The role of ICT and its pedagogical contributions to education in the Dominican Republic: Advances in educational innovation for inclusion and technological literacy from the perspective of higher education institutes, policymakers, and ministries

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Abstract

Information and Communication Technologies offer innovative tools for inclusion and education. In the following paper, it was investigated questions related to the implementation of Information and Communication Technologies in education for the construction of knowledge and digital inclusion of populations with diverse characteristics, capacities, and disabilities in the different educational levels in the Dominican Republic. The strengths and weaknesses of the educational system was the approach of this investigation, describing the participation of private and governmental institutions in the development of educational technology. The qualitative method was used for data collection. To respond to the nature of the problem, the study used the interview as a data collection technique and as an instrument the interview script (questionnaire). The research aimed to a sample with expertise in Information and Communication Technologies as a means of learning in the Dominican Republic

and then carrying out the analysis of the data through the interpretative model of qualitative research.

Keywords: Information and Communication Technologies, Dominican Republic, pedagogy, innovation, Education

Introduction

Education in the Dominican Republic is a fundamental pillar for the development of society. Teachers play a primary and essential role in the educational process to be reliable. They have to implement strategies, actions and activities that support their work, taking into account the characteristics of the group of students and the context where the academic content is going to be developed through the incorporation of ICT that allow the student population to interact with these tools stimulating the teaching and learning process pedagogically. In this context, Marqués (2016) indicates that teachers must use ICTs effectively and efficiently in their professional activities, and to achieve this they need to use the programs and resources of the Internet, but more importantly, they need to acquire academic skills for the use of all these ICT tools. For this reason, the Ministry of Education, through the Digital Republic program, promotes basic, continuous and ongoing training to teachers, students and the community for the inclusion of technological tools in educational processes by providing multimedia and computer resources in national educational institutions of the country. Similarly, private educational institutions have also made significant investments to keep updated with the technological demand that society is currently experiencing and to be able to offer tools to students to confront the digital age positively in technological learning environments, supported by the guidance and skills of teachers. Viñas (2015) defines the digital competence of teachers as the ability to locate, evaluate, use, create and share information. Propose and evaluate tasks in a digital environment, as well as handle solutions for cloud storage, use of social networks, create multimedia presentations, edit images, capture and manage information as well as publishing and sharing content on the web, all through essential tools. Considering the above, it is essential to conceive that the incorporation of any technology in teaching will lead to the modification of the teacher's roles, causing the demand for innovation, and transformation of traditional roles, organization, and planning of classes, to offer students the opportunity to use the new learning scenarios that ICTs provide.

The research aimed to value the experience of teachers and participants about the use of ICT and intelligent learning ecosystems. In this same order, the main limitation of the study was the level of technical skills of the participants.

Territory and characteristics of the Dominican Republic sample

The study conducted between November 2019 and February 2020 in Santo Domingo, Dominican Republic. Three professionals with expertise in areas related to education were interviewed. The first one is the Gen-

eral Manager of the Digital Republic program of the Ministry of Higher Education, an entity belonging to the Dominican state. The second is in charge of the Educational Inclusion Division of the National Council on Disability (CONADIS and the third is the Director of the School of Information Technology of the Universidad Pedro Henriquez Ureña (UNPHU) and a technology advisor in the business and educational areas. The interviewees were chosen because of the observed relationship of their experience with the indicators, dimensions of the study theme, each socialization for data collection was carried out in the field of the selected sample and had an average duration of 40 minutes.

The first interviewee (R1) is a representative of the program Digital Republic of the Ministry of Higher Education and serves as the General Manager of the program of the entity that is responsible for promoting and training in technology in the university field. He has two years in the position and more than 15 years of experience linking the private enterprise with the university centers; also, He participated in the program one to one where a personal computer is assigned to each teacher influencing the updating of the curricula, and Electronic Engineering graduate with Masters in Telecommunications and Pedagogy.

The second person interviewed (R2) is currently a teacher at the Faculty of Education of the Universidad Autónoma de Santo Domingo (UASD) and is in charge of the Educational Inclusion division at the National Council on Disability (CONADIS). She is committed to the coordination and monitoring of public policy formulation processes and the implementation of programs aimed at ensuring the inclusion of persons with disabilities in the education system at all levels. She has a degree in Basic Education, a diploma in Early Childhood Education, and a master's degree in ICT in Education and Management of Educational Centers. She has more than ten years of professional experience in various areas of public and private education.

