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## The effects of using Information and Communication Technologies instead of traditional paper based test, during the examination process, on students with Dyslexia.

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### Abstract

Dyslexia is a type of Specific Learning Disability (SLD) that affects the educational development of a student, as it is the reason of difficulties not only in writing or reading but also in other disciplines like Mathematics. Research has proven that Information and Communication Technologies (ICT) can have a positive effect to the educational development of a dyslexic student.

In this paper, twenty 6<sup>th</sup>-grade primary-school students were observed while using computers during exams - ten with dyslexia and ten with no SLDs. All students were called to solve a digital test and a paper test that were including some basic mathematic operations. The researcher recorded and examined the differences between the results from the two tests. Descriptive and deductive statistical analysis showed that students had better results when examined via a computer compared to a traditional written examination.

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## 1. Introduction

The sector of Specific Learning Disabilities has been differentiated in the last decade. According to relevant research data, a large group of students with SLD deals with difficulties in reading. These difficulties are defined as Developmental Reading Disorder – Dyslexia (for example: Critchley [4]; Porpodas [18]; Jakobson [9]; Snowling [23]; Reid [20]; Mponti [14]). According to literature review it is known that the study of Dyslexia is an inter-scientific matter that could be approached in various ways. It would be most beneficial, instead of considering them contradicting, to consider them as complementary to each other (Anastasiou [2]) so as to gain advantages in the field of intervention.

An effective intervention programme, apart from suggesting differentiated teaching techniques, should be including the use of teaching material that will be adapted to the needs of every student (Tomlinson [24]). Part of this material is also the process of assessing – examining the progress of the student, as well as the tools that the teacher will use in order to achieve this. According to Mavromatis et al. [12], the tools for student assessment that are traditionally used in the Greek school are not enough to cover the special educational needs of all students.

The Greek educational system, not being able to get modernized and adapted to the requirements of the technological developments of the last decades, has not managed to incorporate ICT in all stages of the educational process. The most indicative example is that of the report of European Education Audiovisual and Culture Executive Agency-EACEA [5], in which it is stated that Greece is one of the few European countries that do not use computers in the examinations process. The researcher, by taking into consideration the large number of students with Dyslexia, the lack of use adapted practices of assessment and the absence of ICT from the examinations, has proceeded to this research. The present study's main target is to highlight the need of using computers in the examination process.

## 2. Body

### 2.1. Aim of research

This research was conducted in the light of the fact that students with Dyslexia represent a large subgroup of all the students in a school, as well as the lack of ICT use during the assessment process. The main objective of the present study is to collect and compare data that show how dyslexic students respond when they use ICT instead of a traditional paper based test during an examination process. To collect the necessary data, the researcher designed and created two non standardized tests, one in digital form and the other in paper form, both included basic mathematical operations. The differentiation from previous researches was that the digital test had the same format as the paper test, without any interactivity and feedback during the examination process.

### 2.2. Research Reliability

Reliability is the overall consistency of a measure and can be defined as the probability of getting similar results under consistent conditions (Kirazi [10]; Robson [21]). The assessment tool that was used has a high degree of internal consistency since the index Cronbach Alpha is 0.925. Inductive statistics and software SPSS v.17 were used for the conclusions. Moreover, the maximum significance level for the measurements was set to be  $p < .05$  and the minimum correlation level was set up to be  $r > .38$  because the sample was consisted of 20 subjects (Walter[25]).

### 2.3. Research questions

Students with Dyslexia, very often can lose their concentration and face lots of problems when recalling mathematical procedures and sequences of operations (Anastasiou [2]; Agaliotis [1]; Mponti [14]). Previous researches showed that some students who use ICT daily in order to support their studies can achieve higher performance and increase their leisure time (Rocheleau [22]; Raptis & Rapti [19]). However, the use of computer in the examination procedure, and not during the study may contribute to a better concentration of students? According

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