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A STUDY ON IMPACT OF COMPUTER ASSISTED EXERCISE AMONG DYSLEXIC CHILDREN IN THE SPECIAL SCHOOL

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ABSTRACT

Today's digital youth experience a constant influx of new computer-based technology. Children have extensive and quicker access to global trade, communication, and culture. In order for students to engage in and compete in the increasingly complicated technology environment, schools must prepare them to handle the significant changes. The advantages of computer-based technologies for capable children are quickly acknowledged by society. However, children with disabilities may receive more advantages from computer-based technologies. The ability to use computers with ease is strength for students with learning difficulties and related conditions that enables them to overcome extremely tough areas, such as reading and writing. Computer programs allow for individualized instruction and are encouraging. It gives children time to reflect on reading passages and promotes automaticity. The quantity and caliber of computer programs for teaching reading have dramatically increased as a result of the slow rate of improvement in computer technology. Literacy is taught using words, phonics, vocabulary, reading comprehension, and reading rate improvement via computer applications. Computer technology advancements can assist students in overcoming their reading challenges. Young children can benefit from using computers to build their independence, self-help abilities, motor control, linguistic skills, cognitive abilities, and other precursor skills. Children with disabilities can make decisions and manage their environment thanks to computers. Cooperative computer games can promote social skills as well. As a result, the significance of computer-assisted exercise and its function in helping dyslexic youngsters develop their cognitive abilities, such as attention, memory, reasoning, and language, is understood, which is the motivation behind the current study.

KEY WORDS: Communication, Computer, Learning Difficulties, Technology

INTRODUCTION

The public education programs had quickly spread across the country by the 1960s and 1970s. This necessary growth was aided by a number of factors, including family pressure, an increase in professional knowledge, the availability of teacher preparation programs, and the first state statute passed for students with learning difficulties. The majority of the early special education programs were designed for elementary school pupils, who were thereafter enrolled in specialized courses in accordance with the then-standard special education delivery model. Resource room programs for people with learning difficulties were created later during this time. In order to support the increased number of pupils in the school who were classified as having learning difficulties, a variety of new assessments and instructional tools were created during this time.

THE CURRENT PHASE: EMERGING DIRECTION

Today's kids with learning difficulties are impacted by a variety of important challenges. One should anticipate numerous shifts in the field's direction as well as the emergence of fresh notions and ideas. Some develop naturally from ongoing projects, others are the result of flaws in earlier programs, while yet others are the result of external pressures. This stage focuses on current developments, including computer technology, high-stakes testing, inclusion practices, and supporting culturally and linguistically diverse students.

THE TRANSITION PHASE: CLINICAL STUDY OF CHILDREN

During the transitional period (about 1930–1960), clinical investigations of children were combined with scientific research on the brain to create new approaches to education. Instruments for assessment and correction were developed by psychologists and educators. They also researched particular varieties of learning problems during this time.

Many scientists contributed significantly to the development of the field. They included neurosurgeon Orton (1937), whose idea that children's language difficulties are caused by a lack of cerebral dominance resulted in the creation of the Orton-Gillingham method of instruction. Today, the field of learning difficulties is actively dominated by the Orton Dyslexia Society, which was founded in Orton's memory and to carry on his work. By founding a remedial clinic at the University of California, Los Angeles, where she created a remedial method of teaching reading and spelling, Fernald (1943), as an educator, also made a contribution to this time. In order to promote learning and cognitive development in

children, Montessori (1964), a physician who worked with fragile young children in Italy, highlighted the value of employing properly thought-out materials and an organized atmosphere.

Cruickshank, Barsch, Frostig, Kephart, Kirk, and Myklebust are a few additional pioneers who contributed to the growth of the field of learning impairments during this time. The condition was described using a variety of terms during the transition phase, including learning impairments, Strauss syndrome, minor brain malfunction, and brain wounded children. The evolution of words corresponds to the historical development of the subject. While each term served a purpose in its time, they all had drawbacks.

