

# MENDIVE



## REVISTA DE EDUCACIÓN

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### Original article

## Use of ICT in the teaching preparation of teachers in conditions of social distancing

### Uso de las TIC en la preparación docente de profesores en condiciones de distanciamiento social

### Uso das TIC na preparação docente de professores em condições distanciamientosocial

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### ABSTRACT

The objective of the work is to present the experience of managing the methodological work during the situation of distancing from the university campus imposed by Covid-19 during the months of March to November 2020, a period in which a deep curricular adjustment was made and transformed the model of face-to-face teaching in the country and the university. Case studies, content and document analysis and descriptive statistics were used as methods to achieve a systematization of good practices in the use of Information and Communication Technologies (ICT) in the university, particularly in the case of the Institute of Basic Sciences. It is recognized in the conditions of social isolation in higher education, the need to establish networks of relationships that include the most diverse technologies, to develop distance work of methodological groups at different levels.

**Keywords:** methodological teaching work; educational teaching process; social networks; information technologies; evaluation.

### RESUMEN

El trabajo tiene como objetivo presentar la experiencia en la preparación docente del campus universitario, impuesta durante la situación de distanciamiento por la COVID 19, etapa en la que se realizó un profundo ajuste curricular y se transformó el modelo de enseñanza presencial del país y de la universidad. Se utilizaron como métodos el estudio de casos, el análisis documental y de contenido y la estadística descriptiva para lograr una sistematización de las buenas prácticas del uso de las Tecnologías de la Información y las Comunicaciones en la universidad, particularizando en el caso del Instituto de Ciencias Básicas. Se reconoce, en las condiciones de aislamiento social en la educación superior, la necesidad de establecer redes de relaciones que incluyan

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las más diversas tecnologías, para desarrollar el trabajo a distancia de los colectivos metodológicos a los diferentes niveles.

**Palabras claves:** preparación docente; proceso docente educativo; redes sociales; tecnologías de la información; evaluación.

### RESUMO

El trabajo tiene como objetivo presentar la experiencia en la preparación docente del campus universitario, impuesta durante la situación de distanciamiento por la COVID 19, etapa en la que se realizó un profundo ajuste curricular y se transformó el modelo de enseñanza presencial del país y de a Universidade. Estudos de caso, análise documental e de conteúdo e estatística descritiva foram utilizados como métodos para a sistematização de boas práticas no uso das Tecnologias de Informação e Comunicação na universidade, particularmente no caso do Instituto de Ciências. Reconhece-se, nas condições de isolamento social no ensino superior, a necessidade de estabelecer redes de relações que incluam as mais diversas tecnologias, para desenvolver o trabalho a distância de grupos metodológicos em diferentes níveis.

**Palavras-chave:** preparação de professores; processo de ensino educacional; redes sociais; tecnologias da informação; avaliação.

## INTRODUCTION

*What changes in practices and actions during the exceptional moment we are going through can settle and last over time?*

Grimson, A. (2020)

It is evident that the development of Information and Communication Technologies (ICT) has spread unevenly around the world and has caused substantial changes. These changes in the area of technology are not only technical, but also, and fundamentally, social, cultural and mental, because digital reality is increasingly displacing the physical and tangible world, while changing behaviors and ways to interact socially.

In the area of education, the analysis of the possibilities offered by technologies for the production of social wealth assumes the need for new human and technical training processes that respond to social requirements. For this, education systems are considered vital strategies to provide effective responses to socioeconomic problems at the present time.

At this time, the COVID-19 pandemic has shaken all the structures and processes of society, has brought about the need for computerization and caused changes in many human behaviors and in institutional and individual relationships.

With compulsory isolation, the dependence of individuals (adults and young people) on technology deepens, which shows material, intellectual and psychological deficiencies that slow down the transition from face-to-face to virtuality. This reveals the existence of gaps in terms of access to technology for some human groups, placing them at a disadvantage in their work or teaching performance (Mariño and Bercheñi, 2020).

For example, the use of work in digital networks has been configured as a space that facilitates the professional development of teachers. The facilities for discussion provided by online technologies such as: immediacy, interaction, accessibility from any place and time, are beneficial; however, they are not always available in all educational settings.

For this reason, online technologies are an important tool for processes that transcend the distances between agents: distant teachers and students or outside educational facilities.

