

# **Information And Communication Technologies In The Master's Degree In Health Economics**

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## **ABSTRACT**

The use of information and communication technologies has great relevance in training. The National School of Public Health has a system of courses on this topic for the improvement of students who come to the center. The program of excellence for the master's degree in Health Economics has, since its inception, the course "Information and Communication Technologies for Health Professionals", which in its fifth edition has a strengthened faculty and the technological means necessary to its development. The objective of this work is to describe the results of the course from its implementation in the virtual classroom of the National School of Public Health. The methods used were the bibliographic review and documentary analysis to update the contents, the analysis of the platform reports and the unstructured survey to determine strengths and challenges. As a result, the planned contents were updated and training was carried out for the practical use of collaborative work tools and bibliographic managers. Participations in the virtual classroom were nourished and strengths were appreciated in the preparation of the faculty, in the motivation of the students and in the novelty of the topics. The course provided techniques to search, organize, research and publish on health economics. It is concluded that the use of virtual environments enables the consolidation of technological and informational competencies based on self-learning and collaborative work, as well as the appropriation of content and the best use of the virtual environment with respect to initial familiarization.

**Keywords:** information and communication technologies; virtual classroom; collaborative work tools; Virtual environment; Health economics.

## **INTRODUCTION**

Since the end of the 20th century, information and communication technologies (ICT) have occupied a central place in society and their use has spread rapidly. Among the various concepts that exist about ICT, its emergence is based on the technological convergence of the development of electronics, software and telecommunications infrastructure. The association of these three technologies gives rise to a conception of the information process, in which communications open new horizons and paradigms. <sup>1</sup> Including them in a timely manner in professional improvement scenarios is a necessity and implies studying them in depth.

The use of computer tools is a necessity today in all spheres of human endeavor. Information management is important for decision making and the execution of processes of all types. The challenge proposed by ICT goes beyond recognizing its advantages and potential. One of the important aspects when using these technologies lies in promoting their appropriate use and developing skills in their users while continuing to promote ethics, values and the construction of knowledge collectively.

ICTs provide the conditions to transform traditional passive teaching, focused on the transmission of content, the teacher and the class, into another type of more personalized, participatory education that achieves diverse learning and has real significance for each student. <sup>2</sup> The correct use of ICT in education not only requires mastery of computer tools, but also prior methodological strategies that support their use. The methodological preparations and the academic committee of

the Health Economics department enable better planning of activities through the analysis of the tools to be used in each case. The use of ICT, by itself, does not ensure learning; It is therefore necessary to give priority to the organization, planning and methodological and technical assurance of the classes in advance.

At the end of the 90s, as a sign of the consolidation of the national vision regarding the need to develop a national information policy, the Guidelines of the Computerization Program for Cuban society were developed.<sup>3</sup> This document constituted a necessary initiative at the government level, related to the development of ICT and, at the same time, a new qualitative level in the growth of the information sphere. The objective focused on promoting the massive use of these technologies on a national scale, based on the general strategic objectives that the country has proposed. He also raised the need to promote all sectors in a coherent manner, with a precise identification of the actors of the Information Society.<sup>4-5</sup> This program is monitored today and the perfection of its processes continues in practice.

The Health sector in Cuba shows dissimilar results in terms of computerization, all of them based on satisfying the needs to strengthen the processes of medical care, administration and teaching.<sup>6</sup> The availability of ICT has led to the use of videoconferencing, transmission of medical images, consultations with experts, as well as a greater rise in the use of forms of teaching with less conventional methods. The application of ICT in medical education not only focuses on distance education, but also recognizes the advantages it brings to the approach and interaction of professionals and creates degrees of self-regulation that allows them to evaluate their levels of progress and build alternative learning strategies.<sup>2</sup> It is timely to point out that the construction of knowledge is no longer passive and

scarce and information abounds. On the other hand, the school is no longer the only means that brings new generations into contact with knowledge and information, and in the face of information saturation coming from new technologies, the school has a new function.<sup>7</sup>

A novel aspect of this form of teaching through ICT is the use of Virtual Teaching Learning Environments (EVEA). The definition used by the authors refers to the fact that the term EVEA is associated with a new paradigm in which current trends in education converge, for everyone and throughout life, where learning theories and styles focus their processes in the student, which allow them to build their knowledge based on their own expectations and needs according to the context in which they develop. In this way, they apply investigative methods that allow them to take actions to achieve positive results, united and facilitated by the intensive use of ICT and networking.<sup>8</sup> The EVEA allows each student to represent their opportunities and strategies for learning through the tools and interrelationships with other people in the conditions of cooperation and collaboration provided by technology, which together make the teaching-learning process possible in virtuality.<sup>9</sup>