THE BRAIN-INJURED CHILD

By designating these children as brain-injured children, Strauss and Lehtinen (1947) created a new category of children. A large number of these children had previously been labeled as emotionally unstable, autistic, aphasic, or behaviorally maladjusted. The majority of them displayed such extreme behavioral traits that they were kept out of the public schools. (At the time, public schools had the legal authority to bar students with disabilities.) Additionally, these children's medical records revealed that they had occasionally experienced prenatal or postnatal brain injuries.

Strauss (1947), who sought a medical explanation for the behavioral traits, hypothesized that the children's behavior and learning styles were signs of brain damage. This theory was novel at the time because many of these children's behavioral anomalies had previously been attributed by other specialists to emotional causes. Strauss (1947) further conjectured that other kids who displayed traits akin to those of his study participants had also experienced a brain injury.

According to Strauss (1947), a child's brain injury could happen at any time during the three stages of development: before birth, during the prenatal stage, during childbirth, or some time following. An illness like German measles (rubella), which the mother contracted early in pregnancy and which had an impact on the fetus, is an example of an injury that occurred before delivery. Any circumstance that would significantly restrict the infant's supply of oxygen during the birth process is an example of a birth injury (anoxia). After birth, the brain may suffer damage from a concussion or a fever that is too high throughout infancy or

the early years of childhood. While Strauss believed that such occurrences might also cause behavior and learning issues, he acknowledged that they could also result in other disabilities (like physical or mental impairments).

COMPUTER-ASSISTED EXERCISE

The researcher created the computer-assisted exercise based on the Human Environment/Technology Interaction Application. The computer-assisted exercise receives technical support from certified software development experts. The program was created in a Windows environment. The application is 135 MB in size. The program has twenty games, and each game has its own unique program loop. Dot Net, Adobe Photoshop CS3, Microsoft Visual Studio, and Adobe Flash with Java Script are used to create programs.

The computerized cognitive and reading program PSGCAS COMPUTER-ASSISTED EXERCISE helps students improve their attention, memory, reasoning, and language skills. To make the activity more pleasurable for the study's young participants, it is presented as a game. Each component of the exercise is made to target certain areas of brain function. The current computer-assisted exercise covers four cognitive abilities. They are language, logic, memory, and attention. Memory includes compensatory memory (four minutes), remembering names (four minutes), visual pair memory (twelve minutes), visual pattern memory (four minutes), and memory for direction (four minutes). Attention includes auditory attention (four minutes), hierarchical attention (four minutes), perception of sound (four minutes), perceptual attention and discrimination (four minutes), and visual attention and discrimination (four minutes) (four minutes). It is constructed with a progression of difficulty.

RESEARCH METHODOLOGY

The planning of the research is the topic of the current chapter. The research design, instruments employed, sample selection, dependability, pilot study, and data collecting and statistical analysis is all covered in detail.

RESEARCH DESIGN

SELECTION OF SAMPLE OF DYSLEXIC CHILDREN IN THE SPECIAL SCHOOL

It is determined to only include the schools with more than thirty students in the nine to sixteen-year-old age range in order to have a fair representation. The schools with computer resources are chosen since the current study will use PSGCAS COMPUTER-ASSISTED EXERCISE (maximum of seven computers). The sample consists of eight special schools with a total enrollment of 275 students. Even though, one of the special schools meets the criteria for inclusion in the sampling, the investigator was not allowed to carry out the intervention. 230 kids are identified as dyslexics in the current study with the use of the dyslexia screening test. When explanations are offered concerning the computer-assisted activity, thirty out of the 230 participants are unable to comprehend its substance. Two hundred dyslexic students from each school are selected for the study. One hundred of them make up the experimental group, and another one hundred form the control group.

PILOT STUDY

A pilot study is conducted before the main investigation is started. The pilot study made sure that non-sampling error was under control and that "Local Control" was improved in the experimental design (Fisher, 1947)

The following are some of the goals of the pilot study:

- Determining the accuracy of the computer-assisted exercise for the variables attention, memory, cognitive reasoning, and language.
- Increasing the trust in the current investigation's ability to build relationships with the samples, effectively convey instructions and directions to the samples, and get the samples' honest responses; developing a time and cost schedule to finish the final study by estimating the amount of time and money needed to collect data for the pilot study.

