

Disability and Technologies: A Proposal

Odalys Téllez Veranes^{1*}, Isabel María Ferrera Téllez², Barbara Olaydis Martínez Hechavarría³, Suleija Estrada Domínguez⁴ & Tamara Téllez Veranes⁵

¹Assistant Professor, Department General Dentistry, University of Medical Sciences Santiago de Cuba, Cuba

²Student, Oriente University of Santiago de Cuba, Cuba.

³Assistant Professor, Department General Dentistry, University of Medical Sciences Santiago de Cuba, Cuba

⁴Instructing Professor, Department General Dentistry, University of Medical Sciences Santiago de Cuba, Cuba

⁵Full Professor, Department Psicology, University of Medical Sciences Santiago de Cuba, Cuba

*Corresponding author: Odalys Téllez Veranes, Assistant Professor, Department General Dentistry, University of Medical Sciences Santiago de Cuba, Cuba

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Abstract

Background: Technologies currently constitute a work tool that has unlimited possibilities for its use in the teaching-learning process at different educational levels. In Special Education it allows the corrective-compensatory work of students with special educational needs; however, limitations are observed in the use of technologies to achieve this purpose in educational practice in the case of students with intellectual disabilities. The objective of the research is the elaboration of computerized learning activities for the correction and/or compensation of cognitive processes of students with intellectual disabilities.

Methods: An observational, descriptive, cross-sectional study was carried out, the sample consisted of 45 students with intellectual disabilities from the Manuel Prada Contreras Special School in the municipality of Santiago de Cuba, in the province of the same name. Ten computerized learning activities that favored the correction and/or compensation of cognitive processes in the teaching-learning process were elaborated and provided a theoretical reference of the use of technologies in educational institutions for these students.

Results: The research is relevant because its results argue the pertinence of the use of computerized activities in students with intellectual disabilities as a corrective-compensatory activity in the teaching-learning process, which influences the psychic development and makes it possible for it to be developmental.

Conclusion: It is concluded that the use of technologies in Special Education favors the stimulation of cognitive processes of students with intellectual disabilities and constitutes a work tool that dynamizes the teaching-learning process.

Keywords: Computerized Activities, Intellectual Disability, Correction and Compensation

Introduction

Currently, the use of technologies offers unlimited possibilities in the teaching-learning process and implies the dialectical unity of teaching and learning; the content of the teacher's activity is to teach and the student's activity is to learn. This means that the teaching process cannot be analyzed in isolation from the

main actors in this process. If these elements are separated in a simplistic way, i.e., the teacher is limited to prepare his work to teach and the student simply to learn, the consequences would be a mechanical, empty and not very useful training for the future" [1].

It is precisely in the active approach of this process where information and communication technologies occupy spaces. Not only in the teacher's teaching function, but also in his or her methodological, communicative and research competencies. They also constitute the most dynamic component of the pedagogical process.

Technologies are inserted in the pedagogical process once they demonstrate their usefulness in social life. When acting in the educational environment, they are transformed into teaching means and become components of it, as part of a complex dynamics of selection, design, production and use that is planned and executed by the teacher.

All these characteristics and possibilities, as well as others that derive from the creative application by teachers, make technologies a means of teaching in the development of the present time. Being so allows it to be at the height of the development of science and technology in the world.

One of the areas of the educational field in which the use of technologies raises greater expectations and which in fact benefits from their introduction is Special Education, since it is precisely people with disabilities who most need technological resources to reduce the differences that the contemporary world imposes in terms of access and opportunities.

As made known in this population includes "those who face long-term physical, intellectual or sensory challenges that in interaction with various barriers may hinder their full and effective participation in society on an equal basis with others" [2]. They are not a homogeneous group, i.e., what includes one group excludes the other. For example, people with intellectual disabilities are at a particular disadvantage when it comes to planning or working in teams.

According to Rocha et.al [3]. " ...a person with intellectual disability is characterized by having an IQ significantly below average and also presents limitations in the performance of functional abilities in different areas of life. Changes in society modify the meaning of accessibility not only referring to the elimination of physical barriers, but also to the adaptation and flexibility of hardware and software technologies to reach any user, whatever their limitations and in the teaching-learning process of students with intellectual disabilities acquire special significance".

For students with intellectual disabilities, computerized learning activities become a tool used to teach, provide information and train in a specific area; they facilitate individualization and repetition, in a non-threatening environment if their psycho-pedagogical characteristics and the educational reality where they develop are considered.

