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Applicable technologies to improve teaching processes at the higher education level

Tecnologías aplicables para mejorar los procesos didácticos de nivel superior
Tecnologias aplicáveis para melhorar os processos didácticos de nível superior

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Abstract: The general objective of the study is to analyze the role of the technologies applied in the improvement of higher-level teaching processes at the Toribio Rodríguez de Mendoza National University. The approach is mixed since the documentary analysis and the survey are used to obtain the data; the population consists of the main theoretical contents, Background and theories on the technologies to be used to improve higher-level teaching procedures and by 10 teachers from the Toribio Rodríguez de Mendoza National University, to whom a small survey was applied in order to identify the technological resources applied by teachers to support the teaching process learning, which promote the development of content and its

implementation at the Toribio Rodríguez de Mendoza National University. The methods used were: Systemic, hermeneutic, hypothetical-deductive, statistical and analytical method. The incorporation of ICT into regular teaching practice is becoming closer to reality every day, thanks to the commitment and interest of teachers in the subject and the spread of educational portals on the Internet, where teaching resources for the classroom can be found.

Key words: technologies, teaching processes, technological resources, learning process**.**

Resumen: El estudio tiene como objetivo general analizar el rol que cumplen las tecnologías aplicables en la mejora de los procesos didácticos de nivel superior en la Universidad Nacional Toribio Rodríguez de Mendoza. El enfoque es mixto dado que se usa el análisis documental y la encuesta para la obtención de los datos; la población está conformada por los principales contenidos teóricos, antecedentes y teorías respecto de las tecnologías aplicables para mejorar los procedimientos didácticos de nivel superior y por 10 docentes de la Universidad Nacional Toribio Rodríguez de Mendoza, a quienes se les aplico una pequeña encuesta con la finalidad de identificar los recursos tecnológicos aplicados por los docentes para apoyar el proceso de enseñanza aprendizaje, que favorecen el desarrollo de contenidos, y su puesta en práctica en la Universidad Nacional Toribio Rodríguez de Mendoza. Los métodos usados fueron: Método sistémico, hermenéutico, hipotético-deductivo,estadístico y analítico. La incorporación de las TIC a la práctica docente habitual, cada día está más cerca de ser una realidad, gracias al compromiso e interés de los profesores por el tema y a la propagación de portales educativos.

Palabras clave: tecnologías, procesos didácticos, recursos tecnológicos, proceso de enseñanza aprendizaje.

Resumo: O objectivo geral do estudo é analisar o papel das tecnologias aplicáveis na melhoria dos processos didácticos ao nível superior na Universidade Nacional Toribio Rodriguez de Mendoza. A abordagem é mista uma vez que a análise documental e o inquérito são utilizados para obter os dados; a população é conformada pelos principais conteúdos teóricos, antecedentes e teorias sobre as tecnologias aplicáveis para melhorar os procedimentos didácticos de nível superior e por 10 professores da Universidade Nacional Toribio Rodríguez de Mendoza, aos quais foi aplicado um pequeno inquérito com o objectivo de identificar os recursos tecnológicos aplicados pelos professores para apoiar o processo ensino-aprendizagem, que favorecem o desenvolvimento de conteúdos, e a sua implementação na Universidade Nacional Toribio Rodríguez de Mendoza. Os métodos utilizados foram: método sistémico, hermenêutico, hipotético-dedutivo, estatístico e analítico. A incorporação das TIC na prática regular do ensino está a tornar-se uma realidade todos os dias, graças ao empenho e interesse dos professores na matéria e à difusão de portais educativos na Internet, onde se podem encontrar recursos didácticos para a sala de aula.

Palavras-chave: tecnologias, processos didácticos, recursos tecnológicos, processo de ensino e aprendizagem.

INTRODUCTION

Teaching becomes more and more complex with each passing day, becoming a much more challenging experience for students. On the other hand, each educational level has its own specificity, which is determined by the social and educational needs to which education intends to respond and which are

abbreviated in the educational objectives for each stage of training. Compulsory basic education pursues its goals and the same can be said for higher education. In order to achieve the educational objectives established in the educational programs, teachers plan, organize, manage and implement the teaching-learning process in the classroom according to their training, experience and resources available in the context where they work.

