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REVIEW ARTICLE

Challenges of information and communications at the University of Medical Sciences of Santiago de Cuba

Desafíos de la información y las comunicaciones en la Universidad de Ciencias Médicas de Santiago de Cuba

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ABSTRACT

Introduction: The relationship between information and communications in the university context, particularly at the University of Medical Sciences of

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Santiago de Cuba, presents a significant problem due to the profound impact of information and communication technologies on the training of the current physician.

Objective: To describe the relationship between information and communications as a key educational practice for medical students at the University of Medical Sciences of Santiago de Cuba.

Methods: Twenty-seven articles were consulted, selected from academic databases such as Scielo, PubMed, and Google Scholar.

Development: The results indicate that Information and Communication Technologies (ICT) have revolutionized the field of medical education, not only in accessing and managing critical information but also transforming traditional pedagogical methods, allowing for more interactive, dynamic, and adaptive learning tailored to current needs. Additionally, the strategic inclusion of medical informatics in the academic curriculum strengthens the preparation of medical students at the university in Santiago, providing them with essential technological competencies for an increasingly digital and demanding environment.

Conclusions: The constant evolution of ICT at the University of Medical Sciences of Santiago de Cuba has generated significant changes in the educational and professional roles within the academic training of students. This transformation highlights the need to continuously update teachers' skills and modernize technological infrastructures, in order to maximize the potential of these tools in medical education.

Keywords: Computer Literacy; Medical Education; Medical Informatics; ICT

RESUMEN

Introducción: la relación entre la información y las comunicaciones en el contexto universitario, particularmente en la Universidad de Ciencias Médicas de Santiago de Cuba, plantea una problemática significativa debido al profundo impacto de las tecnologías de la información y la comunicación en la formación del médico actual.

Objetivo: describir la relación entre la información y las comunicaciones como una práctica educativa clave para los estudiantes de medicina de la Universidad de Ciencias Médicas de Santiago de Cuba.

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Métodos: se consultaron 27 artículos seleccionados de bases de datos académicas como Scielo, PubMed y Google Académico.

Desarrollo: los resultados indican que las Tecnologías de la Información y Comunicación (TIC) han revolucionado el campo de la educación médica, no solo el acceso y la gestión de información crítica, sino también transforma los métodos pedagógicos tradicionales, lo que permite un aprendizaje más interactivo, dinámico y adaptativo a las necesidades actuales. Además, la inclusión estratégica de la informática médica en el currículo académico fortalece la preparación de los estudiantes de medicina de la universidad santiaguera, proporcionándoles las competencias tecnológicas indispensables para un entorno cada vez más digitalizado y demandante.

Conclusiones: la evolución constante de las TIC en la Universidad de Ciencias Médicas de Santiago de Cuba ha generado cambios significativos en los roles educativos y profesionales dentro de la formación académica del estudiantado. Esta transformación resalta la necesidad de actualizar continuamente las habilidades del docente y de modernizar las infraestructuras tecnológicas, con el fin de aprovechar al máximo el potencial de estas herramientas en la educación médica.

Palabras Clave: Conocimientos en Informática; Educación Médica; Informática Médica; TIC

INTRODUCTION

In the current context, information and communications technologies (ICTs) are no longer limited to being simple tools for accessing knowledge, but have become an essential necessity for the development of various social spheres. Rapid technological progress represents a determining factor that provides significant advantages for society. Today, the interconnection between the political, economic, social, cultural, and educational spheres through ICTs is undeniable, consolidating their role as a driver of globalization that significantly impacts human activity. ICTs not only optimize the management of information and communication, but also facilitate the generation of deeper knowledge and new forms of intelligence. [1]

Higher education, in the current context, places significant importance on medical-professional education as a generator and disseminator of knowledge. Faced with the challenges facing multiple communities, medical-professional education stands as an indispensable instrument for humanity to advance toward goals of peace, freedom, and social justice. It is not only a matter of

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technological advances; the main essence lies in a paradigmatic shift in the teaching and educational processes of training, in a society where space-time relations modify human communication. (2)

