study is a computerized educational program. And then conduct the test of achievement to make comparisons between students sample of the study before the experiment and then to verify the success of the experiment under study.

6.2 Study Variables

The study included the following variables:

The independent variables in this study are:

Method: Using computer software, and non-computerized methods

2. Sex: Male and Female

The dependent variable: the effect of the computerized program in - the achievement of students in reading skills

6.3 Study Society

The research population comprises fourth-grade students with learning difficulties who are referred to the learning resource rooms in public schools under the Directorate of Education.

6.4 The Study Sample

Ninety students at Zarqa Governorate schools who were identified as having learning disabilities and who were subsequently referred to the learning resource rooms based on the procedures followed were included in the study's sample. These students had all taken the diagnostic tests recommended by the Ministry of Education. Some schools use intelligence tests as part of their assessment process, while others use monitoring lists, cognitive tests, interviews with families, and non-standardized collection tests developed by resource room teachers or the department's supervision department.

The study's factors informed the researcher's selection of 90 pupils for the sample. He split the class in half, with one half receiving instruction in computer-assisted reading skills from a pilot and the other half receiving instruction in reading skills from a student who does not use computers.

Table 1. The distribution of pupils in the two study samples

| The group | Sex       | Teaching method | The Number |
|-----------|-----------|-----------------|------------|
| Experimental | Male Female | Computerized | 20         |
|            |           |                 | 25         |
| Officer | Male Female | Traditional | 20         |
|            |           |                 | 25         |
| Total    |           |                 | 90         |

The purpose of the research was to compare the efficacy of various methods of teaching reading skills to those of identifying the most effective approach for persons with learning difficulties. The researcher started testing the students' reading abilities before and after teaching them reading skills using a computer program in the experimental group, and after using non-computerized methods with the control group, all based on the study's variables.

6.5 Statistical Processes
In order to calculate the mathematical mean, standard deviation, and analytical value, the researcher utilized SPSS, which stands for Statistical Package for the Social Sciences.

In order to determine the significance level for the post-test, we compared the mathematical averages of the findings from the control and experimental groups, as well as those from the experimental group's male and female members. Using the Cronbach alpha equation and the Pearson correlation coefficient, the test was conducted in an honest and forthright manner. The mathematical averages of the arbitrators' replies to the paragraphs' validity have been used as the proportion of their agreement on the arbitration terms of the trends. The standard deviations and mathematical averages now use the percentages of replies to these surveys.

6.6 Skills Measured by the Test
- Understanding
- Analysis
- Installation

7. Results and Discussion

Kids with unique requirements, such as learning difficulties, are the focus of this study, which aims to build an online learning program within the framework of creating effective teaching strategies for these kids. Reading comprehension, computer-assisted learning attitudes among students, instructors, and parents, and the efficacy of remediation for learning difficulties are all variables that this program aims to quantify. The researcher obtained the following results after running the software and examining the data:

7.1 Results Related to Pre Experiment

In order to make sure that both the experimental and control groups were on equal ground in terms of achievement, the researcher gave each group the Pre test and then calculated the means and standard deviations of the students' scores based on their gender. Here are the results:

Table 2. The analysis of the test results of the experimental and control groups

| The group | The Number | Mean | Standard Deviation | Standard error | Value t | Degree of freedom | Level of significance |
|-----------|------------|------|--------------------|----------------|---------|--------------------|-----------------------|
| Experimental | 50 | 47.35 | 5.54 | 1.25 | 0.324 | 52 | 0.849 |
| Control | 50 | 48.98 | 3.25 | 1.14 | | | |

Based on the calculated arithmetic means of the experimental and control groups (47.354 and 48.984, respectively), and $T = 0.324$, which is not statistically significant at the predetermined significance level of 0.849, the results are not conclusive. The absence of statistically significant differences in the pre-test results between the two groups suggests that they are equivalent.