It is in the teaching-learning process of students with intellectual disabilities where computerized learning activities become a tool used to teach, provide information and train in a specific area; they facilitate individualization and repetition, in a non-threatening environment if the psychopedagogical characteristics of the students and the educational reality where they develop are considered. For, the SCM is "the denomination given to the different computer applications, whose final objective is to support learning" [4].

These materials are characterized by the fact that it is the student who controls the pace of learning, the number of exercises, decides when to quit and restart, and can interact several times; additionally, the teacher finds in them a significant help, since in many cases in the ECM all the student's activity is recorded.

The use of learning activities has its origins with the appearance of information and communication technologies at the end of the 70's and beginning of the 80's, the personal computer appears, equipment that is independent, small in size, easy to use and less expensive. From that moment on, a revolution began in the use of these media in the classes of any subject, with much more emphasis on science. To this end, several research works were carried out and different classifications were made by different authors.

classifies it as a medium and as a work tool [5]. for his part classifies it as a didactic resource, instrument for learning, curricular content, school organization resource, instrument for evaluation and community development resource [6].

There are references at the international level regarding the use of computerized learning activities [7-13]. In this sense, research conducted in Cuba related to the use of computerized learning activities since the introduction of the use of computers as teaching aids and work tools at different educational levels in 2000.

Today, Cuban schools have a wide range of audiovisual media that serve as powerful allies in the corrective-compensatory process. This is the supreme aspiration to be achieved by the teacher in students with intellectual disabilities in the educational institutions of this subsystem of education.

However, in the pedagogical practice the following difficulties are observed: insufficient elaboration of computerized learning activities for students with intellectual disabilities in special education, scarce knowledge of teachers about the potentialities offered by learning activities in the teaching-learning process for students with intellectual disabilities and the potentialities offered by learning activities in interrelation with the subjects that are in the special education curriculum are not taken advantage of.

Based on the above, the objective of the research is the elaboration of computerized learning activities for the correction and/or compensation of cognitive processes in students with intellectual disabilities.

Methods

For the development of the research, an intervention study was carried out, with analytical and prospective observational design in the elaboration of computerized activities for students with intellectual disabilities of the "Manuel Prada Contreras" Special School of the Santiago de Cuba municipality in the 2022 academic year.

Methods of the theoretical, historical-logical level were used to study the historical evolution of the use of Computerized Learning Activities, analysis-synthesis in the systematization of the research referents and of the empirical level the interviews to evaluate the level of satisfaction of the subjects who participat-

ed in the study and the level of information of the students and teachers in the use of the activities in Special Education for the correction and/or compensation of the cognitive processes.

The universe was composed of all 132 students and 39 teachers of the institution. The sample consisted of 45 seventh grade students whose parents and/or guardians gave informed consent to be part of the research and 14 teachers who agreed to participate; the selected teachers hold the category of Master in Special Education and have more than 10 years of uninterrupted work in the educational institution where the study was carried out. In a Microsoft Excel spreadsheet, the answers to each question of the interview with the participants were tabulated.

Different variables such as age, sex, level of information (adequate, inadequate) of the computerized learning activities in both groups (teachers and students) were studied in order to obtain the primary data, as well as the degree of satisfaction with the proposed computerized learning activities (satisfied, moderately satisfied and dissatisfied). To obtain information on these variables, participants were interviewed.

Results

The age and sex distribution of students with intellectual disabilities are shown in "Table 1". In relation to age, the predominant ages were: 12 and 13 years (37.8%) and 14 years (24.3%), with a predominance of the female sex with 55% of the total number of students with intellectual disabilities.

Table 1: Distribution according to age and sex according to the enrollment book and graduates.

Age (years)	Sex				Total	
	Male		Female			
	No	%	No	%	No	%
12	8	40	9	36	17	37.8
13	7	35	10	40	17	37,8
14	5	25	6	24	11	24,4

Source: Own elaboration

Table 3 shows the distribution Table 2 shows the results in the subjects and the level of satisfaction of the students of the Manuel Prada Contreras special school with the implementation of the computerized learning activities developed.

In the interview conducted with the students with intellectual disabilities about the computerized learning activities developed, they are generally satisfied and moderately satisfied with the activities designed, suggesting that they be used in applications for cell phones and with visual stimuli of animations or children's movies that they propose.

