

Impact of information and communication technologies on teaching-learning processes in children with special needs autism spectrum disorder.

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Abstract. This research determines the impact of the use of information and communication technologies (ICTs) in students with special educational needs (SEN) in the specific case of children diagnosed with autism spectrum disorder (ASD) in their academic performance. Its objectives were to determine the educational benefits of ICTs and to evaluate their use. The previous premises were approached as a starting point by collecting bibliographical material to conceptualize the variables to be treated. Subsequently, a sample was taken for convenience, with a descriptive, analytical - synthetic tendency; surveys were developed and applied to teachers and students. After the application of the instruments was evidenced as a problem, the lack of adequate teaching practices of ICT use, especially in children with ASD, was able to confirm the hypothesis, proving that more than sixty percent of the students improve their academic performance through teaching-learning processes that add.

Key words: Autism, Education, Teaching, NEE, Processes, ICTs, SEN.

1 Introduction

Students with special educational needs have certain conditions that make it difficult to abstract the concepts analyzed in class and generally require greater accommodations in the teaching and learning methods used. It is where the information and communication technologies play a key role in teaching as a differentiating element in the construction of innovative processes.

During the present academic year 2016-2017 in the SEK Educational Unit in the primary section it works with students with special educational needs diagnosed with mild autism spectrum disorder trying to know:

- The impact of the use in classes of the technologies of the information and the communication.
- The IT tools used in the teaching-learning process.
- Academic progress achieved in elementary students with special educational needs TEA children using ICT S as a tool in strengthening school activities

As an essential objective, this work seeks to analyze the use of ICTs, since it is considered that the use of TICs can be a primordial strand in the assimilation of knowledge.

In addition, it will be investigated in the determination of the incidence of the use of TICs in the school performance of students and in the identification of the educational benefits they provide, primarily in the students mentioned above.

The research work is organized in four sections; through the study of art will define the special needs of education, briefly explained is autism spectrum disorder and what are its characteristics, a tour is made to explain how information and communication technologies essentially in recent years have contributed to innovative processes of education and inclusion, through experimental research can demonstrate the established hypothesis, at the end of the research show the main conclusions, results achieved, and also state possible future lines of work.

2 Development

Since the definition of Kanner in 1943 and Hans Asperger in 1944, Autism Spectrum Disorder (TEA), has presented itself as a distant, strange world full of enigmas [3]

On the other hand, biological theory maintains that in the SEN there are one or several abnormalities in the brain and that these are produced by one or several biological factors such as: genes, complications during pregnancy or childbirth and viral infections. It is also stated that the medical disorders found in children and young people with autism, although they are diverse, share the trait of being associated with damages or cerebral dysfunctions[5]

ASD is a complex neurological disorder that usually lasts a lifetime. It is part of a group of disorders known as Autism Spectrum Disorders. Currently, 1 in 68 individuals and 1 in 42 boys are diagnosed with autism.[6]

On the other hand, living in this age also has its benefits, as many Information and Communication Technologies (ICTs) have been produced and developed which have had a very positive impact on the lives of people with this disorder. In fact, as some authors have commented, in recent years there has been an increased interest in learning how the teaching-learning process develops in people with ASD[7].

Within the framework of an optimistic position, computer technology and communication, plays an invaluable role, since it can provide the subject with the physical supports necessary for the development of their communicative, cognitive and affective partner potentialities; through it can achieve an approximation to three major objectives: autonomy, independence and inclusion, [8]

Also, there are technological resources based on the use of ICT specifically designed to enable the accessibility of people with disabilities. We will focus on these resources for their relevance in the subject and for the importance of disseminating them, and, above all, to boost the use of technology and make it a useful tool to improve learning through innovative pedagogical methods and techniques. [9]

The definition of special educational needs that we are promulgating in his book highlights students with SEN as those who present greater difficulties in accessing the

common learning at their age in relation to the rest of their group, noting that in most of these SEN are not only differences inherent in the student (s) who present it and cannot always be resolved by the classroom teacher without support from outside professions[20].



Fig 1: Teaching learning processes using ITCs .Source: Ministerio Educación

Author: Hospital classroom project

Despite the fact that current government policies in Ecuador promote an inclusive education that favors and encourages the inclusion of children and young people with different capacities [16]. The reality that the Children with ASD is different because ultimately those who have to take care of them within the classroom are the teachers, and they do not have the training and knowledge that this work demands.

It is of great importance to dwell on the benefits that the use of ICTs could have in acquiring the knowledge of ASD students, who have difficulty in internalizing them in various ways. This reality is evidenced as a problem for two specific conditions in our country, the first to mention is the limited access to technology that has the population, as evidenced by the website of the Guayaquil Chamber of Commerce in1:Figura1.