In the current situation, the digital gap that hinders the application of new technologies is more clearly revealed, due to inequalities in access, inappropriate training for handling tools, inadequate connectivity, insufficient devices for the development of academic activities in teachers and students, among others (Mariño and Bercheñi, 2020).

The conditions generated by COVID-19 have reaffirmed the need to implement distance teaching preparation, with the use of the most dissimilar technologies. But, to achieve this use, it is necessary to overcome traditional concepts, associated with rigid and static educational models, characterized by immovable physical structures that limit the flexibility, innovation and dynamism characteristic of transformative educational programs.

For the reasons stated, this paper has the purpose of explaining how, during the situation of social isolation caused by the pandemic, teacher preparation has been developed using ICTs to accelerate and adapt the passage of the teaching process to blended and distance learning modalities.

In Cuba, since the beginning of the century, conditions have been created for a third educational revolution that grants an

important role to the use of ICTs. But it has not always been possible to specify it in all scenarios, nor at all levels for which it offers potential, including teaching.

Today, what is proposed by Rodríguez *et al.* (2019) by stating that the benefits of ICTs depend on the use and relevance given to them by the different sectors of society, especially the educational community.

The university, as a fundamental part of the development of society, is not oblivious to the technological impact that causes the spaces of the educational teaching process to think about ICT; with more reason in the teaching of engineering, due to the characteristics of the professionals that it helps to train.

Therefore, teachers must have spaces for reflection on their own training and teaching practices framed in virtual environments, including the ways in which teaching work is designed and organized based on work in teacher groups.

The achievement of this purpose is conditioned by the capacity of assimilation, the will and the creativity of the teachers. In these conditions, accelerated training is necessary to be able to face the demands of the immediate change to be produced in their daily practices in the conditions of social distancing imposed by COVID-19.

The current teaching work regulation in Cuba not only recognizes the need to use ICTs in the training process, but also establishes functions related to these, for the year, discipline and subject groups (Ministry of Higher Education, 2018). Such is the importance of this issue that the use of technologies is implicit in these regulations in all blended and distance activities, making explicit mention of ICT on six occasions.

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Its integration into the educational teaching process favors access to a large volume of information and, complemented by the use of the Internet, enables interaction with formalized knowledge (Pessoa *et al.*, 2016), in addition to enhancing its impact on social, institutional and individual life.

This is why ICTs have been integrated into university education, based on the particularities and conditions of nations and universities (Hernández, 2017). Thus, they have favored the ways and means of developing the teaching and methodological work in the institutions, in correspondence with the technological capacities of the universities and the development of the skills and work conceptions of the teaching staff.

In turn, the proper use of ICT is a valuable support to adapt the educational teaching process to the conditions of distancing and the biosecurity measures generated by COVID-19.

The global health crisis energized the anticipated change in social relations in general and in education in particular, giving way to the non-face-to-face paradigm, moving classroom teaching processes to virtual environments. This has also caused curricular changes and didactic transformations to ensure university education with equity in the conditions of the Cuban capital (population concentration, high mobility between municipalities and complex urban transport situation).

A dynamic of constant adjustments and high levels of uncertainty has been necessary that could only be faced with flexibility, constant communication and social responsibility. In educational institutions, the pandemic has caused the need to incorporate social networks into their academic uses, with an impact on teaching and training processes.

Interpersonal relationships are part of the natural essence of man, which affect the structures and social groups that depend on a permanent interaction between its members and the environment. In the teaching activity, the results of this interaction must respond to specific objectives and seek the transmission of clear, accurate and consistent ideas with the interests expressed in the study plans and specified in the didactic treatment of the contents, so as to guarantee the fluency and effectiveness of your messages.

Valenzuela (2013) considers a social network, not only the group of people that compose it, but the entire system of hosting and offering the service (generally with the use of various technologies) required to generate links between users, without this necessarily imply a common interest.

Professional social networks are communities where subjects with common interests in the academic field interact, they are characterized by a certain homogeneity, with profiles of users with common interests, and a restricted set of members. Understood as a social network, a space created virtually to facilitate interaction between people (Hütt, 2012).

Caber *et al.* (2016) affirm that social networks have become great technological potentials, since they offer a great variety of services and advantages for their users, among them, easy communication, with which they break down borders and give access to a global community. They particularize their use in the educational sphere in which they recognize that social networks have been incorporated into education as tools that advance towards communicational environments of learning and collaboration, which have been growing exponentially.