This virtual modality makes it possible for both teachers and students to interact with their respective counterparts in activities that enrich their own learning and teaching experiences.<sup>2</sup> It is appropriate to note that, although there are detractors of these new ways of teaching, Cuban medical education has very positive experiences in this regard. An example of this is the Infomed health network, the name that identifies it, which emerged in 1992 as a project of the National Information Center for Medical Sciences. This network is made up of a group of people and institutions that work and collaborate to facilitate access to information

and knowledge, necessary to improve the health of Cubans and the people of the world.<sup>10</sup>

Within the results related to the field of teaching, we can also mention the Virtual Health University (UVS) with open courses, clinical discussions, case studies, questions to experts and different resources such as blogs, wikis, forums, resource repositories, etc. This network also includes the virtual classrooms of the collaborating centers and institutions and the Virtual Health Library (VHL): "information management network, exchange of knowledge and scientific evidence in health, which is established through cooperation between institutions and professionals in the production, intermediation and use of sources of scientific health information, in open and universal access on the Web."<sup>11</sup> Another example to mention is: the Cuba Node of the Virtual Campus of Public Health (CVSP) of the Pan American Health Organization (PAHO/WHO), whose mission is to develop, through cooperation, interaction and learning in network, the capacities of the institutions and the skills of the workers to maintain a permanent education process that allows continuous improvement in the performance of public health practices.<sup>12</sup>

The National School of Public Health (ENSAP) is inserted into this framework, which has human and material resources to incorporate ICT into its processes. One of the work objectives of this institution is to apply ICT in the development of the Intranet and in support services for internal and external activities from the teaching, research and management point of view.<sup>13</sup> This objective translates into the use of tools to support teaching and research processes, as well as the development of computer programs that support them. As part of this institutional objective, there is a system of courses for the improvement of students and the

human resources involved based on the appropriate use of ICT and information management.

ENSAP has an Intranet, a web portal and a Virtual Classroom that supports from a technical point of view the execution of the institution's teaching processes. The platform used to use the Virtual Classroom is Moodle in version 2.5. Moodle ( *Modular Object Oriented Dynamic Learning Environment* ) means modular and dynamic object-oriented learning environment and is a course management system specialized in learning content. Today it is on its way to becoming a virtual educational platform standard. Its users with an administrator role can copy, use and transform the system with absolute freedom without such actions constituting a modification or violation or both of copyright. <sup>14</sup>

It is necessary to point out that collaborative environments do not depend so much on ICT itself, but rather on the reorganization of institutions and the change in methodological paradigm, on the ability of people to accept this way of distributing content and skills. <sup>15</sup> One way to gain followers in this field is precisely to use these EVEA to encourage students in collaborative work spaces and to train them in these tools that facilitate teamwork.

In 2003, to enhance skills in the use and management of information through ICT, the ENSAP master's degree in Health Economics implemented the course "Information and Communication Technologies for Health Professionals" . This course was initially in the Infomed virtual classroom and among its main results were publications on the use of ICT, preparation of a Compact Disc (CD) for students with the course study materials and the Virtual Health Library ( DVD) all authored by professors from the faculty of said master's degree. <sup>16-18</sup>

Currently, in the ICT course of the master's degree in Health Economics there is a highly qualified faculty, since it has teachers with mastery and training in the topics and also graduates from the specialties of Library Science and Computer Science. In 2015, ENSAP migrated the Moodle platform to version 2.5, taking into account the stability and advantages offered by this version of the software. Furthermore, with the support of the faculty, it was agreed by the academic committee of the master's degree in Health Economics to migrate the ICT course from Infomed to the ENSAP virtual classroom. For this, it was conceived to carry out a review of its materials with a view to its reorganization, an aspect that is novel and implies that the course is updated and managed from the ENSAP virtual classroom itself through the professors who make up the faculty. The objective of this work is to describe the results of the course "Information and Communication Technologies for Health Professionals" from its implementation in the ENSAP Virtual Classroom, in its fifth edition.

## **METHODS**

The methods used were the bibliographic review and documentary analysis, as well as the analysis of participation through the platform in the different activities aimed at students, to whom an unstructured survey was applied to know their criteria about the course.

The general objective of this course is to ensure that students are able to assess the importance of the use of information and communications technologies in the management of information and knowledge about health economics. The specific objectives were: to identify the Cuban policy for the computerization of society and its priorities within the National Health System; identify the possibilities of



virtual environments and the web 2.0 paradigm for health information management, through the use of the tools available in Infomed that contribute to the development of collaborative work and online learning, and apply the skills acquired in working with the Moodle platform and information organization and bibliographic management tools in solving information needs, its treatment, search and recovery.

