
Estrategia para la integración de las Tecnologías de la Información y las Comunicaciones en la formación inicial de docentes

Strategy for the integration of Information and Communication Technologies in initial teacher training

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Resumen: El trabajo presenta una estrategia de integración de las Tecnologías de la Información y las Comunicaciones (TIC), en la formación inicial de docentes de carreras pedagógicas y sus principales resultados alcanzados. Para ello se aplicaron instrumentos como la encuesta a estudiantes, la entrevista a directivos y docentes y la revisión de documentos. Las acciones propuestas favorecen el proceso formativo de las carreras y con ella la preparación del profesor y el estudiante en cuanto a su formación en esta área, de manera que se logre un egresado con las exigencias para su desempeño que exige la sociedad cubana actual.

Palabras clave: Estrategia; Integración; Formación inicial; Integración TIC.

Abstract: The work presents a strategy for the integration of ICT information and communications Technologies in the initial training of teachers of pedagogical careers and its main results. For this, instruments such as the student survey, the interview with manager and teachers and the review of documents were applied. The proposed actions favor the

training process of the careers and with it the preparation of the teacher and the student in terms of ICT training, in such a way that a graduate is achieved with the demands for his performance that current Cuban society demands.

Keywords: Strategy; Integration; Initial training; ICT integration.

Introduction

The accelerated development of Information and Communication Technologies (ICT) has transformed the social, economic, political, cultural and educational order of the individual, revolutionizing even his or her way of acting. From the development perspective of this activity, technology is conceived as a means in favor of a more inclusive human and social development, allowing access and diversity of knowledge and information in a fast and simple way. Education for life is the great challenge of society and the potential of human beings is the great wealth of a country.

The incorporation of this technology in education diversifies the opportunities and possibilities in the educational sector, contributing to the improvement of training processes. Integrating these technologies in the educational context is an imperative for universities. It is the responsibility of higher education to create spaces for technological development that provides the necessary support for specialists and for those who have the responsibility to direct them and perform technical and professional functions in the pedagogical process. One of the key factors in the integration of ICT in pedagogical practices is the training of teachers, an aspect that begins with initial training For Tourón (2016):

Effective integration of technology with pedagogy around a specific subject requires the development of some sensitivity to the dynamic, transactional relationship between these knowledge components situated in specific contexts. Individual teachers, the course, school-specific factors, demographics, culture and other factors ensure that each situation is unique, and there is a unique combination of content, technology and pedagogy that will be applied by each teacher, in each course, according to his or her vision of teaching. S/f

The unusual development of science, the ever-increasing demands of the school and the irruption of new information and communication technologies in school life, impose new challenges to teacher training curricula. Cuba is no stranger to these transformations and it is

evident in the policies of the Ministry of Communications where it is proposed: "to implement educational models at all levels of education, which generate human capital with the skills to develop, sustain and use ICT" (2017, p.6). However, despite the objectives set out at the country level, there are still insufficiencies that do not favor the demands of society that require a graduate with greater comprehensiveness and performance in their training. All this implies changes, transformations and a lot of preparation on the part of directors, teachers and students. Therefore, it is necessary to achieve an adequate integration of ICTs in their initial training process.

The incorporation of this activity in our work requires not only the knowledge and mastery of the tools, but also a pedagogical approach aimed at promoting learning. The level of digital competencies of teachers and students can be a limitation or strength to achieve the use of ICTs and their better integration for academic purposes. There is a more intense use for leisure activities, such as games, social networks, among others, but to a lesser extent for academic tasks. The effectiveness of technological devices, both in educational institutions and personally, depends on what teachers are able to guide and control in the learning to be developed.

Universities have the social task of preparing a highly competent professional and for this it is necessary that graduates achieve adequate preparation in terms of their employment, hence the importance of integrating them into the curriculum. The strategy for the integration of ICTs in teacher training was developed after noting the inadequacies that existed in the initial teacher training process regarding their use in the main academic, research, work and university extension processes.

After applying the instruments, surveys and interviews to teachers, survey to students and a review of the normative documents from the professional model, study plans, career strategies, programs of disciplines, it was possible to confirm the insufficient preparation of teachers regarding the pedagogical and curricular use of this for its integration in the initial training process. The low level of activities oriented to students with the use of the technological resources made available to them. In addition, there are not enough resources in interactive platforms that contain formative contents for the disciplines.