The third interviewee (R3) is the Director of the School of Computer Science and Advisor to the Rector's Office on ICT matters at Universidad Pedro Henríquez Ureña. He has worked on national and international projects at the educational level. He has been in the field of information and communication technology (ICT) since 1979, in teaching, research, software project management (SCRUM), consulting, management, planning, and development of solutions for commercial purposes. His main areas of professional practice include e-government practices, collaboration, banking, savings and loans, group decision-making, strategic ICT planning, and ICT organization. Since 1989, he has been involved in the development of computer-aided learning applications and tools, including e-learning and web environments for collaboration and group decision-making. He has extensive experience in managing web develop-

ment projects, including large portals, business intelligence applications for statistical purposes and web applications and tools for government and private institutions in several countries (Peru, Costa Rica, Dominican Republic, Honduras, and Canada).

Results

Implementation of ICT in schools and other educational institutions

For the third representative, ICT has strengthened asynchronous communication, through the implementation of virtual platforms for learning as a space to search for information (Moodle), which are used as a means to build knowledge or as a space. He says that in "The context of Dominican higher education: The use of Moodle and similar platforms, either as a repository of materials or as a platform for asynchronous interaction is, in my opinion, what has been promoted most at the higher education level. In our school, we are in the process of introducing STEM learning, something that in basic education in other countries has been strongly encouraged with success" (R3).

Considering what the interviewee said, it can be observed that the implementation of virtual environments as a learning resource center, betting on the evolution of education through innovative learning methods that adapt to the needs of the student population, integrating knowledge areas through the STEM model of learning. About this, Gil (2017) considers that they are indispensable for the teaching practice since they allow students to improve their autonomous learning, encourage their initiative and interest, and speed up communication with the teacher in an advanced technological environment.

Reinforcing what R3 said, the second interviewee also emphasizes that technology allows the establishment of better synchronous and asynchronous communication channels between those involved in the teaching process and to be able to expand the information between the different stakeholders in the process. It is the case "of the CLASSDOLIO application that allowed daily communication between teachers, students, and parents" (R2).

In the same order, the General Manager of the Digital Republic of Higher Education has achieved significant technological advances where teachers, students, and the general community of higher education institutions have been taught to read and write in ICT, establishing agreements with private companies to offer quality technological resources. For this reason, the interviewee highlighted the one-to-one project, "where each teacher and student in higher education is offered

a computer, which seeks the educational use of ICT. Impact on: 18000 students and 2000 teachers. Using Office 365 platform for teaching in virtual environments" (R1).

It is important to emphasize that part of the development of education in a country is based on the various alliances that the state and the private sector can establish to design innovative strategies that raise the quality of education through complementary skills and resources to achieve the objectives of change, improvement and educational development since education should be of interest to all segments of society. Although it should be a priority for the state, the private sector plays an essential role in the development of the state, so the state must promote coalitions to strengthen the quality of education, increase awareness of the importance, increase funding opportunities and add value to the management of their programs and projects.

In the same way, the person in charge of the educational inclusion division of CONADIS expresses "...that the technological resources favor the teaching and learning process, that in her experience teaching the Spanish language in the classroom she used the digital blackboard as a resource. The school offered many opportunities for the use of technology, and I got so involved that with the time I became a coach of the ICT program for the Spanish language" (R2).

It can be seen that various technological resources allow for the more efficient development of the academic content of the study programs. It is only necessary to implement them correctly to take full advantage of the benefits they offer, added to this the willingness of the teacher to advance in the technological and digital divide to innovate their classes will be of great importance to achieve the academic objectives and equally to offer diverse learning opportunities for students, adapted to a variety of stereotypes for the construction of meaningful learning through group socialization in school environments. In the same vein, "At the school where I worked, I implemented the use of the IPAD as a tool for the development of student tasks; in the same school, they used Apps and digital books of the subject of the Spanish language" (R2).

It is important to emphasize here, as Angel Diaz-Barriga does, in his writing "TIC en el trabajo del aula. Impacto en la planeación didáctica", that, given this situation we must "bear in mind that their incorporation is not limited to (...) having the tools that make up these technologies: equipment and computer programs, but that the most important thing is to build an educational and didactic use of them" (2013, p.5).