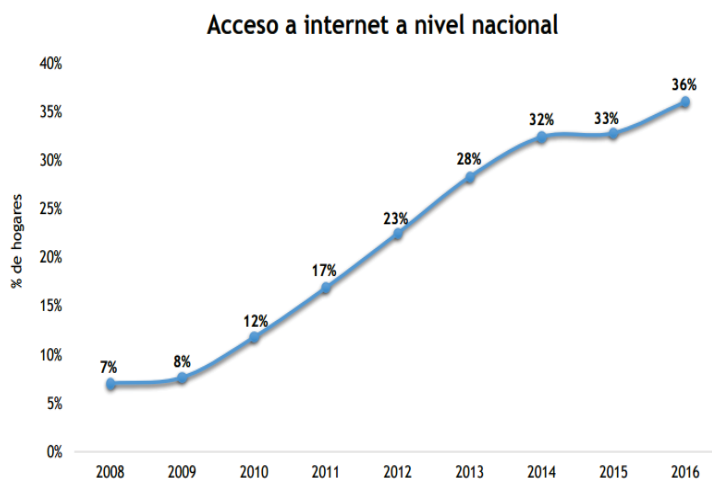


Fig. 2. Access to the internet at the national level. Source: Webpage Guayaquil Chamber of Commerce. Author: Guayaquil Chamber of Commerce

And the second and perhaps more worrisome is that there are certain teachers who are unaware of the positive impacts that can be caused by the use of ICTs, especially in students who have ASD, in order to better understand classroom content and the internalization of concepts Basic and primordial for the resolution of diverse problems. The educational institutions are in a constant process of change, they look for to offer better services to the community, to reach the excellence. The SEK Educational Unit located in the city of Quito during the academic year 2016-2017 has had students at the primary level, for this research we are in the third of basic where there are 3 students diagnosed with AS.

It is worth mentioning that the classrooms have technologies such as digital whiteboards, iPad's, internet, web page, Moodle platform, for student use; However in spite of having the mentioned technology, in certain cases it is not given an adequate use, taking advantage of the advantages that they can offer.



Fig 3: Students making use of TIC'S devices. Source: SEK Educational Unit. Author: Mónica Romero

The qualifications of students with special educational needs (SEN) are relatively low relative to those of their peers because they have certain conditions that make it difficult to abstract the concepts analyzed in class and require greater accommodations in the methods used in classes and in evaluations.

As an essential objective, this paper seeks to analyze the use of ICTs in students with ASD, because it is considered that the use of ICTs can be a primordial strand in the assimilation of knowledge. Additionally, it will be investigated in the determination of the incidence of the use of ICTs in the school performance of students with ASD and in the identification of the educational benefits of ICTs.

3 Methodology

3.1 Population

The population was chosen from the International School SEK in the same we located in the elementary students of third of basic respectively this study is formed by 56 people, divided into: 3 authorities, 10 teachers and 40 students of third of basic of the latter 3 are previously diagnosed with ASD. Five visits were made to the study center.

Table1: Study Population Source: SEK Educational Unit. Author: Mónica Romero

Fellows	Quantity
Autorities	3
Teachers of students with ASD in primary	10
Third-grade students from basic	40
SEN Students Diagnosed	3
Total	56

For this work, the sample will be used for convenience, which is a non-probabilistic sample, the participants are chosen for convenience of accessibility or proximity of the researcher, specifically the three students with special educational needs are chosen from the institution diagnosed with ASD. They are chosen because they are participants in the educational process and because they have the necessary tools to carry out the necessary implementations to carry out the use of ICTs in classrooms.

2.2 Research Design

The investigation was carried out using the procedure described below:

1. Construction of instruments.
2. Categorization of information.
3. Compilation of data.
4. Collection of information.
5. Selection of information.
6. Analysis of the data obtained.
7. Presentation of the data obtained.

General hypothesis

More than 60% of children with special educational needs improve their academic performance with the use of ICTs handled in class in the academic period 2016 - 2017.

Specific hypotheses.

1. A high percentage of elementary students with special educational needs benefit from the appropriate use of ICTs as tools in the teaching - learning process.
2. There are at least two academic progress achieved by students with special educational needs when using ICTs as a tool in strengthening school activities

Table2: Operationalization of the general hypothesis

Operationalization of the general hypothesis			
Variable	Conceptual definition	Dimensions	Indicators of measurement criteria
Use of ICTs in class	ICTs are used to support a curricular discipline or content.	Infrastructure Frequency	Connectivity Hardware IPad's Frequency of use of ICTs
Academy Performance	Qualitative and quantitative values through which there is an approximation to the evidence knowledge, aptitudes and values developed by the student in the teaching process through the ICTs	Quantitative Qualitative	Qualifications average Compliance Report

The investigative process was started with the construction of the instruments starting from the operationalization matrices of the general hypothesis, afterwards the categorization of the information was performed according to the variables.

