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REVIEW

Educational management as a driver of scientific and technological research: New horizons for innovation

La gestión educativa como impulsora de la investigación científica y tecnológica: Nuevos horizontes de innovación

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ABSTRACT

Educational management is interpreted indistinctly as the organizational managerial activity most closely related to its actions. However, educational management is not limited only to considering technical and methodological aspects. Education aims at the integral formation of the individual, and someone is educated in order to achieve a purpose. Therefore, it is necessary to take into account the needs of all those who belong to and are involved in the educational institution from its own management. It is well known that technological innovation plays an increasingly important role as a factor of competitiveness for companies. The word "innovation" is constantly used as a synonym for progress, technological development, job creation and improvement of living conditions. Innovation is spoken of in the economic (e.g. technological innovation in companies) and social spheres (in areas such as healthcare, leisure, working conditions and transportation, among others). In this sense, the general objective of the research is to explain the influence of educational management on scientific and technological research, the pillars of innovation. From a methodological point of view, a documentary review is carried out on future projections within the framework of these variables, in order to integrate diverse experiences and models, taking as a reference the results obtained. It is concluded that all these changes are generating new forms of work and new economic scenarios, in which the keys to creating employment and improving the quality of life are based on innovative ideas applied to new products, processes and services.

Keywords: Process-Based Educational Management; People With Diverse Abilities; Pedagogical Strategies; Development Of Scientific And Technological Skills.

RESUMEN

La gestión educativa se interpreta indistintamente como la actividad directiva organizacional más estrechamente relacionada con sus acciones. Sin embargo, la gestión educativa no se limita únicamente a considerar los aspectos técnicos y metodológicos. La educación tiene como objetivo la formación integral del individuo, y se educa a alguien con el fin de lograr un propósito. Por lo tanto, es necesario tener en cuenta las necesidades de todos los que pertenecen y se involucran en la institución educativa desde su propia gestión. Es bien sabido que la innovación tecnológica desempeña un papel cada vez más importante como factor de competitividad para las empresas. La palabra "innovación" se utiliza constantemente como sinónimo de progreso, desarrollo tecnológico, creación de empleo y mejora de las condiciones de vida. Se habla de

innovación en los ámbitos económicos (por ejemplo, la innovación tecnológica en las empresas) y sociales (en áreas como la sanidad, el ocio, las condiciones laborales y el transporte, entre otros). En este sentido, el objetivo general de la investigación es explicar la influencia de la gestión educativa en la investigación científica y tecnológica, los pilares de la innovación. Desde un punto de vista metodológico, se realiza una revisión documental sobre las proyecciones futuras en el marco de estas variables, con el fin de integrar diversas experiencias y modelos, tomando como referencia los resultados obtenidos. Se concluye que todos estos cambios están generando nuevas formas de trabajo y nuevos escenarios económicos, en los cuales las claves para crear empleo y mejorar la calidad de vida se basan en ideas innovadoras aplicadas a nuevos productos, procesos y servicios.

Palabras clave: Gestión Educativa Por Procesos; Personas Con Diversas Capacidades; Estrategias Pedagógicas; Desarrollo De Habilidades Científicas Y Tecnológicas.

INTRODUCTION

As higher education institutions gradually become one of the fundamental axes of society's knowledge production system, their role in innovation becomes more diverse. For this reason, innovation management has become the driving force behind the development of an innovative culture within academia, to raise awareness among students and teachers in generating productive technology-based projects, generating new knowledge production, promoting alliances and support networks, articulating constructive processes that involve the development of technological knowledge, promoting investment in institutions, and channeling the potential in the results generated from an innovation process from the product to all the actors involved in the process.[1]

Currently, society is immersed in the so-called Fourth Industrial Revolution, which is characterized mainly by distributed applications in cyber-physical systems within a manufacturing environment. The background of this revolution is the deep integration of intelligent and networked systems. The development of digital, physical, and biological technologies are three fundamental technological drivers of this revolution, and they originate mainly in the field of software.[2]

The conception and practice of management in university institutions, at present and with a future vision, pose the basis for analyzing the convenience of process management.[3]

Promoting scientific research in educational management aims to increase the productivity of institutions, focusing on creating a teaching-learning environment based on science, technology, and innovation for the knowledge society.

In this sense, educational institutions must develop and enhance students' research activity in order to foster an inquisitive condition of seeking, discovering, knowing, and learning, thereby achieving the integral and sociocultural fulfillment of their students.

However, this research dimension in education must be tailored to each specific context, event, and particular situations related to broader aspects, such as advances in science, technology, and global sociocultural trends.

Therefore, we currently live in an era of society where the innovation of information and communication technologies grows exponentially, improving and modifying the way many daily activities are carried out.

Therefore, it is logical and necessary that throughout history, education has rigorously changed, opting for growth and evolution in a way that can respond to the continuous changes that modern society undergoes. This leads us to ask how to address or manage these changes to promote scientific and technological research in education.