Other authors who share our interest in ICT in improving our work practices with teachers are Limas and Vargas (2020), who highlight the use of social networks in educational practice, as a communication link between the educational community and affirm which, in addition, favor the development of other methodologies and learning environments.

For this reason, social networks in non-face-to-face environments are not only a possibility, but also useful for complementing professional training processes.

In general, the discussion about the impact of the use of ICT in the establishment of interaction networks for the improvement of teaching and learning usually affirms that social networks are gaining more strength and presence in universities every day, and that this situation points to the need to introduce changes in educational models, in access to information and in the diversification of teaching-learning methods, which makes them an innovative vehicle that facilitates the improvement of all the processes that contribute to improving vocational training.

The reasons pointed out mark the need to think about the teaching-learning spaces around ICT, including the use of social networks, extending the role of teachers and workers who are linked to teaching activities. This requires the reformulation of the design, organization and implementation of new forms and procedures to practice teaching, research and extension in a pandemic situation.

The direction of the teaching preparation of teachers to implement the constant changes that occur in this period requires the diversification and adaptation of this preparation at all levels; this, based on the principle that the transformations cannot be based exclusively on the technological infrastructure of the institutions and the

preparation of teachers (unequal and exclusive in access and use). Rather, they must be based on a teaching-learning model that conceives a structuring of the training process with a relationship of attendance, self-learning, use of ICT and teacher-student, group-student and student-student interaction, more supported by the active role of the subject in obtaining and evaluating their knowledge.

The set of guiding principles proposed by the United Nations Organization for Education, Science and Culture and the International Institute for Higher Education in Latin America and the Caribbean to plan the way out of the crisis in higher education have been supported. (Mariño and Bercheñi, 2020).

The current context raises the need to conceive teaching processes focused more than on the transmission of knowledge, on the promotion of intellectual abilities and capacities, the development of creative thinking and on the stimulation of self-learning with the resources that new technologies provide. It is about taking advantage of the natural predisposition of students to learn in a flexible way and actively acquire knowledge and skills to manage their own learning even while distanced from those who direct and control them (Infante and Breijo, 2017).

To achieve what has been expressed, teacher preparation must be based on a multidisciplinary way of thinking, on collective and team work, and on multidirectional communication, rationally using the communication tools provided by ICTs for the development of distance teaching preparation with highest relevance and quality.

All of the above promotes new ways of approaching the educational teaching process, fostering a virtual learning

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environment that prepares teachers for the implementation of ICT in the transformation of their pedagogical practices.

## MATERIALS AND METHODS

The work is developed in the Institute of Basic Sciences of the Technological University of Havana, as a research with qualitative -quantitative, non-experimental, descriptive methodology. For the collection of information, data related to the forms of communication, exchange and discussion of teachers with their groups were collected and processed.

The data of 178 professors of the Institute of Basic Sciences, from a universe of 200 professors, are recorded for the sample to know the resources they use most frequently in their relationship with their department and interact for teaching and methodological work (table 1). These resources can be: fixed telephony, mobile telephony, the use of email, the use of WhatsApp, Telegram or other work tools in social networks.

It takes place between March and November 2020, identifying three stages differentiated by the objectives and the means of implementation used, namely:

First: accelerated digitization of content for remote work (March-April)

Second: implementation of curricular and didactic adjustments and transformations (April-August)

Third: completion of studies and preparation of conditions for blended learning (September-October)

These stages overlap temporarily, due to the constant adjustments to the conditions of

control of the pandemic and the establishment of the policies of the MES and that also present particularities between each of the faculties and careers.

The documentary and content analysis (of the documents and of the different tools) allows us to advance a characterization of each stage that we present below.

### First

Objective: to place the necessary information within everyone's reach, to guarantee the continuity of the process in a short period of time and closure of the subjects with the possibility of being evaluated.

It is characterized by the compilation, organization and publication in various formats and platforms of the information of the subjects, with emphasis on the content to be managed. The teaching preparation fell to the subject groups and the higher levels were dedicated, fundamentally, to managing easy and equitable access to teachers and students. This stage allowed an advance in the digitization of content, but presented many difficulties with access to information.