By using the bibliographic review and documentary analysis, it was decided to return to the ICT topics already covered in previous editions of the course. The necessary update was incorporated and other content of interest was added due to its novelty and application in health economics research. The use of these collaborative work tools and their possibilities of generating debate among the students so far incorporated into the course (27) were investigated, as well as promoting collective knowledge construction work among them. In this way, it was planned, based on the methodological strategy implemented, to focus on ethics and values associated with the use of technologies and information management.

By analyzing the entries to the platform tasks, the number of participations per activity, the coherence and quality of the responses, and the number of responses to other students were obtained. In this way, it was possible to exhaustively monitor the students of the course and how they used the tools studied. The reports generated by the Moodle platform by activities and by students reflected this data. In the final work prepared on the Wiki, the comparative review of the work was used to know the differences of the document in its versions as the students modified it. These views also allowed us to see the individual contributions and evaluate the quality of each participation with the application of the unstructured survey to the 27 students incorporated up to that moment with the objective of



recognizing the strengths and challenges of the course, which allowed us to investigate the possible course improvements for future editions, as well as maintaining the positive aspects and improving the negative ones. The course included students from health centers in different provinces of the country and a foreign student from a health center in his country. All of them were reviewed through the records and reports generated automatically by the virtual platform. With these reports, the regularity of participation and delivery of evaluations in the activities planned in the virtual classroom was analyzed.

The course contents were divided into four main topics and the teaching activities consisted of lectures, practical classes, individual and group participation evaluations, as well as a final integrative seminar. The analysis of the feasible tools to be used for the development of the tasks was carried out in the academic committee of the Department of Health Economics. The results of the evaluations, the student's journey, as well as the teachers' criteria were considered as the final evaluation. The contents for each topic were selected from updated approaches and materials reviewed by the faculty, so that students focused on the new technological trends used in the world. Work was carried out to design and reorganize the course sections to place them in the corresponding spaces in the ENSAP virtual classroom. Tasks and activities for using virtual environment tools (forums, tasks and wiki) were also added.

The evaluative activities were reviewed, assessing the quality of the responses, the novel contributions and the frequency of participation. For this edition, there were discussion forums, a search for scientific articles and sites useful for the topic through Infomed, and a bibliographic review of important topics which were referenced through the Zotero bibliographic manager.<sup>19</sup> Another activity

conceived was the design of conceptual and mental maps using the Cmaptool<sup>20-</sup><sup>21</sup> and Xmind tools.<sup>22</sup> The Wiki was used in the development of the final seminar. The group was divided into 5 work subgroups and in this way the work was completed by each student. The results of the evaluations on the platform were also analyzed to determine the appropriation of the knowledge taught and the performance of the students in the subject when using the EVEA.

## RESULTS

To describe the results of the course "Information and Communication Technologies for Health Professionals" from its implementation in the ENSAP virtual classroom, data were obtained corresponding to the number of participations in forums, deliveries and evaluations of tasks and work on the wiki. The final Abstract of the grades is shown in the [table](#).

**Tabla.** Evaluación final del curso Tecnologías de la Información y la Comunicación y Gestión del Conocimiento en la maestría en Economía de la Salud, en el año 2015

Excelente	Bien	Aprobado	Total
14	12	1	27
51,9 %	44,4 %	3,7 %	100 %

96.3% of the students participated in the forum. The debates and approaches were appropriate to the content taught and the materials made available in the virtual classroom. With this resource, work on Web 2.0 was put into practice, which enabled immediate actions by students with the dynamic exchange of experiences in order to also achieve feedback for teachers.<sup>23</sup> The task of preparing a document in Word that lists websites or scientific articles, of reference in their performance as professionals through the Infomed network, was completed by everyone and

was influenced by the error when copying the web addresses to the document. and delay in delivery. From this we deduce the existence of difficulties in the skills to navigate through the Internet that require more practice. All students submitted the assignment that corresponded to References and concept maps. The main difficulties focused on the use of the Zotero tool for bibliographic management, which shows that there is a need to develop more practical activities to improve skills in its management.

The final seminar was held on the Wiki, with subgroups and different topics. All students participated and each one modified the text so that the report was prepared in a participatory manner with the knowledge of the entire subgroup. At the end of the course, with the application of the unstructured survey, the strengths and challenges for subsequent editions were confirmed. The [table](#) shows the main criteria of the students in this survey.