One characteristic aspect of the human condition is the ability to research. Social and historical evolution occurs under various circumstances derived from the investigative condition.

The development of personality, the acquisition of knowledge, vocabulary, work, in short, everything that humans create, develop, and produce is deeply related to research. Hence, individuals are natural investigators: they are born with the ability to ask, inquire, learn, and know. However, this natural condition is not enough, as individuals must constantly enhance their research activity under various circumstances.

It is true that some people manage to develop their inquisitive condition more than others, as is the case with faculties, including willpower and intelligence. But every person possesses that potential to search, discover, question, and learn. In this sense, it is the task of education to promote the emergence of human inquisitiveness with all its potential, which, in turn, should be oriented towards considered fundamental purposes, which are related to integral personal and social fulfillment.

The term education is not only complex and broad in its meaning but also in its social and systemic understanding. Therefore, considering its extreme importance due to its human and social condition and function, it is essential that its management takes root in cultural patterns that characterize and define the evolution and direction of each individual.

However, education and research have a reciprocal relationship. Research produces education while educating society, and education enhances research. Both allow individuals to recreate, improve, develop, and fulfill themselves in the corresponding space-time. Therefore, this correlation gives rise to a research dimension in education, which has currently gained unprecedented prominence in planning, not only at the educational but also at the state level. However, research manifests itself according to values, personality, cultural traits, but also, research and education must be tailored to each specific context, event, and particular situations, and must be related to broader aspects, such as advances in thought, science and technology, ideas, and global cultural trends.[4]

Educational management in scientific and technological research as axes of innovation in the Mexican context is part of the initial actions to delve into the topic of public policy and research. But how can we take that first step without getting lost in a multitude of research? The purpose is to review educational management in scientific and technological research as axes of innovation.

As an emerging country, Mexico faces a challenge that demands in-depth studies to achieve the goal of making appropriate use of ICT in the various processes required for teaching and learning. The government's official discourse in regulatory frameworks expresses the need for the use of new technologies to achieve quality education nationwide. The importance of using new technologies in education cannot be denied; however, it seems that these policies have not been adequately designed.[5,6]

According to the Political Constitution of the United Mexican States, Article 3 states that every person has the right to education. The State - Federation, States, Mexico City, and Municipalities - will provide and guarantee early childhood, preschool, primary, secondary, upper secondary, and higher education. Early childhood, preschool, primary, and secondary education constitute basic education. Basic education and upper secondary education will be compulsory, and higher education will be compulsory according to the provisions of the tenth section of this article. Early childhood education is a right of childhood and will be the responsibility of the State to raise awareness of its importance. The State is responsible for educational leadership, and the education it provides, in addition to being compulsory, will be universal, inclusive, public, free, and secular.[7,8]

The Public Research Centers (CPIs) and their importance for development and innovation in Mexico, together with education, as well as the implementation of academic programs that promote the training of researchers, technology generation, and its transfer. Educational training processes have been constantly evolving, but with the arrival of the SARS-COV-2 virus, all educational processes had to be modified, including the adaptation of CPIs to the use of new technologies, the creation of new support programs for research, and new ways of transmitting knowledge.[9]

METHODS

A descriptive review was conducted on educational management in scientific and technological research. The search for advances in scientific articles was carried out in international databases and systems, including Scopus, Web of Science, ScienceDirect, Scielo, Proquest, and Springer, using the following keywords and expressions: "scientific and technological research," "educational management," "educational management and innovation."

Inclusion criteria considered articles published between 2017-2022, focused on educational management in primary and secondary education institutions and universities. The research designs included systematic reviews or experimental studies with at least one type of evaluation technique or instrument. Scientific reports from the conducted study were selected for the results. Exclusion criteria included selective reviews, reviews, and reflection articles.

RESULTS

As a constitutional state, Ecuador has the constitutional duty to provide a gestational model through its educational system that respects the characteristics of a constitutional state, such as unity, interculturality, and plurinationality. The objectivity of Ecuador's educational system has undergone significant changes with the goal of trying to meet the educational objectives for 2015 and currently with the 2030 agenda with Sustainable Development Goal 4, proposed in the World Education Forum in 2000 and 2016, respectively.

Among these changes are the implementation of educational quality standards, curricular designs, and the current use of a Decennial Education Plan (PDE) 2016-2025 proposed and developed by a group of teachers from across the country in coordination with the Ministry of Education. This plan encourages the participation of the educational community towards educational coherence that determines the quality of education.

Therefore, the role of educational management is to incorporate a research culture into its formative activities from an early age, aiming to stimulate the relevant skills and potentialities at each stage of life, enabling individuals to fully develop as scientifically and research-oriented individuals who contribute resiliently and sustainably to the social, cultural, academic, and university dynamics of the country.

Next, an outline is presented of the new ways of managing the educational institution from an innovation

perspective in accordance with Mello[10] (2013) and Del-Prete et al.[11] (2019) (figure 1).