In October 1998, the World Conference on Higher Education was held in Paris, where the "World Declaration on Higher Education for the 21st Century" was drafted. One of its articles establishes that the potential of new information and communication technologies must be fully utilized to renew higher education, expanding and diversifying the transmission of knowledge, and making knowledge and information available to a wider audience. Furthermore, the Ministry of Public Health promotes policies that favor the integration of these technologies in the training of future health professionals. These initiatives not only seek to modernize teaching methods but also ensure that future medical professionals are trained to face current challenges. (3,4)

In line with these guidelines, the University of Medical Sciences of Santiago de Cuba has excelled in implementing innovative educational programs that utilize information and communication technologies to expand and diversify access to knowledge. These initiatives are essential to ensure that students and faculty not only have access to the latest trends and advances in the health field, but can also actively contribute to the country's scientific and academic development. (4)

Furthermore, ICTs as secure tools make it possible to secure technical, educational, and professional systems to meet national and regional priorities, thereby strengthening the University's responsiveness to population demands. (4)

Information and Communication Technologies (ICTs) not only play a fundamental role in higher education but also in medical education, as they facilitate the transition from teaching knowledge to a constructivist approach, strengthening and enriching the educational system. In this context, this article proposes a reflection on the importance of incorporating the use of ICTs in university settings, both in undergraduate and graduate programs, in order to face the challenge posed by the technological explosion of the so-called digital knowledge era or society. (5)

ICTs play a crucial role in medical education, as they optimize information management and the development of communication within the University of Medical Sciences of Santiago de Cuba, favoring its optimal functioning. These technologies not only allow more efficient access to knowledge but also facilitate the generation of new educational ideas and practices. Furthermore,

ICTs transform teaching methods, enrich the learning experience, and contribute to the comprehensive development of students. (5) In this context, it is essential to analyze how the relationship between information and communications can be leveraged to strengthen the academic training of medical students at the University of Medical Sciences of Santiago de Cuba.

Based on the above, the objective of this article is to describe the relationship between information and communications, as an educational practice for medical students at the University of Medical Sciences of Santiago de Cuba.

MATERIALS AND METHODS

This study was based on a descriptive literature review conducted between January and March 2024. Twenty-seven articles were selected from the SciELO, PubMed, and Google Scholar databases, prioritizing those (in Spanish and English) that addressed the integration of digital competencies in medical science curricula.

The analysis focused on examining current trends and challenges in the integration of ICTs in medical universities, with particular attention to the University of Medical Sciences of Santiago de Cuba. This methodological approach allowed for the collection of diverse and comprehensive information, offering a comprehensive view of the need to modernize medical education in the context of the current technological revolution.

In addition, the study included international best practices and recommendations for the development of ICT competencies in medical institutions. This framework facilitated a descriptive-comparative analysis between global standards and the reality of Cuban medical education.

DEVELOPMENT

Universalization and impact of Information and Communication Technologies in Higher Education

Information and Communication Technologies (ICTs) originated in universities as a strategy for acquiring deeper and more specific knowledge, depending on the different academic areas in which individuals work. Although their use has spread to all educational levels and diverse areas of human knowledge, their most well-known and studied development is that which occurs in this context. (6)

Their development is evident in the university context. The introduction of ICTs in the academic field has been driven by their ability to facilitate more interactive education, with almost immediate access to information, the creation of innovative teaching methods, and the possibility of barrier-free communication. This integration not only responds to technological advances but also to the need for a pedagogical transformation, in which curricula, teaching methodologies, and assessment adapt to the dynamics imposed by these technologies. (7)

In this sense, the University of Medical Sciences of Santiago de Cuba has been an outstanding example in the incorporation of ICTs into its training programs. This approach not only improves the quality of medical education but also fosters a more student-centered educational model.