The orchestration of the teaching process is not a simple task; it demands from the teacher theoretical and practical knowledge, cognitive and social skills, skills, attitudes and desirable values, as well as a good dose of intuition or common sense, among others. One of the essential components, which allows higher education to achieve its mission, is didactics. Higher education has its own specificity, therefore, it requires a distinctive didactics that enables the learning of students, mostly adults, with previous knowledge and experiences, motivations and diverse expectations regarding their personal and professional project. Although there are different didactic approaches and proposals, there are certain approaches that seem to be more in line with the demands currently placed on higher education institutions around the world.

The emergence of Information and Communication Technologies (ICT) has had an impact on the functions of the education system and has allowed innovation in the transmission of new knowledge. Educational institutions, possessors and distributors of knowledge, are no longer the only sources of knowledge and learning. Much knowledge that used to be the exclusive patrimony of schools can now be found in different places. ICTs are offering students access to unlimited sources of knowledge, to multimedia tools that allow them to expand their knowledge of information.

It is transcendent for the educational field to make known the importance of technologies to improve higher level didactic processes, due to the fact that, in a world with a higher level of technology day by day, it is necessary to find

tools that go hand in hand with the technological changes that occur in everyday life. The technological changes of the information and communication society, reveal the felt need of the general public. This is a phenomenon of globalization, which is manifested in information and communication technologies (ICTs), enabling communication, interaction and interconnection between people and institutions worldwide, and eliminating spatial and temporal barriers. ICTs must be used appropriately, in a way that allows the development of more democratic and inclusive societies, so that they strengthen collaboration, creativity and a fairer distribution of scientific knowledge and contribute to a more equitable and quality education for all.

This study is of great importance because it shows that the incorporation of ICTs in higher education still faces great challenges; empirical experience has shown that their instrumentalization is carried out through routine practices, where the technical aspect is privileged over the pedagogical one. It is insufficient to ensure that teachers and students have access to ICTs; the most important thing is the effective use of ICTs and their natural incorporation into academic practices. This depends on the effectiveness and efficiency of teaching-learning processes and school management, as well as on the capacities of the actors involved and their interactions with electronic resources in the classroom.

It is therefore of interest to understand the different ways in which the relationship between computers and telecommunications and educational processes has been understood, in order to visualize the trends and possibilities of this linkage. The conception of the use of these technologies has been modified on the basis of two elements: the educational nature that organizes mediation and the technological possibilities at the time of its use.

In order to give theoretical support to this research, it is important to mention that Educational Technology has gone through different historical moments from its inception to the present and that certain phenomena or ideological currents have had an important influence on them. Among the most important influences are those that came from the field of Didactics, from the field of psychology (behaviorism, cognitivism) or from the world of communication. García et al., (2014), points out that didactic strategies constitute mediation tools between the learning subject and the teaching content that the teacher consciously employs to achieve certain learning. For their part, learning strategies are the predominantly mental procedures that the student follows to learn. In addition, he considers that didactic strategies guide and orient the student's psychic activity so that he learns significantly. This author emphasizes that these are not mere observable actions that denote what a group of students do during the lesson; they are those actions that induce a certain mental activity of the student that makes him really learn.

For his part Gallo, (2017) specifies that didactics, is the theoretical-normative science that intentionally guides the optimizing process of teaching-learning, in a given and interactive context, enabling the apprehension of culture in order to achieve the integral development of the student. Another author of great relevance as Iñesta & Pascual, (2015), points out that it is the didactic act as the teacher's performance to facilitate students' learning. It is a performance whose nature is essentially communicative. The author circumscribes the purpose of the teaching activities of learning processes as the achievement of certain objectives and specifies as necessary conditions.

Likewise, it must be recognized that, from a social point of view, the area of communication provides the necessary tools to achieve an assertive and empathic relationship, solve conflicts, propose and reach consensus, indispensable conditions for a harmonious and democratic coexistence. From

an emotional perspective, it allows to establish and strengthen emotional bonds. From a cognitive point of view, communicative competence is fundamental for the development of learning in the other areas, given that language is an instrument for personal development and the main means for developing the symbolic function, as well as for acquiring new learning. From the cultural point of view, the use of the mother tongue enables the development of self-esteem, identity and communication with the inner and outer world.

That is why the various theories talk about human behavior, learning theories try to explain the internal processes when learning, for example, the acquisition of intellectual skills, the acquisition of information or concepts, cognitive strategies, motor skills or attitudes. For example, behaviorism is based on studies of learning through conditioning (instrumental conditioning theory) and considers the study of higher mental processes unnecessary for the understanding of human behavior. One of its representatives is Skinner, who describes how reinforcement shapes and maintains a given behavior.