Barriers to the implementation of ICT resources in Education in the Dominican Republic

At the moment of implementing technological resources in school environments, barriers must be identified before their incorporation to ensure optimal use of the tools and thus achieve the planned objectives. About this, General Manager of Digital Republic indicates, "that there are two main barriers in the Dominican Republic which are resistance to change and economic status of the people" (R1).

On the other hand, the second interviewee reaffirms that "the resistance to change, teacher´s socioeconomic status and the lack of training in ICT tools would also be a major barrier in the country" (R2).

It is essential to point out how the attitude of resistance to change in teachers' teaching patterns becomes a threat to the incorporation of technological tools offered by ICTs in education, which can bias students towards technological environments that allow them to take full advantage of resources, activities and technological elements that promote the construction of knowledge for meaningful learning. Another important aspect is that the population that chooses to be a teacher in the Dominican Republic comes from low socioeconomic sectors, which makes it difficult for some to have easy access to the acquisition of technological tools and, at the same time, not have solid skills in handling them. In this sense, Tapia (2014) states that "It shows that even though a teacher has a positive perception of ICT, he or she does not make use of these tools".

In the same order, the Director of the School of Computer Science at the Universidad Nacional Pedro Henríquez Ureña indicates that "the preparation of the professors and their availability of time to dedicate to innovation work" (R3).

In this sense, teachers today are faced with technological advances and the break with traditional schemes, providing skills to channel learning in a transformative way through plans and updating programs that allow them to consolidate their educational work, obtaining skills and competencies to develop work with efficiency and effectiveness. However, teachers must have time to rethink teaching methods involving ICT as a cross-cutting theme.

Reinforcing the above, it is important to emphasize what González and De Pablos (2015) have said: "The most relevant impediments to the use of ICT in the teaching-learning process are related to the role played by the educational institution in promoting pedagogical changes, so it is essential to rethink structural aspects of the organization". This identifies

that not all barriers are on the responsibility of the teacher. Educational institutions should also promote and establish technology literacy plans to strengthen the competencies of academics, to increase the meaningful use of ICTs in the classroom and to engage students in constructive learning processes based on technological tools. This coincides with the viewpoint of the second interviewer, who said, "there are teachers who do not know how to use Word, or how to write an e-mail, and who enter schools without validating the minimum technological skills to implement them in education, and the curricula of universities that train teachers to present a gap concerning the use of ICTs" (R2).

Hardware and human potential for education through ICT

The person in charge of CONADIS states that "there must be a relationship between theory and practice, and there must be a pursuit of technological knowledge at the various levels of the education system" (R2). Similarly, the first interviewee states, "...there must be a curricular transformation in universities to be able to respond to society's integral demand for the various areas of technological knowledge, and the ministries of education, universities, and business must be aligned" (R1). Continuing with the idea, the third interviewee expresses, "it is important to universalize STEM education" (R3). The presence of technological equipment in educational institutions is part of the process of transformation in training environments. This process must be accompanied by training plans for teachers so that they acquire the skills and abilities needed to implement these resources in teaching practices. This will allow to enter the STEM learning system, inverted classroom, augmented reality, robotics, virtual reality, which have gradually been taking prominence in education and providing strategies and methodologies to teachers and students to develop academic content through the use of ICT.

Following the same order of idea, the Digital Republic Manager said, "Programming languages should be taught in schools, identifying and directing these talents towards research." (R1). This will allow students to have a broader vision of what the future holds, since they will be able to have formal technological experiences that will promote the development of innovative ideas for the intrinsic development of their learning. It also indicates, "...so far this year there have been three calls for ICT-related diplomas, impacting approximately on 6 thousand students and professionals in computer science and technology..." (R1).

It is necessary to emphasize the effort that the Dominican state is making to incorporate ICTs both in the education and in the society. For that reason, it is seen the advances of the program of digital republic, that

has as purpose to provide laptop and tablet as resource for the learning, supported in trainings for the technological literacy and the development of diverse branches of the computer science, to answer the needs that the society of the information and the digital era demands.