Results regarding the study's initial hypothesis This hypothesis posits that the implementation of the computerized educational program does not result in a statistically significant difference (at the 0.05 level of significance) between the mean scores of students in the experimental and control groups on the achievement test for reading skills (comprehension, analysis, and composition) in the post-test. In order to ascertain this hypothesis, the average and standard deviation of the post-test scores of the experimental and control groups were initially calculated. Then, the following comparison of the two groups' reading proficiency indicators—comprehension, analysis, and composition—was made:

Table 3. Mathematical averages, standard deviations of the total score and reading skills in the post-test

| The group | The Number | Mean | Standard Deviation |
|-----------|------------|------|--------------------|
| Total mark | Experimental | 69 | 6.4 |
| Control | 47 | 7.5 |
| The comprehension skills | Experimental | 66 | 8.1 |
| Control | 54 | 7.0 |
| The analysis skills | Experimental | 61 | 7.3 |
| Control | 44 | 6.4 |
| composition Skills | Experimental | 70 | 9.8 |
| Control | 49 | 6.1 |
The experimental group benefited from a higher mean total score, as seen in the table above (22). The mathematical averages as well. The following reading abilities were examined: The control group had a twelve-point mathematical advantage in the verbal competence. The experimental group had a higher mathematical average in the comprehension skill, at around 14. The experimental group had a higher mathematical average of around 31 marks in the analysis skill. The experimental group had a higher mathematical mean of approximately 21 marks in the composition skill. The experimental group outperformed the control group on all measures, including the total score and the reading skills scores that were examined in the study (composition, analysis, and understanding). The control group had a higher mathematical mean of linguistic ability.

To find out the significance of these differences, T - Test was used as shown below, With regard to the total marks of the post-test of the experimental and control groups, the results were as in the following table:

Table 4. Shows the comparison of the post-test markers of the experimental and control groups

| The group   | Number of students | Mean | Standard Deviation | Standard error | Value t | Degree of freedom | Level of significance |
|-------------|--------------------|------|--------------------|----------------|---------|-------------------|-----------------------|
| Experimental | 30                 | 69   | 7.82               | 1.52           | 0.416   | -8.136            | 0.000                 |
| Control     | 30                 | 47   | 10.81              | 2.06           | 0.416   | 0.416             | 0.000                 |

After comparing the mathematical averages of the two groups, it was discovered that there was a significant difference in the post-test results between the experimental and control groups. This was particularly true for the experimental group, as indicated by the value of T = 0.416 and the level of significance = 0.000 at the significance level (α = 0.05).

7.2 Results for the Second Hypothesis of the Study

The hypothesis states that the mean scores of males and females in the experimental group on the post-application scale of achievement in reading skills (verbal, comprehension, analysis, and composition) do not differ statistically significantly at the 0.05 level of significance. This lack of difference is attributed to the sex of the pupils. The mean scores and standard deviations of the aggregate scores of the male students in the experimental group were calculated and compared to the results of the female students in the post-test in order to validate this hypothesis. Subsequently, on the post-test, compare the male and female signs in the following reading skills categories: pronunciation, comprehension, analysis, and composition:

Table 5. Shows the comparison of male signs with female signs of the experimental group in the post-test

| Total marks | Number of students | Mean | Standard Deviation | Standard error | Value t | Degree of freedom | Level of significance |
|-------------|--------------------|------|--------------------|----------------|---------|-------------------|-----------------------|
| Male Female | 20                 | 58   | 8.52559            | 2.00128        | -3.214  | 24                | .000                  |
|             | 25                 | 71   | 9.21851            | 2.07031        |         |                   |                       |

Table (5) shows that the male arithmetic average of male performance in the experimental group reached the post-test (58) compared to the average female performance (71), which is the largest (13) mark. And the value of T = -3.214, with a significance level of 0.000, which is statistically significant at the level (α = 0.05) for females.

8. Discussion of Results

The purpose of this research was to determine whether a computer program was successful in improving the reading ability of third graders who had reading problems. The purpose of this study was to compare the reading abilities of students in two groups—those who were taught reading skills using a computer program and those who were not—before and after receiving instruction in reading skills in two different ways. The study arrived at the results revealed in the previous chapter by extracting data linked to the courses of study using the statistical application SPSS. Both of these aspects pertaining to the study arrangements will be examined in this chapter.