Table 2: Student results according to subject and level of satisfaction

Subjects	Satisfied				Satisfied Mod-erately				Dissatisfied				Total			
	H	%	V	%	H	%	V	%	H	%	V	%	H	%	V	%
Spanish Language	22	88	18	90	2	0.08	1	0.5	1	0.04	1	0.5	25	100	20	100
Mathematics	24	96	19	95	1	0.04	1	0.5	-	-	-	-	25	100	20	100
Music Edu-cation	25	100	17	85	-	-	2	0.1	-	-	1	0.5	25	100	20	100

Source: Own elaboration

Table 3 shows the distribution of teachers by grade of the Manuel Prada Contreras special school who participated in the study, considering that all of them teach the subjects of Spanish Lan-

guage and Mathematics to students with intellectual disabilities and that they can use the Computerized Learning Activities considering the content of the curricula they teach.

Table 2: Student results according to subject and level of satisfaction

No.	Grades	Number of teachers
1.	Preparatory	1
2.	Second	1
3.	Third	1
4.	Fourth	1
5.	Fifth	1
6.	Sixth	1
7.	Seventh	1

8.	Eighth	1
9.	Ninth	1
Total		9

Source: Own elaboration

Specialists who work at the Manuel Prada Contreras Special School participated in the study and are included in the study as

shown in Table 4 so that with their experience they can assess the feasibility of the Computerized Learning Activities for their subsequent generalization in the educational institution

Table 4: Specialists who participated in the research

1.	1-4	1	Music Education
2.	1.-9	1	Computing
3.	7-9	1	Workshop teacher
4.	1-9	1	Deputy Director
Total		4	

Source: Own elaboration

Table 5 shows the degree of satisfaction of the teachers who participated in the study, and an interview was conducted so that

they could express their degree of satisfaction with the computerized learning activities developed, considering the indicators satisfied, moderately satisfied and dissatisfied.

Tabla 5: Teachers' degree of satisfaction with the activities designed for students with intellectual disabilities at Manuel Prada Contreras Special School

Subjects	Satisfied		Satisfied Moder-ately		Dissatisfied	
	Total	%	Total	%	Total	%
Spanish Language	13	92.6	1		-	
Mathematics	14	100	-		-	
Music Education	14	100	-		-	

Source: Own elaboration

Once the interviews were conducted, the responses of the teachers were tabulated and 1 teacher considered that in the subject of Spanish Language the terms should be related to the activities that are developed extracurricularly; the rest of the teachers were satisfied with the computerized learning activities developed.

Discussion

The computerized learning activities respond to the characteristics of students with intellectual disabilities for the enrichment of the teaching-learning process and allow the correction and/or compensation of cognitive processes.

The correction and/or compensation of cognitive processes is one of the seven principles that govern Special Education in Cuba from the postulates of the historical-cultural school that leads who considers..." any defect originates stimuli for the formation of compensation [14]. That is why the dynamic study of children with deficiencies cannot be limited to the determination of the degree and severity of the insufficiency, but must include the control of the processes of compensation, substitution, building and balancing processes in the development and behavior of the child.

The compensatory approach of the educational actions carried out in the school must be developed in the middle of the relationship between the affective and the cognitive. The goals that

the school sets for the intellectual development of its students should always be accompanied by those that have to do with the development of affections. Church, (2015) p.3 In the school, compensation is closely linked to correction, the latter understood not only in the sense that compensatory actions favor reforming, rectifying and transforming the learning and behavior of children, adolescents and young people with special educational needs, but in its look towards what corrects, attenuates, "diminishes" and alleviates biological deficiencies [15].

The analysis of the fulfillment of these principles evidences the presence of essential dialectical relationships, regularities, as well as internal coherence between the different elements and functions of the design process of computerized learning activities.

Depending on the objective they pursue, the educational moment in which they are to be used or the complexity of their design, computerized learning activities present different typologies. There are materials of algorithmic type, exercise and practice, tutorial systems, heuristics, educational games, simulators, exploratory micro worlds, expert systems and intelligent tutors, among others [16-19].

The above is shared because computerized learning activities have links with affective, cognitive and procedural processes that allow building learning in terms of keyboard mastery by

the student and carrying out the text dictation instruction by the teacher; they have a defined intentionality and motivations, this allows stating that the complexity of its elements is diversified by depending on subjectivity, existing resources and the context itself where their implementation occurs and may have limitations or advantages in their use.

Limitations of Computer-Based Learning Activities for Students with Intellectual Disabilities.