The role of the business sector in education

The link between the business sector and the educational field has a fundamental value in the development and growth of society. The power to merge these two sectors will guarantee the provision of real opportunities to the educational population of the country. Concerning this, the third interviewee points out that "in the country, there are various companies that have foundations that support education in the country, as is the case of FUNDECITEC, which offers robotics programs for children and young people who feel the desire to be scientists" (R3). For the Manager of Digital Republic, "the workshops that are held between the software industry, academia and experts serve to identify the needs, vacancies, and priorities that the country has in the field of technology, but there is no evidence that there is a mechanism to ensure that companies contribute significantly to education" (R1). In this order, the CONADIS manager comments, "…there is no evidence of actions to improve education, only indicators of the demand for the labor that is needed, but no strategies are observed…" (R1). It can be seen that the presence of the business sector in education is focused on offering information so that universities can add indicators to their study programs. However, there is no clear evidence that there is an excellent contribution to providing technological resources, plans or programs that support the strengthening of Dominican Republic education. About this, the second interviewee points out that "Entrepreneurs are supportive in saying the skills you need, but they are not investing resources, and universities are teaching other things that are not completely aligned with current demand" (R.2)

In order to achieve a link between companies and education, it is important to promote business transformation in its social responsibility. As expressed by Zamora (2016), "they imply a change of chip, going from small and isolated projects to projects that generate strategies capable of integrating their different work areas, illuminated by their teleology and that are visible to the communities and integrate different sectors or organizations, carrying an implicit common objective: to generate change and multiple benefits."

To generate a significant change in the Dominican society, corporate social responsibility needs to focus on supporting the development of education, integrating projects that encourage the human talent that makes up these two sectors to materialize ideas that can be visible in

society, and that serve to promote educational transformation that responds to the forefront of the country's progress.

Educational innovations in the Dominican Republic

The significant advances that ICT affect various sectors of society and generate change in the curricula of universities. Careers taught in higher education institutions should correspond to social and business needs. For this reason, colleges have incorporated various technological resources as a means to build knowledge, but the existence of these resources in academic environments does not guarantee innovation in the classroom. López and Heredia (2017), refer to educational innovation as the "implementation of a significant change in the process of teaching and learning, the materials used for it, the methods of delivery of the sessions, the contents or the contexts in which teaching takes place" (p. 18). The innovation must produce a learning strategy that the teacher develops taking into account that technology present on the campus provides students with learning experiences where the fundamental axis is the constant interaction with technological elements. Regarding innovation, the third interviewee said, "that in the country there is a robotics and software development program that has had a good impact on Dominican schools" (R3). The effort to innovate education with the programs mentioned above and their dissemination is evident as well as the significant advances in the Dominican society. However, the same interviewee emphasizes that, "Although it could be much greater if there was more investment in teachers" (R3). There is a need for universities to promote technological training programs to encourage teachers to innovate their pedagogical practices, to understand that the technological era is changing and impacts directly on students who demand new ways of teaching and teachers who can meet the requirements through strategies to build knowledge by integrating various areas. Fernandez (2017) said that "it is necessary to incorporate technologies from the mediation teacher/tutorial and incorporate them to face as part of teacher training because without a teacher who uses ICTs properly the road can be truncated".

The leaders of education in the country must assess whether innovation is taking place in the sector or only in educational institutions, which are being equipped with technological resources. At this point, it is interesting to note what the inclusion responsible person of the CONADIS said, "there is general confusion with the term innovation because it is believed that innovation is synonymous of having technology in schools and it is not. We see an effort to provide technological equipment. However, we do not see clear strategies to increase benefits for education since it is used as a means of disseminating content" (R2), that is why educational institutions must structure mechanisms to encourage teachers to train themselves to innovate their pedagogical practices. Concerning

this, Jerez and Silva (2017, p.25) "propose to classify educational innovation, depending on its level of scope and space for action, into small-scale innovation of teaching routines and disruptive innovation" It is to see innovation as a transversal axis of the educational model of the universities, which has an impact on all those involved in the educational process, i.e., curricula, teachers, students, evaluation methods, which becomes a fundamental principle for the institution.

Similarly, the first interviewee emphasized that "there is a national strategy of entrepreneurship, where students of technology and business can work together on innovation through business model competitions" Achieve knowledge transfer through technological resources invites to develop a management model that triangulates research, entrepreneurship, and society to develop innovative projects that impact the various sectors of the community and at the same time respond to the needs present in the various areas of social ordinary. That is why Flórez-Trujillo (2019), "raises the latent possibilities of this emerging model, which is more and more accepted by society and is gradually taking away from traditional education" The innovation must be of the whole educational model and cannot be focused only in the classrooms. Likewise, the author affirms that "it is necessary to emphasize the appearance of methodologies of innovative service based on diffuse logics for the joint construction of interactive learning environments, which in a living way are adapted to the needs of the actors of the chain of value".