Undoubtedly, ICTs have transformed the current learning environment from a traditional teacher-centered one to a student-centered one, because the former has ceased to be the main source of information and the main transmitter of knowledge to become a guide or conductor of learning, and the student has gone from being a passive recipient of information to an element that actively participates in his or her own learning. Questions about the potential contributions of these technologies to education have been clarified to the extent that the developments necessary for their use are conceived within a broader educational framework than that of computer systems alone. ICTs are facilitating the democratization of access to and distribution of an enormous volume of information, which was previously unreachable, exponentially increasing the speed and agility of communications and

enabling the exchange of roles between sender and receiver in such a way that both are an active part of the communicative act.

Therefore, the academic environment needs to be at the forefront of these changes. The teaching-learning possibilities that ICTs allow as didactic and pedagogical tools are many, which means that educational institutions must go hand in hand with them. This is one of the reasons that led to choose this topic for the research. The identification of the technological and computer applications most used by higher education students of the Universidad Nacional Toribio Rodríguez de Mendoza in their daily activities was taken into account, in order to analyze how they could be used in classroom work, to attract the student's attention, leading to meaningful learning.

MATERIALS AND METHODS

The research approach is mixed with an exploratory design, given that qualitative and quantitative techniques are used for data collection, which complementarily allow a better analysis of the problem, with qualitative data being presented first, followed by quantitative data. Therefore, a documentary review of similar research in the educational field is carried out, as well as the contribution of higher education teachers. Due to its type, this is an applied research, which seeks the application or utilization of the knowledge acquired.

The population for the qualitative aspect is made up of the main theoretical contents, background and theories regarding the technologies applicable to improve didactic procedures at a higher level; while the population for the quantitative aspect is made up of 10 teachers of the Universidad Nacional Toribio Rodríguez de Mendoza, to whom a survey was conducted with the purpose of identifying the technological resources applied by the teachers to support the teaching-learning process, to favor the development of contents,

the appropriation of knowledge and the implementation of the same at the Universidad Nacional Toribio Rodríguez de Mendoza. Statistical data were processed through simple percentages in an Excel spreadsheet.

RESULTS

From what has been reviewed in the theoretical sources and the survey applied, it can be affirmed that the role of applicable technologies in the improvement of didactic processes at the higher level at the Universidad Nacional Toribio Rodríguez de Mendoza is relevant, because there is a need to rethink the didactics of the classes, using applicable technologies as tools to facilitate the teaching-learning process, due to the growing interest and great motivation shown by students for technology, computer science and the virtual environment in which they develop.

Theoretical contents, background and theories related to the applicable technologies that allow improving the didactic processes in education Reviewing the appreciations of Sepúlveda & Véliz, (2013) these authors point to the motivation that young people feel for the use of ICT, and the decisive way in which this type of didactic tools will increase the creativity and thus the emotional intelligence of the students. Also Zaragoza Ramos et al., (2016), in their doctoral thesis, exposes the design of a didactic strategy, to integrate the forms of the chemical experiment that the teacher performs in the classroom, but that, although starting from the academic, involves and establishes a relationship with the labor and research, the requirements for the management of the process, and with the application of ICT in the teaching of chemistry.

Indeed, one of the pertinent topics that coincide with this proposal is the good use given to the Internet and the motivation that it generates in young people; considering the important support to the formative work that ICTs offer, since they make the classes more practical. As the authors point out, with the integration of technology in the classroom, new pedagogical spaces open up that enrich the didactics of science teachers. Currently, those who use ICT have great advantages over the traditional way of teaching classes, because they take advantage of the technological means that serve as a platform for simulating the different natural phenomena. The latter would be difficult to represent and would become inappropriate for efficient learning, especially for this generation in which students are always going at a fast pace, forging their continuous learning.

In order to identify some theories that support this research process related to the applicable technologies to improve the didactic processes at a higher level, it was necessary to consult other authors and their contributions to the topic in question. This is why Ausubel's significant learning, Novak's concept maps, as well as the motivational aspects for learning according to Vygostky, and topics related to evaluation according to significant learning, and the applicable technologies to improve the didactic processes in higher level students are related.