PILOT STUDY SAMPLE

A group of fifty dyslexic kids receive social proforma. After receiving the data, the Talland Letter Cancellation Test and the Binet-Kamat Test for Intelligence are performed. They are

split into 25 pieces for the experimental group and 25 pieces for the control group. While the experimental group receives the unique training, the control group is just required to continue with their regular training. Children with dyslexia are divided up into batches because they have trouble reading. They receive instructions, receive assistance from a computer during a computer-assisted exercise, and have their scores meticulously recorded. Their questions are answered there and then. The next batch is not called until the previous batch has finished responding. The information is also gathered directly from each dyslexic youngster. The Human Environment/Technology Interaction Application serves as the foundation for the development of the computer-assisted exercise. Twenty exercises make up this intervention item, which is used in the study. Three months' worth of training sessions total one hour and 36 minutes. Following the three-month intervention, the experimental group and the control group get another administration of the Binet-Kamat Test for Intelligence and the Talland Letter Cancellation Test as post-tests.

RESULTS AND DISCUSSION

DEMOGRAPHICAL CHARACTERISTICS

Multiple techniques could be used to evaluate an instrument's validity (Guilford, 1987). The constellation of the factors included under one rubric in the profile was meaningfully characterized by the correlation between the dimensions and the overall score.

According to the actual data gathered for this study, the findings indicate that the demographic features can be relied upon with validity. The Binet-Kamat Test found acceptable and positive intercorrelations between all of the pre- and post-test dimensions. With the exception of the association between language in the pre-test, all of the dimensions had strong and substantial correlations with the aggregate scores.

The sample characteristics are presented in the first section of the chapter, and the findings of the Binet-Kamat Test of the experimental group's inter-correlation between the dependent variables are shown in the second section. The comparison of the experimental group's and the control group's pre- and post-test scores with the variables is explained in the third section. The final section compares the experimental group's age and gender to the variables.

CHARACTERISTICS OF THE SAMPLE

The characteristics of the sample used in the primary study are described in this part, including age, sex, place of residence, family type, and number of children, birth order, parents' occupations, and family's monthly income.

Table -1 lists the age distribution of the sample's makeup.

TABLE 1: DISPLAYS THE AGE OF SUBJECTS IN THE SAMPLE

S. No	Age	N	Percentage
1.	9-10	75	25
2.	11-12	75	25
3.	13-14	75	25
4.	15-16	75	25
	Total	300	100

The respondents' ages range from 9 to 16, as may be observed in the aforementioned table 1. There is an equal distribution of each subject. 25% of the individuals are between the ages of 9 and 16 years old.

Table 2 provides the subjects' sex information.

TABLE 2: DISPLAYS THE SEX OF SUBJECTS IN THE SAMPLE

S.No	Sex	N	Percentage
1.	Male	221	73.66
2.	Female	79	26.33
	Total	300	100

It is clear from table 2 above that there are 73.66% male subjects and 26.33% female individuals.

The residence of the sample's Subjects is shown in table 3.

TABLE 3: DISPLAYS THE DOMICILE OF SUBJECTS IN THE SAMPLE

S.No	Domicile	N	Percentage
1.	Urban	217	72.33
2.	Sub-urban	60	20.00
3.	Rural	23	7.66
	Total	300	100

In accordance with the data in table 3 above, 72.33% of the subjects live in urban areas, followed by 20% in sub-urban areas and 7.66% in rural areas.

Table 4 in the primary study provides information about the type of family.

TABLE 4: DISPLAYS THE SUBJECT'S TYPE OF FAMILY IN THE SAMPLE

S.No	Type of Family	N	Percentage
1.	Nuclear	258	86.00
2.	Joint	37	12.33
3.	Extended	5	1.66
	Total	300	100

Table 4 above shows that 86% of the subjects are members of nuclear families, 12.33% are members of joint families, and 1.66% are members of extended families.