Through the use of ICTs, student participation is encouraged, allowing students to construct their own knowledge based on theoretical frameworks such as constructivism and collaborative learning. This methodological approach not only changes the role of the student, giving them a leading role in their learning process, but also opens new pedagogical perspectives that enrich the educational process. The incorporation of ICTs in higher education implies a profound change in the way teaching is conceived. (8-11)

Transformation of educational roles and information management in the digital age

In the context of the information society, the interaction between students and faculty is being redefined, allowing for greater flexibility in pedagogical roles and learning scenarios. (12) According to the authors, the University of Medical Sciences of Santiago de Cuba has embraced these changes, adapting its organizational and methodological structures to the universalization of higher education in Cuba. This process has required the adaptation of educational environments, leading to the implementation of technological platforms and digital tools that facilitate access to knowledge and the continuing education of students.

One of the main challenges of university education in Cuba has been managing the massification of information without losing sight of educational quality. (14) In response to this challenge, the University of Medical Sciences of Santiago de Cuba has used ICTs not only as a resource to facilitate access to education, but also as a tool to improve digital literacy, foster self-learning, and promote collaborative work between students and faculty.

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Researchers such as Marrero Pérez MD et al. [13] have pointed out that ICTs have radically transformed education. Through their use, learning scenarios have been diversified and updated, allowing for the creation of virtual educational environments based on innovative pedagogical models that guarantee effective student learning. [15]

In the authors' opinion, at the University of Medical Sciences of Santiago de Cuba, virtual education has been a key tool for offering a more open and flexible educational modality that responds to the needs of students of diverse ages and backgrounds, allowing them to continue their academic training or specialize in specific areas of knowledge. This virtual education model not only eliminates time and space barriers but also offers a methodological alternative in which curricula, assessment criteria, and pedagogical approaches can be adapted to students' needs. [16]

Digital transformation in health sciences: the pioneering role of the University of Medical Sciences of Santiago de Cuba

ICTs have revolutionized education at all levels, and the field of medical sciences is no exception. These technologies provide advanced tools for accessing, processing, and managing health information, making them essential for the training of future professionals in this sector. Medical education, faced with the rapid social and technological transformations of the modern world, has had to adapt to meet new demands. This has required a profound adjustment in its pedagogical strategies to effectively integrate the use of ICTs into its training processes. [17-21]

According to the authors, the University of Medical Sciences of Santiago de Cuba has been a pioneer in this adaptation process, effectively integrating ICTs into its curricula. The institution has not only focused its efforts on traditional academic training but has also promoted the use of ICTs as a fundamental tool for self-learning, knowledge sharing, and improving educational quality.

Educational paradigm in health: from pedagogical innovation to the development of digital skills

ICTs are transforming medicine and rethinking approaches to medical education. The introduction of ICTs in the classroom has not only fostered more independent and creative students but has also forced educators to rethink their pedagogical approaches to offer more dynamic and interactive learning. The implementation of ICTs in medical education has also brought

with it new challenges, such as the development of digital skills among future physicians. (22-25)

In the authors' opinion, at the University of Medical Sciences of Santiago de Cuba, priority has been given to training in computer skills and the use of digital tools in the medical field, to ensure that graduating professionals are not only experts in their field but also master the technologies that will allow them to improve their practices and optimize patient care.

Medical Informatics: A Fundamental Pillar in the Training of Healthcare Professionals in the Face of Digital Challenges

The curriculum of this Higher Education Center in Cuba has been continually updated to include subjects that develop skills in the use of ICTs, such as Medical Informatics, a key discipline for strengthening and expanding students' digital competencies.

The inclusion of Medical Informatics in the curricula of Medicine, Dentistry, and Nursing in Cuba was a milestone in the evolution of higher education in the health sciences. Since its approval in the 1990s, this discipline has played a crucial role in the training of healthcare professionals, providing the technological tools necessary to face the sector's contemporary challenges. (26)

This discipline did not emerge in isolation, but rather was a natural evolution of preexisting subjects such as Research Methodology and Biostatistics, which were included in the curricula of medical programs in the 1980s. (27)

This research provides scientific evidence on how the strategic integration of ICTs in higher medical education, particularly in the Cuban context, transforms training paradigms. It highlights as a novelty the pioneering model of the University of Medical Sciences of Santiago de Cuba, which combines pedagogical innovation with the development of digital skills to address the challenges of contemporary medicine.