Meaningful learning: the theory of meaningful learning, has its origin in Ausubel's interest in knowing and explaining the conditions and properties of learning, which can be related to effective and efficient ways of deliberately causing stable cognitive changes, capable of providing individual and social meaning (Esteban et al., 2016, p. 56), that the essence of meaningful learning lies in the fact that ideas are related symbolically and not arbitrarily with what students already know.

With meaningful learning, students give meaning to what they can understand, to what is within their proximal learning zone, to which they were led or oriented by the teacher. Learning seen in this way, allows humans to integrate new knowledge, within the previous knowledge structures, when the concepts are of interest and are related to what we already know (Marchán-Carvajal & Sanmartí, 2015, p. 45).

Concept maps and meaningful learning: in concept maps, concepts are shown in the form of levels, from the most general to the most particular, therefore, it is necessary to know the previous basic concepts and outline them in a clear, connected way that guarantees understanding. For long-term learning to take place, it is necessary to develop the connection and internal coherence of the concepts to be learned, so it is important to connect and relate them in a non-arbitrary and coherent way. It can be said that to achieve meaningful learning it is necessary to use the most powerful tool to relate and connect concepts: the concept map Zurbano, (2014).

In concept maps, concepts are shown in the form of levels, from the most general to the most particular, therefore, it is necessary to know the previous basic concepts and outline them in a clear, connected way that guarantees understanding. The concept map according to Novak has three basic elements: the Concept, the Preposition and the Linking Words Lozano & Penagos, (2014).

ICT in the Educational Scenario: the OECD report states that all countries want to improve the quality and effectiveness of school learning and are betting on ICT as a means to achieve it. This report indicates that there are pedagogical reasons why educational centers should incorporate ICTs, among them because they can broaden and enrich learning, developing the ability to think independently, creativity, problem solving, and the management of learning itself, among others. For its part, (Galindo et al., 2015, p.34) refers

to the fact that one of the educational uses of the computer that has most attracted the attention of educators is that it serves as a resource to support the learning process itself, but incomprehensibly it is the most incipient use. Even today it is difficult to use it as a didactic tool, since it is still an object of learning.

When alluding to the inclusion of new technologies in education, it is necessary to refer to the relationship between the use of new media and educational innovation. The situation is no longer as it was initially seen, to teach about ICT, to train in the skills and abilities necessary for the management of information systems, but rather to use ICT in the classroom as an innovative didactic tool to promote student learning, taking into account the motivational factor it represents for them. It is about teaching with ICT and through ICT, not only teaching ICT.

In addition to everything discussed, it is necessary to affirm that the evolution of technologies allows today to identify seven dimensions in which it is necessary to have some degree of competence to be able to take advantage of the benefits of these tools in the educational processes within the classroom by the teacher. In this sense Hernandez, (2018) compiled the most used indicators to measure these teaching competencies in ICT globally. The following figure highlights each of the eight blocks identified by the author for the incorporation of technological tools in the teaching and learning process.

On the other hand, Albarrán Torres et al. (2020) states that in order to articulate ICT in the classroom, it is necessary to analyze the principles of curricular integration of technological media as didactic tools. This should take into account the cultural environment of students, in order to facilitate learning, development of skills and competencies, within a digital context. It is also important to train teachers constantly to promote the teacher in the use

of ICT. For the above, 3 dimensions of teacher training can be taken into account: knowledge and competencies on ICT as didactic resources in face-to-face and virtual classrooms; knowledge of the hidden curriculum; and knowledge of the school and social reality contexts. These points present a comprehensive process of teacher awareness of the importance of ICTs González, (2016) in the following figure shows the detailed relationship.

The first electronic tools to reach the classroom were the audiovisual media. The use of projectors and slides opened the field for the use of technology in the processes of knowledge transmission in the classroom, and led to the first changes or refreshments in the way classrooms were approached to be positively stimulated. By integrating the use of ICT, it is possible to speak in terms of inclusion, allowing to welcome students with diverse educational needs who had previously been excluded, adapting the teaching and the school to the needs of the student. This ensures that the insertion and expansion of ICT in education responds to the needs of the entire educational population, enhancing their participation in the teaching-learning process, reducing barriers of exclusion by eliminating the limitations of time and space when information is dispersed.