In table 5, the number of children of the subject is given

TABLE 5: DISPLAYS THE NUMBER OF CHILDREN OF SUBJECTS IN THE SAMPLE

S. No	No. of Children	N	Percentage
1.	1	171	57.00
2.	2	63	21.00
3.	3	45	15.00
4.	4	21	7.00
	Total	300	100

Table 5 above makes it clear that 57.00% of the subjects are from single-child families, which indicates that the greatest number of members of this group participated in the study; 21% are from two-child families; 15% are from three-child families; and 7% are from four-child families, which indicate the lowest percentage of the group.

The reliability of the computer-assisted exercise is one of the key components of the current research's strategy. To ensure that the computer-assisted exercise in this study has appropriate dependability and may be considered as valid, rigorous statistical tests were conducted.

ATTENTION

The results of the t-test show that there is a significant difference between the experimental group's pre-test and post-test scores, but not between the control group's pre-test and post-test scores. No discernible difference was discovered between the experimental group and the control group at the pre-test; however the experimental group outperformed the control group at the post-test. The experimental group's males and girls showed no discernible differences. Additionally, there is no discernible difference in the experimental group's age groupings according to the f-ratio.

Hypothesis 1: Between the experimental group's pre-test and post-test, there is no discernible difference in attention.

TABLE: 6. DISPLAYS MEAN, STANDARD DEVIATION AND 'T' VALUE OF THE EXPERIMENTALGROUP FOR PRE-TEST AND POST-TEST IN ATTENTION

Variable	Experimental group	N	Mean	Standard Deviation	't' value	Significant value
Attention	pre test	150	24.15	15.10	7.857*	0.000*
	post test	150	34.84	13.06		

* - p<0.05

The't' value between the experimental group's pre-test and post-test attention scores is shown in the aforementioned table (t = 7.857). The't' value is discovered to be significant at the 0.05 level. This table indicates that there is a substantial difference in the experimental group's attention scores between the pre-test and post-test. Therefore, the aforementioned hypothesis that there is no discernible variation in the experimental group's attention between the pre-test and post-test is disproved.

CONCLUSION

The findings are significant and consistent with those of numerous other investigations. The randomized control trial demonstrates the viability of implementing computer-based therapies for attention in a school context and gives preliminary evidence of their efficacy. The most well-liked kind of brain training involves computerized cognitive activities. Children with attentional issues improved in measures of attention in a controlled trial evaluating the impact of computerized instruction and attention training, with more severe symptoms showing larger improvements. In a different study, children with attention deficit hyperactivity disorder improved academically and had less symptomatology than controls after playing games that engage all three attention networks. Both the mild traumatic brain injury and attention deficit hyperactivity disorder groups on the IV A Continuous Performance Test significantly improved their full scale attention and full scale response control scores compared to the control groups. Only the experimental group showed a substantial improvement in intellectual functioning (p.01) as judged by the full scale and performance I.Q. scores on the Jackson's Multidimensional Aptitude Battery. This is a sign

of the potential advantages of a computerized cognitive skills training program that emphasizes executive, attentional, visuospatial, and problem-solving abilities. Both individuals with only attention issues and those with both attention issues and cognitive impairment made improvements. These studies confirmed the Captain's Log computerized cognitive training system's effectiveness in enhancing participants' capacity for sustained attention, encoding and retrieving visual and aural information, and quickening mental processing. Compared to the control group, children who underwent computerized training displayed greater post-training increases in the effects of attention on brain processing. A substantial effect size (Cohen's D = 0.8) and a specific alteration in the signal amplification of attended stimuli were indicative of the heightened effect of attention on brain processing. These results suggest that training can correct the brain mechanisms of selective auditory attention, which have been previously demonstrated to be lacking in children with specific language impairment, and can accompany improvements on standardized language assessments. Steven, C. et al. (2008) Games have been demonstrated to enhance cognitive capacities in younger individuals in areas like visual attention. According to the study's results, the experimental group showed a considerable improvement in attention on the Talland Letter Cancellation Test following three months of software-based training. The findings thus indicate a hopeful outlook for kids with inadequate attention skills; multimedia computer design is another instructional aid. It presents computer-assisted instruction as a viable alternative to traditional teaching methods and is adaptable and simple to use (Howell & Navarro, 1997). The appropriate practical significance of this effect would be significant since childhood attention resource consolidation would prevent learning problems in adulthood.

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