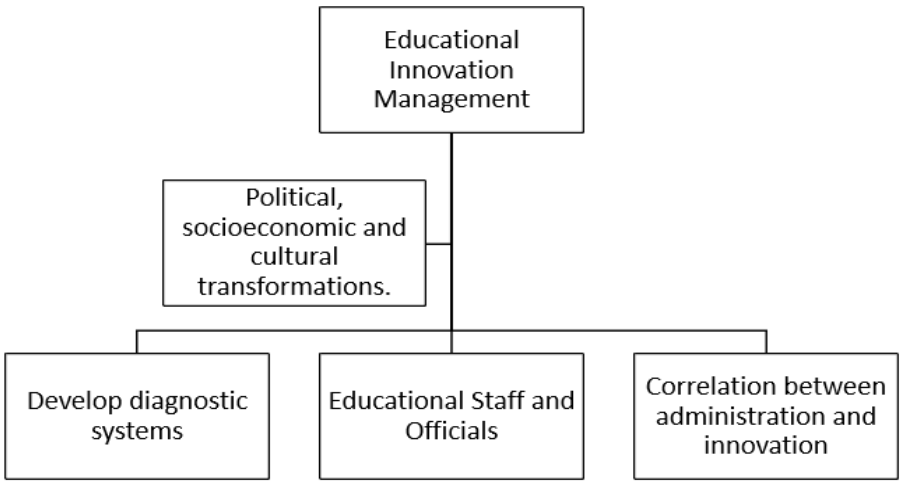

Figure 1. New ways of managing the educational institution from an innovation perspective

Educational management for innovation is based on new approaches to learning, which rely on dialogue, collaboration, cooperation, research, and ICT,[12] in order to build connection networks for the generation of knowledge in the global social context of the present world. This also entails moving beyond the vision of disciplinary science towards a multidisciplinary approach to achieve broader results in solving the complexities of the world.[13]

From a teaching perspective, the influence of curriculum adjustments and educational quality standards on the structure of the Ecuadorian system, according to Barrera[14] (2017), in their research, states that there is no true connection in their application or evaluation, making it difficult for them to become authentic meaningful learning experiences.

In their research, these assertions are reflected in the surveys where over 75 % of teachers agree that there should be an interconnection of curricula between Early Childhood Education, Primary Education, and Secondary Education. Regarding the indicator of quality standards in education, 50 % state that they have not been applied, and finally, the importance of developing interpretive, argumentative, and propositional competencies, as well as the demands of research, technology, and communication, is evident. 90 % of teachers affirm that these are necessary for the formation of proactive human beings.

DISCUSSIONS

The semestral periods in the higher education management system encompass systematization from contextualization, diagnostic planning, evaluation of results, and improvement.[15] In order to establish quality education, institutions must make didactic adjustments to their curricular objectives and train faculty members in scientific and technological advancements to become empowered leaders in managing students' preparation from a bioethical conception of society.[16]

In this sense, Torres[17] (2015) defines educational management as a group of acts composed of organizational knowledge to achieve a specific goal within a given time frame, where the transcendental work is the direction and organization of specific ideals sought to be acquired.[18] Thus, the responsibility lies with the collective of individuals involved in the educational atmosphere, under the guidance of the academic leader, who will coordinate actions to achieve the proposed objectives. This highlights the purpose of teachers in modeling a strategic approach that enhances the skills and abilities of children and adolescents.[19]

Therefore, the teacher's mission is to expand their awareness and empower themselves through continuous training in active methodologies and digital practices projected from and towards educational innovation, implementable in the learning environment with their students. Additionally, fostering interpersonal relationships and attitudinal changes, creating a functional organizational environment.[20]

CONCLUSIONS

In the current education system, teachers have to spend hours and hours at their desks designing the methodology applied in each classroom. However, this happens because there is no real coherence in the curriculum plans among each phase of the educational level.

There should be an interconnection of the curricula between Early Childhood Education, Primary Education, Secondary Education, and University to ensure true coherence and relevance within different learning

environments. This, in turn, involves using ICT tools to solve educational context problems effectively.

The educational management level establishes the generation and production of new knowledge at all levels in educational and academic institutions. Accordingly, projects will be planned and developed in accordance with the current context and societal development, as these will create relevant benefits based on scientific and technological advancements. In other words, all knowledge will have a simultaneous impact on societies, which will then contribute those results to the generation of new research.

The socioeconomic development of a country is closely linked to the progress of science and technology, which is usually the result of research at the higher education level. These become indispensable factors for overall progress. Sustaining this development requires the preparation of new types of scientists and technicians who previously did not seem to perform a useful task for society. Therefore, it is the duty of educational management to address, from the beginning of a person's academic formation, particularly the student body participating in the social reconstruction in universities, which will be the next generation to take on the task of researching to transform society.

Therefore, nowadays, an educational system designed based on multidisciplinary approaches is necessary to generate the necessary synergy to focus on students with a global reflective vision and the ability to assume the sociological challenges of the knowledge society.

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Ninguna.

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