8.1 Discussion of Results Related to Tribal Testing

The results of the tribe test indicated that there are no significant differences between the groups, suggesting that the two groups are equal, since the value of T = 260 is not statistically significant at the level of significance (α = 0.05).
Discuss the area results with the first hypothesis of the study:

In regards to the first study hypothesis, it asserts that no statistically significant difference exists at the level (\(\alpha = 0.05\)). On the post-application exam of learning achievement in reading skills (pronunciation, comprehension, analysis, and composition), the experimental and control groups' average scores were measured. Results for both the test and control groups were averaged and their standard deviations calculated. A mean improvement of 26 points was observed in the performance of the students in the experimental group as compared to the average performance of the control group. The average performance of the students in the experimental group in the cognitive skill was found to be (22) when compared to the average performance of the control group. The average performance of the students in the experimental group in the analysis skill was 31% higher than the average performance of the students in the control group. The average composition performance of the students in the experimental group was twenty-one points higher than the average composition performance of the students in the control group. This serves as evidence of:

- Students with learning difficulties in this study tend to use new teaching strategies in learning reading skills.
  - The ability of students with learning disabilities participating in this study to learn computer-aided reading skills.
  - The interactive component of the computer program can be used to teach learning disabilities as it is used for ordinary students, with the difference in how training is prepared and focused.
  - The design of the program, which was based on the transfer of the textbook as it is, with a change in the method of assessment to suit the abilities of students with learning difficulties, make students ask to return the words and sentences that they did not mastered from the first time, to avoid their mistakes in the answer to questions, Or to dissolve the exercises, the student was afraid every time of the phrase (try again). In other words, the accompanying reinforcement method had a positive and effective role in trying to acquire the skills accurately and avoid mistakes as much as possible. The principle of reinforcement is the foundation of programmed education.
  - Students with learning difficulties on the computer lab are motivated to drive towards learning. Computer programs, including pictures, sounds and movements, can be considered as a means of learning through play.
  - The results of the experimental sample students on the results of students in the control sample may be due to the fact that the use of computers in education helps to reduce the problem of ADHD among people with learning disabilities in general.

Table 6. A comparison of male signs with female marks shows the skill of pronunciation in the post-test of the experimental group

| Skill marks pronunciation | Number of students | Mean | Standard Deviation | Standard error | Value t | Degree of freedom | Level of significance |
|---------------------------|--------------------|------|--------------------|----------------|---------|------------------|----------------------|
| Male          | 20                 | 39   | 5.91               | 2.7            | -1.58   | 24               | .046                 |
| Female        | 25                 | 48   | 6.74               | 3.9            |         |                  |                      |

Table (6) shows that the mean average male performance in verbal skill in the experimental group was in the post-test (39) compared to the average female performance (48), which is the largest (9) marks and the value of \(T = -1.58\), and the level of significance =0 .046, which is significant at the level (\(\alpha =0.05\)) for the benefit of females.

Table 7. The comparison of male signs with female marks shows the skill of understanding in the post-test of the experimental group

| Signs of understanding skill | Number of students | SMA  | Standard Deviation | Standard error | Value t | Degree of freedom | Level of significance |
|-----------------------------|--------------------|------|--------------------|----------------|---------|------------------|----------------------|
| Male | 20                 | 37   | 15.91              | 3.49           | -2.375  | 24               | .034                 |
| Female | 25                 | 59   | 11.50              | 3.88           |         |                  |                      |

Table (7) shows that the mean average male performance in verbal skill in the experimental group was in the
post-test (37) compared to the average female performance (59), which is the largest (22) marks and the value of T = -2.375, and the level of significance =0.034, which is significant at the level (α = 0.05) for the benefit of females.