El 76.5% de la población encuestada, compuesta por profesores de la Universidad Nacional Toribio Rodríguez de Mendoza, desde su percepción consideran que la utilización de las tecnologías aplicables por parte del docente debe darse de manera cotidiana, para fortalecer sus debilidades en la acogida adecuada de las mismas y promover la renovación del proceso de enseñanza. La necesidad de cambio de metodología tradicional a una más activa es innegable, en la que el alumno sea más activo en su participación y responsable de su propio aprendizaje, lo cual con la implementación de las TIC en el aula se hace más fácil de alcanzar con la dinámica que logre insertar el docente.

En este sentido, se puede considerar que el docente debería propender a otorgarle a estas herramientas la importancia suficiente, de modo que su utilización se vea reflejada positivamente en el aula y en la potencialización de los componentes de las competencias de los estudiantes. Específicamente, desde la docencia universitaria, es urgente establecer y desarrollar prácticas pedagógicas o metodologías que garanticen aprendizajes significativos que capaciten al estudiante para enfrentarse a un contexto laboral o profesional. A los estudiantes les llega la información por múltiples vías (la televisión, la radio, Internet, etc.), por lo tanto, los docentes no pueden permanecer al margen de estos nuevos modos de construcción de la realidad cotidiana. De esta manera, la solución no está solo en el cambio del rol docente, sino que implica una transformación del modelo educativo y, por ende, de la práctica pedagógica.

Actualmente, es innegable la presencia e irrupción de las tecnologías de la información y la comunicación en cada uno de los ámbitos de la vida del ser humano, debido a que, los transforma y genera avances en el medio circundante. En la sociedad del siglo XXI, las TIC determinan también nuevas formas de enseñanza, de evaluación y de comprensión en todas las áreas educativas. Como herramientas para la gestión del conocimiento y facilitadoras de la comunicación global, tienen un rol importante, debido a que, pueden propiciar oportunidades de aprendizaje, facilitar el intercambio de información e incrementar el acceso a contenidos diversos, así como propiciar la democracia, el diálogo y la participación activa. Por tanto, se le pregunto a los docentes si ¿Considera que para integrar las TIC al ámbito educativo es importante contar la infraestructura o la adquisición de recursos tecnológicos?, obteniendo como respuesta que el 79.6% de los docentes encuestados, consideran que el reto de integrar las TIC al ámbito educativo

no solo se relaciona con la infraestructura o la adquisición de recursos tecnológicos, sino también en cómo el docente trabaja con ellos, el momento en que los utiliza, para qué los emplea y qué tipo de aprendizajes espera generar en los estudiantes. Para un mejor aprovechamiento de las TIC en el aula, se considera esencial tener en cuenta estándares con un sentido y propósitos establecidos, no solo desde la labor docente, sino también desde los currículos y los fundamentos de los programas universitarios, a fin de que exista coherencia entre el discurso pedagógico de la educación superior y su realidad en los salones de clase.

Ante estas posibilidades, resulta necesario cuestionar sobre el saber, el saber hacer y el saber ser de los docentes, y reafirmar la necesidad de que estos se encuentren preparados y capacitados en el uso pedagógico de las herramientas TIC y los recursos educativos digitales. Esto con el fin de enriquecer su desarrollo profesional y la formación integral de los estudiantes, es decir, la práctica pedagógica debe alejarse de los enfoques tradicionales con el propósito de responder a las necesidades y demandas educativas de la actual era tecnológica. Esto podría ser posible si los educadores desarrollan y potencian los conocimientos, las habilidades, las destrezas y las actitudes necesarias para utilizar e integrar las TIC adecuadamente en sus áreas de experticia.

El uso que los profesores realizan de la tecnología aplicada, depende de las concepciones pedagógicas que posean. La rápida adopción de estos medios sociales principalmente entre los jóvenes ha propiciado que las universidades estén interesadas en utilizarlas con propósitos educativos, específicamente para mejorar la participación de los estudiantes. Una educación de calidad, ha siempre tenido en cuenta la habilidad para conectar y construir relaciones. La oportunidad, en este momento, es establecer una fuerte relación entre la alfabetización digital que los alumnos ya poseen y combinarla con la clase

tradicional, como afirma Edmondson (2012). Asimismo, se le pregunto a los docentes si

¿Utilizan los recursos tecnológicos para recoger y analizar datos e interpretar y comunicar los resultados, con el fin de mejorar las prácticas educativas y maximizar el aprendizaje de los alumnos?, a lo que respondieron; el 89.8% de los docentes encuestados, consideran desde su percepción individual que las prácticas educativas, mejoran a través de los recursos tecnológicos implementados en las aulas, Todo lo anterior, con métodos de enseñanza centrados en el estudiante y proyectos colaborativos, con el objetivo de contribuir a la comprensión profunda de conceptos clave por parte de los estudiantes, así como a su aplicación para resolver problemas complejos del mundo real. Con el propósito de apoyar proyectos colaborativos, los docentes podrían utilizar recursos de la red, y así ayudar a los estudiantes a colaborar, a acceder a información y a comunicarse con expertos externos con miras a analizar y resolver problemas específicos.