Development

For the elaboration of the strategy, the starting point is the definition given by the Dictionary of the Spanish Language, where it expresses that a strategy "is the art of directing military operations, art, a plan for directing a matter, a set of rules that ensure an optimal decision at each moment" (Espasa, 2001, p. 1002).

For Sánchez, the curricular integration of ICTs is defined as: "the process of making them an integral part of the curriculum, as part of a whole, permeating them with the educational principles and didactics that make up the gear of learning" (2003, p.2). The inclusion of ICT in the curriculum will allow: "Foster intelligent educational organizations, which achieve high quality standards in the service they offer, translated into better training of the population to which they are directed" (Garbanzo-Vargas, 2016, p.86).

Gargallo states that: "Among the main barriers to the integration of ICT in education, aspects related to training, knowledge and beliefs that teachers have about ICT and their relationship with teaching practices have been identified" (2018, p.330).

To achieve the challenge of integrating it into the current educational systems, it is necessary to plan, organize and develop a strategy for its incorporation, since it is worthless to have the equipment and resources if the actions to be carried out by both managers, teachers, students and support staff in its integration in the initial training process are not conceived. That is why the strategy presented in this paper was created and applied. It assumes the premises provided by Coloma and Salazar (2011), which state:

- The principle of accompaniment. Since the actors of the strategy will be accompanied at all times to achieve the integration of ICTs.
- The principle of shared responsibility. Achieving ICT integration is everyone's task, so only by sharing responsibilities will it be achieved.
- The principle of ongoing training. The permanent preparation of the actors of the strategy is vital to achieve the proposed objectives.
- The principle of proactivity. Ensure that the strategy's actors have the initiative and capacity to anticipate future problems or needs in order to integrate ICTs into the initial training process.

The actors of the strategy are the teachers of the pedagogical profile careers and the students of pedagogical profile careers.

The general actions of the strategy are stated below:

1. To diagnose the actual state of ICT integration in the pedagogical process in order to guarantee initial teacher training with a systemic and systematic character.
2. To guarantee the development of teacher preparation actions that contribute to achieve the integration of ICT in the different processes that are developed in the initial teacher training.
3. Execute actions that favor the integration of ICT in the pedagogical process so as to guarantee a qualitative transformation of this, both in terms of the mastery by managers, teachers and support staff of ICT as work tools, their use as a teaching tool to support the learning of the contents of the curriculum of the career for which they are trained and for the teaching of the contents of the subject of the basic link in which they are prepared.
4. To evaluate, in a systematic way, the degree of compliance with the actions foreseen in the strategy, in order to guarantee their correction, giving a preventive and regulatory character to the evaluation process.

Its structure has four stages, called diagnosis, preparation, execution and evaluation. Each of them has a specific objective, a set of actions to be developed by teachers, as well as evaluation criteria for both actors of the teaching-learning process. The general objective is to integrate it in the initial training of teachers, in correspondence with the current development and perspective of computer devices, based on international references and the concrete conditions of the country, which guarantees the training of a teacher with the competences in correspondence with the demands of contemporary society.

The specific objectives are to integrate ICT in the educational teaching process in the pedagogical profile careers. Promote the development of competencies in initial teacher training. To guarantee the training of a teacher capable of autonomously assimilating new technologies, in accordance with the trends and challenges brought about by contemporary technological development in the field of Educational Technology.

Stages

Diagnosis:

Objective: Diagnose the actual state of the use of ICT in the initial teacher training process with a view to meeting the objectives of the curriculum with quality.

Actions of the Diagnostic stage (for teachers)

To diagnose

- Teachers' level of preparation for the use of ICT in the course curriculum.
- Teachers' mastery of the competencies necessary for the student with a pedagogical profile, in correspondence with the contents of the subject of Computer Science of the basic link.
- Teachers' mastery of the ICT curricular strategy for the course.
- Level of preparation of the teachers for the use of ICT in the particular didactics.
- The experiences, motivations, aspirations, and perceptions of the teachers in relation to its use in the pedagogical process.
- Level of use by teachers of the educational resources and services of the university network.