### Second

Objective: to clear up the uncertainty caused by the pandemic, determine the curricular and didactic transformations that the moment required, and prepare teaching groups to adopt them.

It is identified by the establishment of networks of relationships between the different levels of teacher preparation, with an emphasis on collegial decision-making, using various communication channels in correspondence with individual conditions (social networks, email groups and WhatsApp, personalized emails, etc.). instant and conventional messaging, mobile and fixed telephony and limited personal contacts

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and complying with hygienic-sanitary standards. This stage allowed the collective work of the career commissions and other methodological and management groups, the elaboration and dissemination of tips, info graphics, guides and recommendations in various digital formats, to support transformations.

### Third

Objective: closing of the rest of the subjects that could be evaluated, carrying out the exercises for continuation of studies and assembly on the Moodle platform of the adjustments for the new course.

It stands out for the teaching preparation on the diversification of the evaluation, the establishment of flexible ways of carrying out and evaluating the completion of study exercises, frequent adjustments of the curricula impacted by the decisions imposed by the pandemic and preparation of teachers for the introduction of ICT tools in teaching under the new conceptions, fundamentally complementing the blended learning process with activities on the Moodle platform. This stage allowed the graduation and job placement of more than 90% of the day course students, the reorganization of the career curricula to compensate for the period of face-to-face teaching inactivity, and progress in planning the activity to achieve mastery of the contents identified and adjusted in the previous stages.

At the university level, various social networks were used (Facebook, Telegram, Twitter and WhatsApp, fundamentally), the websites of the faculties and careers, the Cujae tele training site, the courses on the Moodle platform, mobile and fixed telephony, e-mail and personal contacts and in small groups inside and outside the institution, and other ways. In the direction of teacher preparation at the central level, the use of WhatsApp groups with data from institutional

phones and many other private phones, virtual and face-to-face contacts of groups and the production of information in various formats was relevant, in support of work on study priorities, guided by the Teaching Vice-Rector and the Undergraduate Training Department.

Due to the importance of the work of the first years of our careers and the breadth of the work with the professors (seven departments with two hundred professors in total), it was decided to present as an example the case of the work carried out at the Institute of Basic Sciences (ICB), of the Cujae.

## RESULTS

The case study of the work carried out by the ICB in this period includes the combination of qualitative and quantitative methods, which seek to identify the quantity and quality of the interactions achieved in teacher preparation through the different channels, as well as the analysis of the perceptions of directors and teachers about its relevance and effectiveness for the orientation and transformation of teacher preparation.

Given the situation of distancing from the university, various challenges were faced. From the objective point of view, the difference in the availability of technological resources was faced and, from the subjective point of view, the lack of skills in the use of technology and the traditionalist mentality of many teachers who are skeptical about the use of these resources.

Challenges were identified as the need to:

- Promote the exploitation of current technological advances, promoting in the university community forms of communication, interactivity and

behavior that support the educational teaching process and the realization of teacher preparation in the conditions of distancing.

- Impact on changing the attitude of teachers and on the development of informational skills that allow them to use ICT, so as to strengthen their work and facilitate learning processes in blended learning conditions.
- Generalize the appropriate use of tele training platforms, guaranteeing the continuity of the educational teaching process with different levels of attendance.

To face these challenges, emphasis was placed, from the first stage, on establishing distance work relationships through different channels and a system was structured in each department, in correspondence with the availability of resources for teachers; In addition, the methodological activity was organized through virtual groups with different variants in each of the seven departments that make up the institute and that teach, fundamentally, in the first years of the careers.

In the different groups, a network composed of different levels of use of technological communication resources was structured (table 1), which used technologies in a pyramidal, hierarchical and particular way, to the extent that the available technological infrastructure allowed it.

For communication between managers, between managers and teachers, and between teachers, three basic resources were available: fixed telephony, mobile telephony, and computer networks that were through the institution's network or through the home network.

**Table1-** Availability of technological resources

<b>Technological resource of communication</b>	<b>Number of Teachers who use it</b>
fixed telephony	112
mobile telephony	96
computer network	48

The way in which the teachers established communication was basically developed through email, social networks (primarily WhatsApp) and direct telephone conversations (cellular or fixed telephony). It is pertinent to clarify that some teachers use more than one form of interaction.