**Cuadro:** Fortalezas y retos del curso Tecnologías de la Información y la Comunicación en la maestría en Economía de la Salud

Fortalezas	Retos
La calidad de las conferencias sobre las TIC ha sido excelente, lo que permite realizar valoraciones y análisis de las diferentes temáticas tratadas en cada una de ellas.	Abordar estos temas importantes en mayor tiempo por ser necesarios para todos los profesionales.
Todas las conferencias fueron productivas, ya que ayudaron a ampliar los conocimientos con el uso de las tecnologías. Se logró el aprendizaje independientemente de que los estudiantes no siempre las tienen a su alcance.	Continuar el perfeccionamiento técnico de los equipos de computación y garantizar la disponibilidad para los estudiantes.
Se evidenció preparación e interés por parte de los profesores, ya sea para buscar participación como para motivar a los estudiantes a fin de que sean asertivos y analíticos en cada clase.	Disponer de mayor tiempo para realizar las tareas orientadas y practicar las herramientas de trabajo en la computadora.
Intercambio del conocimiento entre varias personas. Formas nuevas de aprendizaje. Indicaciones y sugerencias de profesores de distintas especialidades.	Realizar actividades prácticas más frecuentes para desarrollar más habilidades.
El alcance de todos los servicios que brinda Infomed, con sus servicios y portales, sin desestimar la Biblioteca Virtual y los artículos y tesis que se pueden consultar allí.	Desarrollar más práctica en las búsquedas en Infomed y sus recursos de información.
Descubrir los mapas conceptuales y mapas mentales fue algo fascinante.	Emplearlos como herramientas para la organización de la información en las presentaciones de las tesis y trabajos.

## DISCUSSION

In the academic committee of the master's degree in Health Economics, the types of activities to be used for the development of the students' tasks and practice were discussed, taking into consideration the tools that would enable group exchange and that would also affect the work. individual students.

With the use of the forum activity "Importance of ICT in Information and Knowledge Management in Health", it was possible to promote a busy debate among the students that was based on the analysis of the conference on said topic. In this forum, the participation not only analyzed the strengths of the technologies, but also the ethical considerations and the need to reinforce values regarding their use. Furthermore, the need to address this topic more frequently was raised, which would minimize the risks associated with ignorance.

The task on preparing a document in Word allowed students to thoroughly explore the resources of the Infomed Web Portal, which contributed to enriching their knowledge of updated information sources. With this task, students were able to recognize the potential of the resources made available to health professionals without the need for Internet access. The task on searches and their references through the Zotero tool provided students with knowledge to organize the References found for the final seminar. This tool in this edition was addressed in a practical class, which reinforced the practice in its use and motivated students who did not know it. Despite this, the need to continue training in skills with said tool was evident. The mental and conceptual mapping task was successful and the tools studied were used, which motivated the students for their subsequent use in their master's degree completion work. With this content, students developed the skills of organization and representation of concepts and themes, which will contribute to the development of the thesis workshops and pre-defense exercise and final defense of the master's thesis. These tools made their work easier when addressing information structures and work schemes, among others.

With the use of the wiki in the final seminar, the value of respect for criteria, collective work and the union of knowledge to focus on the same research topic

was promoted. The wiki also allowed them to correct the working document and they showed motivation for its use in the development of other research topics as a collective of authors. The result of the evaluations shown describes an adequate level of appropriation of the contents, which reinforces the idea of using these teaching strategies through virtual environments. The course had a good performance and the participation was interesting and rich in knowledge from various disciplines. The quality of the responses to tasks was corroborated, which showed interest in learning through ICT and the acquisition of skills in the tools studied.

When analyzing the survey, it was evident that the selected topics were indicated as productive and the way to address them was appropriate. The use of practical tools from the environment, as well as those used for working with maps and References, was a strength. The preparation of materials and classes were recognized for their quality.

The challenges present the faculty with the need to continue perfecting practical activities and address these topics more frequently due to their importance. It must be recognized that ENSAP has laboratories with equipment in good condition and with access to the Infomed and Internet networks, which facilitated the work as planned. When comparing the results stated with the initial familiarization that is given to the students on their first day of class with the virtual classroom, it was possible to see that the skills in managing classroom tools improved with respect to how they started. It is also important to know that some of the students had never worked in these environments before and that this initial familiarization constituted a starting point for the faculty to diagnose the main existing difficulties and the students who required more individualized attention.

## **FINAL CONSIDERATIONS**

The results of the implementation of the course "Information and Communication Technologies for Health Professionals" in the master's degree in Health Economics were described, in which it was possible to verify that EVEA, in this case the use of the platform Moodle with the ENSAP virtual classroom makes it possible to consolidate technological and informational skills based on self-learning and collaborative work. The evaluations reflected appropriation of content and better use of the virtual environment with respect to how students began the course through initial familiarization.

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