CONCLUSIONS

The rapid advancement of ICTs has generated significant changes in the social, economic, educational, and scientific spheres. Through their application, medical sciences have transformed professional and institutional roles, practices, and, of course, medical education. Faculty must be trained to meet this challenge, fostering their development. The use of new technologies

in the computerization process plays a fundamental role in Medical Science Universities, as it allows them to enter the era of digitalization without being separated from the material resources available at the different institutions.

BIBLIOGRAPHIC REFERENCES

1. Camacho Lozano FE, Gónzales Carrión EL. Innovación educativa: Integrando las TIC en la educación superior. Revista Latina: Revista Multidisciplinaria [Internet]. 2024 [cited 08/10/2024]; 8(1): [aprox.17 p.] Available in: https://dialnet.unirioja.es/servlet/articulo?codigo=9430281

2. Arocha Mariño C, Castillo Guzmán A, Bustamante Alfonso L, Hernández Ferro P, González González AV, González Valcárcel B. Curso de Dirección en Salud en ambiente virtual de enseñanza aprendizaje. Educ Med Super [Internet]. 2012 [cited 08/10/2024]; 26(4):[aprox.9 p.] Available in: http://scielo.sld.cu/scielo.php?script=sci_arttext&pid=S0864-21412012000400004&lng=es&nrm=iso&tlng=es

3. Declaración Mundial Sobre la Educación Superior en el siglo XXI: visión y acción. Conferencia mundial sobre la educación superior. Unesco, París 5-9 de octubre de 1998. Rev cubana Educ Med Super [Internet]. 2000 [cited 08/10/2024]; 14(3): [aprox. 17 p.]. Available in: http://scielo.sld.cu/pdf/ems/v14n3/ems06300.pdf

4. Marcelo C. Las tecnologías para la innovación y la práctica docente. Revista Brasileira de Educación [Internet]. 2013 [cited 08/10/2024]; 18(52): [aprox. 22 p.]. Available in: www.scielo.br/pdf/rbedu/v18n52/03.pdf

5. Falcón Villaverde M. La educación a distancia y su relación con las nuevas tecnologías de la información y las comunicaciones. Medisur [Internet]. 2013 [cited 08/10/2024]; 11(3): [aprox. 12 p.]. Available in: http://scielo.sld.cu/scielo.php?script=sci_arttext&pid=S1727-897X2013000300006

6. Cabero Almarera J. La educación a distancia como estrategia de inclusión social y educativa. Revista Mexicana de Bachillerato a Distancia [Internet]. 2016 [cited 08/10/2024]; 8(15): [aprox. 12 p.]. Available in: http://hdl.handle.net/11441/34247

7. Del Castillo Saiz GD, Sanjuán Gónzales G, Gónzales Martínez M. Tecnologías de la Información y las Comunicaciones: desafío que enfrenta la universidad de ciencias médicas. Revista EDUMCENTRO [Internet]. 2018

[cited 08/10/2024]; 8(15): [aprox. 12 p.]. Available in: http://scielo.sld.cu/scielo.php?pid=S2077 28742018000100011&script=sci_arttext&tlng=en

8. Rojas Machado N, Pérez Clemente F, Torres Milord I, Peláez Gómez E. Las aulas virtuales: una opción para el desarrollo de la educación médica. EDUMECENTRO [Internet]. 2014 [cited 08/10/2024]; 6(2): [aprox. 9 p.]. Available in: http://scielo.sld.cu/scielo.php?script=sci_arttext&pid=S2077-28742014000200016&lng=es&nrm=iso&tlng=es

9. Ruiz JA, Martínez M, Sánchez M. El impacto de las TICs en la calidad de la educación superior. Revista de Investigación en Ciencias Contables y Administrativas [Internet]. 2015 [cited 08/10/2024]; 1(1): [aprox. 2 p.]. Available in: https://scholar.google.es/scholar?hl=es&as_sdt=0%2C5&q=El+impacto+de+las+TICs+en+la+calidad+de+la+educaci%C3%B3n+superior.+Revista+de+Investigaci%C3%B3n+en+Ciencias+Contables+y+Administrativas&btnG=#d=gs_qabs&t=1739705426783&u=%23p%3DzEHlTE56ao0J