Actions of the Diagnostic stage (for students)

To diagnose

- Students' level of preparation for the use of ICT as a work tool.
- Status of development of ICT competencies in the students in correspondence with the curricular strategy of the course.
- Level of preparation of the students for the use of the tools included as object of study of the subject of Computer Science in the basic link.
- Students' experiences, motivations, aspirations, and perceptions of their use in the PEA.

Actions of the Diagnostic stage (on normative documents)

Analyze

- Career curriculum to determine the level of presence of ICT in each of the disciplines and subjects by academic years.
- Educational Strategy of the course (including the ICT curricular strategy) to determine how its presence is evidenced in the year objectives, in the profession's mode of action and in the formative actions that are expressed per year.

-Level of its presence in the programs of the disciplines and subjects of the particular didactics.

-Potentialities offered by the curriculum to contribute to the use of the ICT tools that constitute the object of study of the subject of Computer Science in the basic link.

Actions of the Diagnostic stage (on ICT infrastructure)

Identify

- Infrastructure conditions in relation to ICT resources and associated services such as, for example: availability of computer labs for students, student to PC ratio, securing PCs and other resources for teachers, personal devices for teachers and students (PC, laptop, Tablet, Smartphone, etc.).

-Possibilities of wired and wifi network connectivity and navigation services, synchronous and asynchronous communication, social networks, ftp, and others.

-Status and use of the resources offered by the university network for use in the initial training process (educational portal, repositories, media library, classrooms, etc.).

Actions of the preparation stage (for teachers)

-Socialize, in the groups of years, disciplines and subjects, the main limitations reflected in the diagnosis made to professors and students, regarding the level of development of ICT competencies and degree of compliance with the curricular strategy in the course.

To elaborate, based on the results of the diagnosis, a preparation system (specialized conferences, workshops and practical activities) oriented to raise the level of preparation of teachers in terms of knowledge and skills for the use of the available resources as a work tool and teaching medium and the knowledge related to the theoretical foundations of Educational Technology and the specific strategies and tools associated with their particular disciplines, as well as to contribute to the creation of a proactive state regarding their use in the teaching-learning process.

-To create a system of tasks to develop abilities, capacities and ways of acting in the teaching practices, of the subjects related to Educational Technology for the use of these resources as a means of teaching in support of the subjects of the curriculum of the National System of Education for which the students are prepared.

- Prepare them in terms of distance classes (Webinar), using various digital platforms (Moodle, Edu2.0, Google Meet, among others). Social networks and messaging services are also used. Preparation of mirror classes.

Preparation Stage (Regulatory Documents)

- Propose and approve the necessary adjustments to the curriculum, either with the incorporation of subjects in the curriculum itself, optional or elective, or topics in other subjects, related to Educational Technology and the use of tools specific to the career.

-Propose and approve the necessary adjustments to the programs of the subjects of the specialty, with emphasis on those of the particular didactics, through the inclusion of strategies and tools that support the teaching of the contents of the subjects of the basic link for which the student is trained.

-Propose and approve adjustments to the Educational Strategy of the course (including the ICT curricular strategy) so as to ensure its integration in the training of the future teacher, evidenced in a gradual incorporation of the contents related to it in the objectives of the year and the definition of professional problems to be solved through the use of these.

-Propose and approve optional or elective courses or cycles of workshops in which contents related to the program of the subject of Computer Science in the basic link, related to the contents of the career, are approached.

- Propose the insertion of ICT explicitly in the methodological orientations of the subject programs.

Actions of the preparation stage (of the infrastructure)

-Ensure the availability of ICT resources for an optimal use of these means such as, for example, the use of teaching laboratories, the use of the institution's network services (navigation, synchronous and asynchronous communication, ftp, social networks), access from personal mobile devices to the university's network.

-Ensure the creation, organization and access to digital resources for use in the initial training process (educational portal, repositories, media library, virtual classrooms, online platforms).

Actions of the execution stage (for teachers)

-Development of a system of actions according to the characteristics of the career to favor the raising of the students' level of preparation for its use as a work tool and as a teaching medium (with emphasis on its use in particular didactics), as well as to contribute to the creation of a proactive state regarding its use in the teaching-learning process through the courses of the proper curriculum, optional/elective, ICT Workshops.

-Development of methodological activities that demonstrate the appropriate use of ICT in the initial training process, based on the experiences obtained.

- Promote the preparation of blended teaching, with the use of virtuality.