- They do not address elements related to activities that are developed in the educational institution in an extracurricular manner.
- They have limitations for use on mobile devices.

Advantages of Computerized Learning Activities for Students with Intellectual Disabilities

The main advantage of this tool is that it makes the student an active subject in the teaching – learning process, allowing them to interact at their own pace and feedback their knowledge, thanks to the variety of activities designed according to learning styles [20].

The construction of the teaching-learning process is a process of both parties that is made up of appropriate strategies, processes with intentionality, clear objectives and learning that are accompanied by various resources to achieve in this case that the accuracy and speed when writing or typing texts or documents is with the greatest possible neatness and also automate the tasks in the classroom and work environment in the future.

A teaching-learning environment is the physical scenario where a student, or community of learners, develops their work, includ-

ing all the tools, documents and other artifacts that can be found in such scenarios [21].

In other words, the learning environment includes not only the physical scenario, but also the materials, strategies and sociocultural aspects related to the context where the learning process takes place. At this point, the didactic strategy is relevant, understood as an instance that includes methods, means and techniques, considering that the concept provides greater flexibility and usefulness in relation to the treatment of ICT in the didactic process [22].

Characteristics of computerized learning activities for students with intellectual disabilities. Figure 1

- **Intentional:** the use of CCAs in the teaching-learning process opens spaces for debate, reflection and the search for joint and participatory solutions, with emphasis on the problem-solving process.
- **Interactive:** the set of activities developed is oriented to promote interrelation among students, team work (duos or trios); it guarantees a teaching-learning process based on exchange.
- **Developmental:** from the very conception of the teaching-learning process, corrective and/or compensatory work is strengthened for the stimulation of cognitive, affective and volitional processes.
- **Contextualized:** requires the identification of the characteristics and cognitive, volitional and affective needs of students with intellectual disabilities of the special school “Manuel Prada Contreras” for its implementation [1].

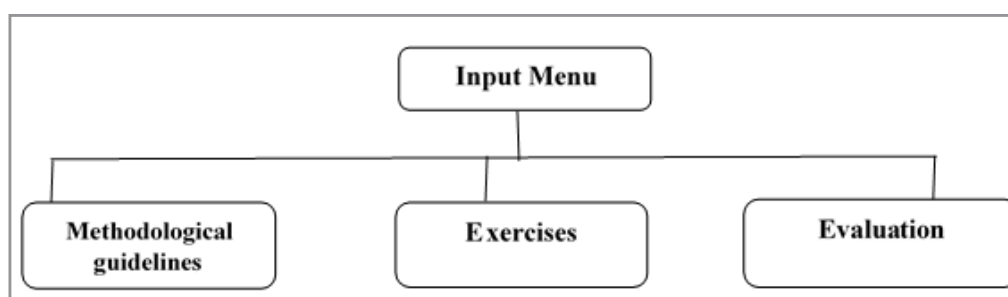


Figure 1: Structure of Computerized Learning Activities

Note: The figure shows the structure of the Menu of the computerized learning activities, in which the specific contents of each subject are visualized for the correction and/or compensation of the cognitive processes of the students.

The topics addressed by the computerized learning activities are related to the contents that students with intellectual disabilities receive according to the curriculum taught in Special Education and promote a change in the use of technologies.

The changes in education imply new forms of relationship between the actors of the formative process, while providing new alternatives for access to communication and information technologies. It is important that the student is not a receiver of in-

formation, but, in addition, is able to build his own knowledge with the tools and strategies that have been worked on both in the activities, as well as in the virtual learning environment in general [23-25].

The results obtained in the interviews with teachers and students show that the level of satisfaction is adequate, although they make suggestions that can be considered in other research on the subject.

Conclusion

The computerized learning activities allow enhancing the level of knowledge of the contents of the subject of Spanish Language, Mathematics and Music Education, and they favor a better development of the teaching-learning process if the criteria of the beneficiaries to whom they are addressed are considered.

The objective of this software product is to provide a solution to a problem of the educational reality in special schools for students with intellectual disabilities. Inferring that with its use coexist alternatives, feasible dynamics, which allow the appropriation of knowledge more quickly, with quality and interactivity, enriching the teaching means of the subjects of Spanish Language, Mathematics and Musical Education.

The limitations in the research are in the fact that the sample of students and teachers can be expanded and lead to the generalization of the proposal in other educational institutions of Special Education.

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