The data collection phase revolves on the correct choice of instruments according to the previously performed categorizations, in order to carry out the collection of the information that is executed directly in the educational unit, in a personal way. The selection of the information is based on the reliability, the accuracy and the validity of the same, taking into consideration its origin.

In order to proceed with the analysis of the data obtained in a statistical manner following the analytical - synthetic method, concluding with the presentation of the data obtained to make a interrelation between them, extracting valid criteria for the verification of the hypothesis raised.

3.2 Data Collection Instruments and Techniques

As research techniques, the survey has been chosen for students with special educational needs diagnosed of the educational institution because they are considered descriptive research instruments that need to identify questions a priori To perform the selected people in a representative sample of the population, to specify the answers and to determine the method used to collect the information that is obtained

Direct observation in the classroom based on the collection of non-obstructive information regarding behaviors and processes.

In the student survey the following topics will be handled: Knowledge of the management of the technologies that the institution possesses, knowledge of special educational needs, benefit of the use of ICTs in students, frequency of use of ICTs as Tool to enhance education, academic performance, teacher training in technological

aspects and the relationship between their behavior and the use of ICTs in class. Teachers manage a survey based on the following topics: Institutional infrastructure, knowledge of the management of available technologies, students' SEN, training on ICTs and SEN, ICTs and the strengthening of school activities, frequency of use of ICTs and academic performance, benefit of ICTs in academic performance.

2.4 Data Analysis Plan

Excel software is used to make the results empty, to design the tables and graphical representations.

2.5 Procedure

The research will be descriptive, analytical - synthetic and propositional, according to because data will be gathered from students, teachers and managers about different aspects of the use of ICT in the Institution, then performing the analysis of the information collected and the measurement thereof.

It will use the quantitative methodologies to emit criteria in numerical terms that are evidenced in percentages to optimize their comprehension and qualitative because it has a social approach, where it is necessary to analyze behavioral and emotional factors of the students diagnosed with ASD, that influence in the educational process. To be used are:

Descriptive. - Data representation and characteristics of the research population, data are collected objectively and accurately, can be used averages, frequencies and other statistical information.

Analytical - synthetic. - The analytic seeks to separate the constituent elements of the phenomenon to investigate and the synthetic unites them to achieve a global understanding of the situation, seen from various perspectives.

4 Conclusions and Future Work

The information collected by the various instruments applied in the research give foundations to consider that the educational center under study has the technological infrastructure necessary to give students an avant-garde education.

Teachers have a professional training that guarantees their ideal level to perform as educators; however, there is evidence of mismatches between theoretical knowledge and teaching practice, at the time of merging special educational needs children with ASD and information technologies and communication. This requires new and precise methodological strategies to fulfill the premises of curricular adaptation.

The academic and strengthening benefits in school activities are undoubtedly enhanced by the use of technologies within the educational field. It is important to consider that within the educational community all contribute in the construction of knowledge and assimilation of the same, with more emphasis in the case of having students with special educational needs within the working group.

The academic progress is relative in each student, since having improved significantly, often due to the difficulties it presents, it moves away from the excellence in the qualifications, with the support of the authorities, tutors and teachers to generate spaces, where it recognizes these progresses and motivate the students, thus demonstrating that their efforts are valid and important for themselves and for the educational process to which they submit.

As a result of the information collected, the hypothesis is confirmed that more than 60% of students with SEN diagnosed with ASD improve their academic performance with the use of ICTs, as students, teachers and managers agree that performance was optimized 100% with the implementation of technologies in class in the academic period 2016 – 2017.

The research made, allows concluding in the following points:

- 1.- Information and communication technologies significantly benefit students with special educational needs in this case, especially children diagnosed with ASD, as it provides various adaptations required for the mastery of the academic curriculum and for the integral development of the Students, delivering to society fully capable and fully realized citizens.
- 2.- The use of ICTs in the teaching-learning process is constant in the investigated institution. Its teachers and managers are at the forefront both in infrastructure and in the training of the appropriate management of technologies in the educational field.
3. Educational progress is evident not only in the quantitative aspect of qualifications, as evidenced by the hypothesis that more than fifty percent of students improve their academic performance, but also in the qualitative aspect, in order to observe to the students certain of their capacities and connoisseurs of the uses that must give to the ICTs to meet the educational needs that they present.

As possible future lines of work we can indicate the following:

- Initiate new research in order to determine the level of self-esteem of students who are favored by the use of ICTs as tools to meet their special educational needs.
- Conduct a study proposing a methodological guide for teacher training in ICTs for children with autism spectrum with various adaptations required for the mastery of the academic curriculum, where teachers can practice using the proposed technologies and create new pedagogical strategies based on their teaching actions.
- It is important to add that studies need to be further focused on the parents or guardians of children with SEN in order to provide guides, processes, and tools to reinforce the teaching-learning processes taught in the educational units from the homes

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