Los docentes deben además estar en capacidad de utilizar las TIC para crear y supervisar proyectos de clase realizados individualmente o por grupos de estudiantes, así como para contactar expertos y colaborar con otros docentes, utilizando redes con el fin de acceder a información, a colegas y a otros expertos que contribuyan a su propio desarrollo profesional. En este sentido, se destaca la importancia de los recursos educativos como una oportunidad para desarrollar y fortalecer las competencias de docentes y estudiantes en el propósito de utilizar, crear, acceder y evaluar sus aprendizajes en red; generar capacidades institucionales para promover una cultura tecnológica en la que se pueda diseñar, usar, compartir, comunicar, navegar y colaborar en línea; y desarrollar competencias TIC e investigativas en los docentes que les permitan diseñar materiales, contenidos, herramientas y entornos virtuales de aprendizaje.

CONCLUSIONS

Las tecnologías aplicables basadas en TIC, promueve aprendizajes significativos en los estudiantes, debido a la alta motivación que genera en los mismos el uso de recursos tecnológicos de su entorno, teniendo en cuenta su condición de nativos digitales. Estrategias como mapas conceptuales, las WebQuest, y con la participación en foros, la realización de laboratorios virtuales y el trabajo colaborativo, fortalecen el aprendizaje significativo en el estudiante, quien llega a ser consciente de su aprendizaje y lo aplica en el contexto en que se desenvuelve. Las características del modelo pedagógico de la universalización de la educación superior, basado en la semi-presencialidad, tienen en común la búsqueda de la independencia cognoscitiva del estudiante. Esta cualidad justifica la pertinencia del uso de la tecnología aplicable, como un recurso que garantiza eliminar las barreras que obstaculizan el acceso a la formación y, además, por sus potencialidades para ampliar el entorno formativo del estudiante, en función de un intercambio, una colaboración y una interactividad más eficientes.

Las TIC generan verdaderos cambios al interior del aula cuando el profesor las usa como herramientas didácticas innovadoras para favorecer el aprendizaje en los estudiantes, teniendo en cuenta el factor motivacional que representan. Se trata de enseñar con y a través de TIC en las diferentes áreas del saber, y no tenerlas solo como objeto de estudio. La incorporación de las TIC a la práctica docente habitual, cada día está más cerca de ser una realidad, gracias al compromiso e interés de los profesores por el tema y a la propagación de portales educativos en internet, en los que se pueden encontrar recursos didácticos para el aula. Además de las redes en las que los profesores pueden compartir con otros sus experiencias con el uso de TIC y enriquecer así su práctica.

Uno de los grandes retos de la educación del siglo XXI, es el uso de las Tecnologías de la Información y la Comunicación TIC, que representan nuevos modos de expresión, relación, comunicación y participación en el ámbito educativo. Los países desarrollados han enfrentado este reto al establecer el sentido y aportación de estas en el proceso de enseñanza aprendizaje y una correcta política en la formación docente, viendo en la educación, uno de los campos más privilegiados de explotación de las posibilidades de las TIC. La difusión de la innovación educativa con las tecnologías aplicables, se encuentra en una fase de asimilación y, en algunos casos, de transición, pero aún lejos de la transformación. Las creencias y actitudes del profesorado, así como su confianza y competencia hacia las TIC, son fundamentales en su adopción pedagógica. No obstante, el uso que los profesores hacen de las tecnologías para la enseñanza y el aprendizaje, depende de las políticas educativas y los contextos sociales y organizativos en los que ellos viven y trabajan. En suma, la integración de las tecnologías aplicables en la práctica del aula exige cambios estructurales en los sistemas educativos. El uso de TIC por parte del docente debe darse de manera cotidiana, para fortalecer sus debilidades en la acogida adecuada de las mismas y promover la renovación del proceso de enseñanza. La necesidad de cambio de metodología tradicional a una más activa es innegable, en la que el alumno sea más activo en su participación y responsable de su propio aprendizaje, lo cual con la implementación de las TIC en el aula se hace más fácil de alcanzar con la dinámica que logre insertar el docente. El reto frente a este escenario, involucra el esfuerzo y compromiso de docente, institución y alumno, en donde cada uno desde su posición aporte de manera integral al proceso de enseñanza y aprendizaje.