10. Rama C. La virtualización universitaria en América Latina. RUSC. Universities and Knowledge Society J [Internet]. 2014 [cited 08/10/2024]; 11(3): [aprox. 9 p.]. Available in: http://dx.doi.org/10.7238/rusc.v11i3.1729

11. Padilla Beltrán JE, Rojas Vega PL, Rincón Caballero DA. Tendencias y dificultades para el uso de las TIC en educación superior. Entramado [Internet] 2012 [cited 09/10/2024]; 10(1):[aprox. 21 p.]. Available in: http://dialnet.unirioja.es/servlet/articulo?codigo=5473608

12. Gómez-Hernández JA. Tendencias en programas de alfabetización informacional para empoderar a las personas y a las comunidades: tecnologías sociales y nuevas prácticas ciudadanas. E-lis [Internet]. 2015 [cited 09/10/2024]; 4(2): [aprox. 11 p.]. Available in: http://eprints.rclis.org/28990/

13. Marrero Pérez MD, Pérez Pérez GJ. Papel de la investigación en la formación de recursos humanos de la carrera de Medicina. EDUMECENTRO [Internet]. 2013 [cited 09/10/2024]; 5(3): [aprox. 13 p.]. Available in: http://scielo.sld.cu/scielo.php?script=sci_arttext&pid=S2077-28742013000300014

14. Mejías Rodríguez R. Preparando el camino para una educación abierta. RCIM [Internet]. 2013 [cited 09/10/2024]; 5(1):[aprox. 7 p.]. Available in: http://scielo.sld.cu/scielo.php?script=sci_arttext&pid=S1684-18592013000100003&lng=es

15. González García NC, Garriga Zarria EP, Cuesta García Y, Mas Camacho MR. La disciplina Informática Médica en el "Plan D" de la carrera de medicina. Rev Cubana Informática Med [Internet]. 2015 [cited 09/10/2024]; 7(1):[aprox. 7 p.]. Available in: http://scielo.sld.cu/scielo.php?script=sci_arttext&pid=S1684-18592015000100003&lng=es&nrm=iso&tlng=es

16. Linares Pons N, Verdecia Martínez EY, Álvarez Sánchez EA. Tendencias en el desarrollo de las TIC y su impacto en el campo de la enseñanza. Revista Cubana de Ciencias Informáticas [Internet]. 2014 [cited 10/10/2024]; 8(1):[aprox. 9 p.]. Available in: http://rcci.uci.cu/index.php?journal=rcci&page=article&op=view&path[]=517

17. de la Torre Navarro LM, Domínguez Gómez J. Las TIC en el proceso de enseñanza aprendizaje a través de los objetos de aprendizaje. Rev Cubana de Informática Med [Internet]. 2012 [cited 10/10/2024]; 4(1): [aprox. 9 p.]. Available in: https://scholar.google.es/scholar?hl=es&as_sdt=0%2C5&q=+Las+TIC+en+el+proceso+de+ense%C3%B1anza+aprendizaje+a+trav%C3%A9s+de+los+objetos+de+aprendizaje.+&btnG=#d=gs_qabs&t=1739705923110&u=%23p%3DjtUFO0vslG8J

18. Pupo Ávila NL, Pérez Perea L, Alfonso García A, Pérez Hoz G, González Valcárcel B. Aspectos favorecedores y retos actuales para la misión de la Universidad de Ciencias Médicas Cubana. Educ Med Super [Internet]. 2013 [cited 10/10/2024]; 27(1): [aprox. 10 p.]. Available in: http://scielo.sld.cu/scielo.php?script=sci_arttext&pid=S0864-21412013000100014&lng=es&nrm=iso&tlng=es