In this way, we can see the great challenge that colleges in the country must face in regard to expanding the vision of the educational model that they wish to develop and that responds to world trends to provide favorable conditions for students and approach the demands of educational innovation under the technological premises.

Development of ICT-related skills among people responsible for learning and digital inclusion

For the development of ICT skills, continuous training sessions are fundamental to build and strengthen knowledge related to resources, tools, and technological elements for learning. For this reason, the inclusion responsible person of CONADIS comments that it is necessary to "generate effective training, improve the technological skills of new teachers and those currently in the system" (R2). Similarly, the General Manager of Digital Republic stated that "..teachers should be trained through courses, seminars, and workshops" (R1), as well as "that there should be a focus on quality rather than quantity" (R2). In the same order, the third interviewee states that is necessary "training for innovation in ICT and STEM" (R3). It shows the importance of training active teach-

ers in the Dominican educational system. Pozuelo (2014) demonstrated that "training in digital competencies of teachers is a key factor in driving methodological change in teaching work, and shows that more technologically trained teachers use ICT more often, introduce more changes and promote ICT competence in students," this effort is demonstrated by the national government and can be seen in the author's statement. "The MINERD programs in robotics, software, and similar STEM elements were a good start but the programs have not been developed with the necessary impact" (R3). In order to guarantee the quality of training programs, it is necessary to establish evaluation and strict follow-up mechanisms in order to measure the impact and to be able to experience the innovative benefits that teachers can develop after receiving training. The first interviewee said, "An observatory should be set up to collect evidence of the evolution of training." (R1). Claro (2010) mentions "that in order to understand the relationship between ICT use and student learning, it is necessary to observe the types of use given to these technologies," in the same vein, Hernández, Ayala, and Gamboa (2015), "finally evaluate their use of these tools. This would make it possible to identify their level of use and integration of the potential of ICTs in the teaching activity, as well as to manage the definition of lines of action and training routes that will make it possible to integrate technology resources and tools optimally" It is essential to emphasize the fundamental role of evaluation and monitoring in the process of training teachers in technological skills for educational innovation. It allows evidence of whether the training strengthens the skills of teachers to develop meaningful learning strategies based on technology, as well as mediating whether the learning experiences of students have elements of innovation that drive them to the construction of knowledge.

Open educational resources and work with disadvantaged groups

For the second interviewee, "the methods and strategies meet Multiple intelligences (presenting material in different formats) and universal learning" (R2). For the first interviewee "to provide labs for teachers, certification of teachers in Microsoft because it is the only one in the country that currently meets the requirements for this type of education" (R1). The third interviewee mentioned: "What the country needs to do is create Open Learning Computer Megacentres.with hundreds of computers connected to the internet and free access to services for everyone, including disability considerations in each center." (R3). It should be noted that currently, that terms such as flexibility, adaptability, and accessibility of information, the ability to interact and build knowledge from anywhere in the world, at different times and addressing different needs are very popular. Thus, open education offers the possibility of putting these ideas into practice. However, it must be a joint effort between the

state and the education sector. For the person in charge of Inclusion at CONADIS, the disadvantaged groups have to "use different methodologies, accessible resources, in various formats, resources that can be read on any device, using collaborative work with a personalized teaching methodology." (R2). In addition, the first interviewee expresses, "the government makes available digital rooms with the equipment, connections, prepares the content that is available to students and the Dominican web portal for the unification of all the databases of the country's libraries for access by all students and teachers with diverse conditions at the national level" (R1). The use of ICT must be in an accessible way, to promote social, educational, business and cultural actions, to encourage innovation for the integration of diversity and disability, to raise awareness in all sectors and society to create awareness towards people with disabilities. When working together, teachers, educational institutions, government entities, and the private sector the universe of the diverse population impact increases considerably.