Generally, and in a simplified way, it can be identified that the telephone conversation was at the top of the pyramid, as it was the most common and accessible to the largest number of teachers; second, the use of email and the use of social networks (mainly WhatsApp).

Table 2 shows the use of different communication channels, which allowed the use of institutional sites and platforms, the use of mail (individual and in lists), mobile telephony and fixed telephony. All this was complemented by the personal and direct link between the teachers who live close to each other, always with respect for the established hygienic-sanitary measures.

**Table 2-** Distribution of teachers by forms of communication used

<b>Forms of communication</b>	<b>Number of Teachers</b>
Email	103
WhatsApp	91
Telephone communication	136



In this way, the management of information, the exchange and the execution of the tasks of curricular and didactic adjustment that the situation demanded was achieved.

This system of relationships allowed: keeping teachers informed and updated, sharing ideas, sharing pertinent documentation, debating experiences, points of view, dialoguing and reaching consensus on aspects of the educational teaching process in conditions of social isolation.

For example, using mailing lists, it was possible to socialize methodological documents, scientific articles referring to different current issues, such as distance evaluation, class meetings, face-to-face and semi-face-to-face teaching activities, the use of a tele-training platform, among others. Taking advantage of the potential of WhatsApp chat, which can be used synchronously or asynchronously, depending on the objectives of the activity, allows the sharing of messages in written form as well as voice and images. This made it possible to establish more dynamic and fluid debates and exchanges, corroborating in the case of Cuba what was stated by Yeboah and Ewur (2014) in their study on the use of WhatsApp, that the efficient use of WhatsApp makes communication easier and faster, therefore, a more efficient flow of information and a shared idea between students and teachers.

The use of the direct link between geographically close teachers was the last possible alternative when the teacher could not access any of the previous ways to maintain the link with social distancing; always under the principle of not violating what is established by the government authorities and the Ministry of Public Health. This channel allowed teachers in a less advantageous situation to keep abreast of the documents shared and debated and the fulfillment of the tasks emanating from the group of department, discipline or subject.

At the head of this activity, the central figure was the head of the department, center or directorate, who organized, directed and controlled the process. In the case of areas with large teaching staff, groups by disciplines were available, if these in turn included many teachers and a diversity of objectives and interests, groups by subjects were established. All were supported in the forms initially explained. In most cases it was necessary to combine them, but always taking care that no teacher was left out of the teaching and methodological preparation.

## DISCUSSION

The discussion and investigation of the use of ICT in educational processes is not a new topic in itself, but it is undeniable that the current conditions give it greater relevance and timeliness, given the necessary contextualization and adaptation of the Teaching-Learning Processes to the changing conditions of non - attendance, attendance and semi - attendance.

In this work, the interaction between the agents of the process through social interaction networks is studied, which reaffirms the importance of assuming the potentialities of the use of ICTs as a determining factor in the conditions of social distancing imposed by the pandemic. It is a topic of current discussion to identify weaknesses in the use of social networks and facilitate interaction between teachers and between them and their students, as a strategy in the development of the educational teaching process.

In our study it is explicit that a social network in the teaching environment necessarily implies the common interest of establishing the Teaching-Learning Process in the case of social distancing conditions.

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Communication is emphasized as an elementary factor in the interrelation between the agents of the process with the use of ICT and specifically of social networks. In the experience of the Institute of Basic Sciences, with the use of computer tools, the development of teacher training in various networks was supported.

It can be affirmed that the use of social networks to carry out teaching and methodological work in conditions of social distancing has constituted a training of teachers to adopt technologies as a means of working with students and has led to the training of a large group of teachers who previously doubted the effectiveness of these resources in the educational teaching process.

At the same time, its analysis in this study allows us to affirm that confronting the COVID-19 situation and its impact on training resulted in a process of flexibility, diversification and learning of teacher preparation in each of the identified stages. It was found that it is necessary to establish networks of relationships that include the most diverse technologies, to develop the distance work of groups of teachers at different levels and that, through the use of various tools, forms and formats, it allowed maintaining a level of teacher preparation that guaranteed the necessary adjustments and transformations to adapt the training process to post- COVID conditions in Cujae.

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**Conflict of interests:**

The authors declare that they have no conflicts of interest.

**Authors' contribution:**

The authors have participated in the writing of the work and analysis of the documents.



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