19. López Domínguez R, Flores Santiago I, Llaguno Roque JL. Tecnologías de la información y las comunicaciones (TIC) y ciencias: el reto de la creación de contenidos para apoyar una cultura digital en la enseñanza de ciencias biológicas. Revista Iberoam Producción Académica y Gestión Educativa [Internet]. 2015 [cited 10/10/2024]; 5(4): [aprox. 10 p.]. Available in: https://scholar.google.es/scholar?hl=es&as_sdt=0%2C5&q=Tecnolog%C3%ADas+de+la+informaci%C3%B3n+y+las+comunicaciones+%28TIC%29+y

+ciencias%3A+el+reto+de+la+creaci%C3%B3n+de+contenidos+para+apoyar+una+cultura+digital+en+la+ense%C3%B1anza+de+ciencias+biol%C3%B3gicas&btnG=

20. García Garcés H, Navarro Aguirre L, López Pérez M, Rodríguez Orizondo MF. Tecnologías de la Información y la Comunicación en salud y educación médica. EDUMECENTRO [Internet]. 2014 [cited 10/10/2024]; 6(1):[aprox. 10 p.]. Available in: http://scielo.sld.cu/scielo.php?script=sci_arttext&pid=S2077-28742014000100018&lng=es&nrm=iso&tlng=eS

21. Regalado Miranda EM, Regalado Miranda EM. Nuevos retos en informatización y ciberseguridad para la Universidad de Ciencias Médicas de La Habana. Rev Habanera de Cienc Med [Internet]. 2015 [cited 10/10/2024]; 14(4):[aprox. 4 p.]. Available in: https://scholar.google.es/scholar?as_ylo=2024&q=inform%C3%A1tica+m%C3%A9dica+salud&hl=es&as_sdt=0,5#d=gs_qabs&t=1739706705892&u=%23p%3DwY5DRQc9BPUJ

22. Schneider EC, Eisenberg JM. Strategies and methods for aligning current and best medical practices. The role of information technologies. West J Med [Internet]. 2022[cited 10/10/2024]; 168(5): [aprox. 2 p.]. Available in: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1304973

23. Gónzales Arencibia M, Mar Cornelio O. Objeto, métodos, principios y funciones de la bioética en el campo de la Informática Médica. Revista Científica de Salud BIOSANA [Internet]. 2024 [cited 10/10/2024]; 4(3): [aprox. 4 p.]. Available in: http://soeici.org/index.php/biosana/article/view/369

24. Miralles Aguilera EÁ. Cronología de los mapas curriculares en la carrera de Medicina. Educ Med Sup [Internet]. 2024 [cited 10/10/2024]; 29(1): [aprox. 10 p.]. Available in: http://scielo.sld.cu/scielo.php?script=sci_arttext&pid=S0864-21412015000100010&lng=es&nrm=iso&tlng=eS

25. Programa de la Informática Médica. Plan D de la carrera de medicina. La Habana: Minsap; 2015.

26. Programa de la Informática Médica. Plan E de la carrera de medicina. La Habana: Minsap; 2023.

27. Díaz Melgarejo L, Carrete Aties DE, Robaina Flores A, María Salinas L. Propuesta metodológica para el perfeccionamiento para el proceso de educación ambiental en la carrera de Medicina. Revista Cubana de Informática Médica [Internet]. 2024 [cited 10/10/2024]; 16(1): [aprox. 18 p.]. Available in: https://scholar.google.es/scholar?hl=es&as_sdt=0%2C5&as_ylo=2024&q=inform%C3%A1tica+m%C3%A9dica+salud+en+la+carrera&btnG=&oq=la+inform%C3%A1tica+medica+y+su+importancia+#d=gs_qabs&t=1739725384811&u=%23p%3DQjICeiEqWn4J

STATEMENT OF AUTHORSHIP

LASB: Conceptualization, Data curation, Formal analysis, Research, Project management, Resources, Validation, Original draft writing.

OAPR: Conceptualization, Research, Methodology, Project Management, Resources, Validation and Writing, Review and Editing.

YBA: Conceptualization, Research, Methodology, Project Management, Resources, Validation and Writing, Review and Editing.

CONFLICT OF INTEREST

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