REFERENCES

Albarrán, F., Urrutia, M., Ibarra, J., Miranda, C., & Meza, S. (2020). Models as didactic strategy in health students. *Educacion Medica*, *21*(3), 198–206. https://doi.org/10.1016/j.edumed.2018.08.003

Esteban, M. B., Gutiérrez, B., & Rodríguez-mu, L. J. (2016). Permanencia en la universidad: la importancia de un buen comienzo. *Aula Abierta*, *44*, 1–6. https://doi.org/http://dx.doi.org/10.1016/j.aula.2015.04.001

Galindo, L., Arango, M. E., & López, J. A. (2015). Orientaciones en didáctica para la formación de competencias en los posgrados médicos. *Investigación En Educación Médica*, *4*(14), e9. https://doi.org/10.1016/s2007-5057(15)30041-7

Gallo, L. E. (2017). Una didáctica performativa para educar (desde) el cuerpo. *Revista Brasileira de Ciencias Do Esporte*, *39*(2), 199–205. https://doi.org/10.1016/j.rbce.2016.09.002

García, A. M., Reynaga-Obregón, J., & Márquez-Algara, L. (2014). Satisfacción con la discusión de casos clínicos como herramienta didáctica: informe de dos ciclos escolares. *Investigación En Educación Médica*, *3*(9), 3–8. https://doi.org/10.1016/s2007-5057(14)72719-x

González, J. T. G. (2016). La producción editorial didáctica de la Universidad Estatal a Distancia de Costa Rica: Un diagnóstico a partir del modelo de industrias de contenidos. *Investigacion Bibliotecologica*, *30*(68), 125–153. https://doi.org/10.1016/j.ibbai.2016.02.007

Hernández, R. M. (2018). The didactic strategy against learning styles in higher education. *Educacion Medica*, *19*, 227. https://doi.org/10.1016/j.edumed.2017.10.034

Iñesta, E. M., & Pascual, J. (2015). Plurilingual didactics in teacher training: An empirical study from the training course. *Aula Abierta*, *43*(2), 94–101. https://doi.org/10.1016/j.aula.2014.12.001

Lozano, D. L. P., & Penagos, W. M. M. (2014). El PCK, un espacio de diversidad teórica: Conceptos y experiencias unificadoras en relación con la didáctica de los contenidos en química. *Educacion Quimica*, *25*(3), 332–342. https://doi.org/10.1016/S0187-893X(14)70549-X

Marchán-Carvajal, I., & Sanmartí, N. (2015). Criterios para el diseño de unidades didácticas contextualizadas: Aplicación al aprendizaje de un modelo teórico para la estructura atómica. *Educacion Quimica*, *26*(4), 267–274. https://doi.org/10.1016/j.eq.2015.06.001

Sepúlveda, J. M., & Véliz, J. B. (2013). Consistency between the teaching strategies curricular and beliefs of teachers second cycle, from educational activities. *Perfiles Educativos*, *35*(139), 25–39. https://doi.org/10.1016/s0185-2698(13)71807-5

Zaragoza, E., Orozco, L. M., Macías, J. O., Núñez, M. E., Gutiérrez, R., Hernández, D., Navarro, C. L., de Alba, M., Villalobos R. M., Gómez, N. A., Cerda, R. I., Gutiérrez, A. D., & Pérez, K. A. (2016). Didactic strategies in teaching-learning: In respect to the study of nomenclature of organic chemistry in students of the Atotonilco Regional High School). *Educacion Quimica*, *27*(1), 43–51. https://doi.org/10.1016/j.eq.2015.09.005

Zurbano, E. M. (2014). Actividades prácticas de Matemáticas y su Didáctica 1: Andrés Nortes Checa (Coord.) (2013). *Aula Abierta*, *42*(1), 68–69. https://doi.org/10.1016/S0210-2773(14)70012-5