An example of this is the accessible virtual library designed in Argentina in 2014 by the Ministry of Social Development of the Nation, aimed at people with disabilities (www.desarrollosocial.gob.ar/biblioteca) and the obligation for mobile phone companies to sell equipment for people with hearing disabilities have begun to take effect. Supporting this, the third interviewee states, "In developed countries, the same elderly people educate others. In the morning, in Taiwan, for example, the parks are full of older people (and younger ones), teaching all kinds of things. The government encourages these activities, which benefit not only older adults but the general population" (R3).

Government support for ICT use and educational inclusion

Governments play a decisive role in the development of policies, norms, guidelines, and innovations in education. The Dominican Republic does not escape from this reality, and through the various bodies that direct the nation's education, the plan for a digital republic has been developed, which aims to promote the use of ICTs in the teaching and learning process, providing teachers and students with technological resources as educational support. "As for the use of ICTs, the most valuable thing the government has done is to give students personal computers and Internet access in their homes" (R3). Similarly, the second interviewee reaffirms that "through the Digital Republic Program, the state tries to respond to the inclusion of a large part of the population that is excluded by various economic and social factors" (R2). The first interviewee tells us, "Through the Digital Republic program, soft grants for graduates, delivery of technological resources, among others" (R1). It is evident how the state's effort has contributed to the inclusion of technological tools

in education. This shows the positive results of the Digital Republic program, with which the interviewees agree.

Concerning inclusion, the third interviewee comments, "Inclusion in the Dominican Republic, although there is a law (Law 5-13) and poor regulations in this regard, is at a minimum level of implementation, as is special education in the country" (R3). It can be inferred that despite the distribution of technological equipment, it does not guarantee that it is a mechanism for inclusion. For this reason, the second interview highlights "On the other hand, CONADIS promotes that the institution has accessible information for disabled people, through laws and standards to achieve the objectives of ICT inclusion that various institutions in the country are promoting" (R2). It is interesting to note that in the country there is a body in charge of dictating the guidelines for inclusion. However, it is not possible to observe a control mechanism for the various laws that are available to educational institutions. In this same line of thought, it is essential to highlight the recent report of the United Nations (2016) which highlights that, for Latin America and the Caribbean, policy commitments are maintained in the areas of access and infrastructure, the digital economy, e-government, sustainable development and inclusion, and governance (United Nations, 2016, p. 9).

Conclusions

This study shows that the Dominican Republic is aware of the importance of ICTs and their implementation in the education system and society in general. In order to achieve this, the government and private institutions have drawn up a series of guidelines that are close to those that Marchesi, Blanco, and Hernández (2014) consider fundamental for achieving inclusive education systems:

1) Increase the coverage and improve the quality of early childhood education provided to the most vulnerable groups. Ensure timely progression and universal completion of early and secondary education.

2) Remove the different forms of discrimination in order to make the right to education effective.

3) Improve the quality of educational processes and learning environments to narrow gaps in access and emergence of knowledge.

4) Invest more on teachers and develop policies that integrate initial and in-service training, labor insertion and adequate working conditions.

5)   Develop support systems that collaborate with schools and teachers in addressing student diversity.

6)   Strengthen comprehensive social protection and promotion systems.

7)   Democratize access to ICTs.

8)   Increase investment and make public spending on education more equitable.

9)   Develop information systems disaggregated by factors of exclusion.

Similarly, national policies are aligned with the objectives of the digital agenda for Latin America and the Caribbean (CEPAL, 2018), in which three related to the subject matter of our work can be recognized:

1)   Incorporate or strengthen the use of ICTs in education and promote the development of programs that include teacher training, new pedagogical models, the generation, adaptation and exchange of open educational resources, the management of educational institutions and educational evaluations.

2)   Promote a comprehensive gender equality perspective in public policies for digital development, ensuring full access to and use of ICTs by women and girls, and fostering women's participation and leadership role in public and private decision-making forums in the digital sphere.

3)   Ensure access to ICTs for vulnerable groups in order to improve their social, educational, cultural, and economic integration.

To achieve the objectives, the criterion that teachers are mere replicators, and users of ICT's must be eradicated. The fact that with the implementation of the projects, we are not focusing only on resources and infrastructure improvements. Instead there is a need to invest on teacher training, not only from the instrumental point of view, but from pedagogical dimensions and with particular emphasis on the evaluation and follow-up of training projects. This can contribute to the achievement of the proposed objectives.

This research offers the opportunity to develop studies on technological competences for people with disabilities, artificial intelligence as a learning strategy and design of mobile apps for digital inclusion

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