-Conduct discussion sessions in the career groups, years, disciplines and subjects, to coordinate the work aimed at fulfilling the educational strategy of the career, with emphasis on the curricular strategy of ICT use and the formation of these competencies in students.

-Participation of teachers in events in which the best experiences of integration work with this activity in the initial training process are disseminated.

Development of class festivals, to promote the presentation of model classes, in which teachers demonstrate how, from a given class or topic, the available resources can be integrated, to achieve a significant transformation in student learning, in a face-to-face or distance way using digital platforms.

Implementation stage actions (for students)

-Operation of Student Scientific Groups of the career, to promote their use in the initial training process.

-Participation by students in class festivals, to promote the presentation of model classes, in which students demonstrate how, from a given class or topic, from the curriculum of the basic link for which they are trained, the available ICT resources can be integrated, to achieve a significant transformation in learning.

-Participation of students in events in which the best experiences of ICT integration work in the initial training process are disseminated.

Participation of students in student contests, which will reward the best integration proposals in the initial training process, whether related to the use of ICT-based learning strategies or the use or development of digital resources to support the subjects.

Actions of the implementation stage (infrastructure)

-Ensure the maintenance of an optimal use of computer resources such as, for example, the use of teaching laboratories, the use of the institution's network services (navigation, synchronous and asynchronous communication, ftp, social networks), as well as access from personal mobile devices to the university's network.

-Raise the level of presence of digital resources for use in the teaching-learning process (PEA), educational portal, repositories, media library, virtual classrooms and others.

Actions of the evaluation stage (for teachers)

-To evaluate the level of preparation of teachers for their use in the course curriculum and the degree of development of ICT competencies.

-To evaluate the level of transformation in teachers in relation to their experiences, motivations, aspirations, and perceptions about its use in the ASP.

-To verify the degree of compliance and relevance of methodological activities specialized conferences, workshops and discussion sessions in the year groups, disciplines and subjects programmed in the implementation stage.

-Check the level of use by teachers of digital resources (educational portal, repositories, media libraries, virtual classrooms, etc.) and services offered by the university network (synchronous and asynchronous communication, browsing, ftp, social networks), for use in the PEA.

Actions of the Evaluation Stage (for students)

-To verify the level of preparation of the students for its use as a work tool and teaching medium and the degree of development of competencies, in correspondence with the curricular strategy of the course.

-To verify the level of preparation acquired by the students for the use of the contents of the subject "Informatics" taught in the basic link.

Conclusions

The study on the integration of ICT in teacher training revealed the need and value that the authors contribute to the subject. The strategy was elaborated on the basis of the inadequacies

detected in the instruments applied and was applied in the Biology Education degree program at the University of Holguín, allowing the achievement of favorable results, highlighting the insertion of an optional program on this in the first year of the course.

This allowed the development of several topics that the student needs to achieve an adequate training in ICT. A system of preparation of specialized conferences, workshops and practical activities oriented to increase the knowledge and skills on the available computer resources as a work tool and teaching means, as well as the theoretical foundations of Educational Technology and the specific tools associated to their particular disciplines was elaborated.

Teachers were given the opportunity to participate in events and disseminate the best experiences of ICT integration work. This can be exemplified by the 23 papers presented by the teachers of the career collective at the national event on this activity and Education. The 8 papers presented at the international conference. The degree of compliance and relevance of methodological activities, specialized conferences, workshops and discussion sessions in the year groups, disciplines and subjects is highlighted. A high level of use of digital resources (educational portal, repositories, media libraries, virtual classrooms, etc.) was achieved, as well as the use of the services offered by the university network, for their use in the ASP. The necessary adjustments to the programs of the specialty subjects were proposed and approved, with emphasis on the particular didactics, through the inclusion of ICT strategies and tools that support the teaching of the contents of the subjects of the basic link for which the student is trained. Methodological guidelines were added to the programs in each subject that allowed it and it was made explicit which and how to use it.

Adjustments to the Educational Strategy of the course (including the ICT curricular strategy) were proposed and approved in order to ensure a better integration of ICT in the training of the future teacher, evidenced in a gradual incorporation of ICT-related contents in the objectives of the year and the definition of professional problems to be solved through the use of ICT. Optional or elective courses or cycles of workshops were proposed and approved in which contents related to the program of the subject of Computer Science in the basic link, related to the contents of the career, are addressed.

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