Table 8. The comparison of male signs with female marks shows the skill of analysis in the post-test of the experimental group

| Signs of skill analysis | Number of students | Mean | Standard Deviation | Standard error | Value t | Degree of freedom | Level of significance |
|------------------------|--------------------|------|--------------------|----------------|---------|-------------------|-----------------------|
| Male Female            | 20                 | 52   | 8.74               | 1.41           | -2.375  | 24                | .038                  |
|                         | 25                 | 69   | 4.82               | 1.57           |         |                   |                       |

Table 8 shows that the mean average male performance in verbal skill in the experimental group was in the post-test (52) compared to the average female performance (69), which is the largest (17) marks and the value of T = -2.375, and the level of significance =0.038, which is significant at the level (α = 0.05) for the benefit of females.

Table 9. A comparison of male signs with female marks shows the skill in the post-test of the experimental group

| Skill marks composition | Number of students | Mean | Standard Deviation | Standard error | Value t | Degree of freedom | Level of significance |
|-------------------------|--------------------|------|--------------------|----------------|---------|-------------------|-----------------------|
| Male Female             | 20                 | 57   | 7.46               | 1.64           | -3.984  | 24                | .000                  |
|                         | 25                 | 72   | 4.29               | 1.85           |         |                   |                       |

Table 9 shows that the mean average male performance in verbal skill in the experimental group was in the post-test (57) compared to the average female performance (72), which is the largest (15) marks. And the value of T = -3.984, and the level of significance =0.000, which is significant at the level (α = 0.05) for the benefit of females.

8.2 Discussion of the Results of the Second Hypothesis of the Study

This hypothesis states that there is no statistically significant difference at the level (α = 0.05) between the mean scores of male and female students of the experimental group on the scale of achievement in reading skills: (pronunciation, comprehension, analysis, and composition). The post-application, is attributed to the sex of pupils.

On the basis of the results, the mean of the female signs in the total score was greater than the male signs by (9) marks.

The arithmetic mean of female scores in the skill scores was greater than that of males by 17 marks. The arithmetic mean of female marks in the skill marks was greater than that of males by 15 marks.

These results can be explained by the following:

1. It seems that the results of the females in the experimental group were better than those of the males. This finding is in line with previous research showing that girls learn language better than boys. Additionally, there are more girls than boys who have trouble reading. Despite men's supposed superiority in areas like mechanical comprehension and spatial cognition, many still hold the view that women are more naturally gifted when it comes to linguistic skills. The massive amounts of data collected by McCupey and Jacqueline in this area corroborate the existence of substantial disparities in the maturation of languages. Girls reclaim their high school diplomas at about the age of 11, while another study found that girls have a distinct advantage in language ability from a young age. By the third year of life, boys start to attach themselves to girls. Females started talking before boys, according to observations gathered on all children, including those with normal, articulate, and weak heads. Research also shows that girls are far less likely than boys to experience reading difficulties or speech issues across all age groups. When it comes to reading speed, matching comparable words and tables, and rearranging and complementing phrases, girls consistently outperform boys. This outperformance in reading speed and other areas of brute intelligence is likely due to girls' greater proficiency in language and verbal skills.

2. Women in the test group had better outcomes than those in the control group.
3. Students with learning disabilities, whether they were male or female, had a better chance of learning to read utilizing new tactics that could lead to improved educational outcomes in the experimental group, where male results were higher than control group results because of the variable teaching style.

9. Study Proposals

Some suggestions were made in the light of the study's findings:

1. Invest the computer program in teaching reading skills, which proved effective in the presentation of lessons, and the method of evaluation.
2. Conduct more research and field studies in the field of learning difficulties, not for the sake of study and to benefit the researcher, as much as the goal is to serve people with learning difficulties already.
3. The preparation of educational programs for children with special needs, including those with learning disabilities, to help them overcome some of the academic problems they suffer from.
4. Emphasize the need to train teachers and teachers of special education, including teachers and teachers of learning resource rooms on the use of computers in the education of students who deal with them.
5. Conducting research studies for a number of studies in the field of computerized education for people with special needs for long periods, as in the case of some foreign studies, because of its usefulness through which the evaluation of Arab studies and the development of work in the fields of special education.
6. The possibility of benefiting from the program in the future in the field of training teachers in the use of computers in education.

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