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Digital Academic Knowledge Management: Keys to Optimize Teaching and Learning

Orlando[1], Daniel[2], Campoverde[3] and Campoverde[4]

Abstract

The use of digital technologies and information systems today facilitate the access, distribution and application of knowledge. However, despite its potential benefits, digital academic knowledge management (GCAD) also poses some challenges and limitations, such as the digital divide, information quality, data security and resistance to change. The objective of this work is to know the strategies in knowledge management to improve educational practices in the teaching and learning of students. For this purpose, it was carried outa bibliographic analysis of the methodological phases: the diagnosis of needs, the design of strategies and objectives, the selection of tools and resources, the curation and creation of content, training and education, implementation and monitoring, as well as evaluation and improvement keep going. The investigation of information is based on the method of action, it allows identifying precise elements about the topic raised to verify the contributions and optimization of teaching and learning in the digital environment at the Tecnoecuadorian Institute. Active participants are considered to be: regents, teachers and students promoting efficient management of academic knowledge, for this purpose systematic search strategies and the analysis of high-impact published articles were used.

Keywords: *Academic, Knowledge, Digital, Management, Inquiry, Optimization, Optimization, Technology*

INTRODUCTION

According to some studies, digital academic knowledge management (GCAD) is a key process that uses technology to extract the information necessary for teaching from a large volume of geographic data based on a geographic database. To do this, it uses identification technology and statistical methodologies (Zhang et al., 2019). This technology provides scientific data support for leaders of universities, colleges, and faculty management functional departments. One of the significant aspects of this technology is that it allows you to discover the most practical data processing method, by constantly evaluating and identifying this data information. This tool can be an efficient way to optimize teaching and learning in the academic world, as it allows access to valuable resources, personalize training, encourage collaboration and improve evaluation (García-Peñalvo et al., 2019). This is possible because it has a wide variety of applications in modern management education, such as e-learning technology-based systems, clustering of educational data, and prediction of student performance.

The implicit laws present in this data can be used to create a more efficient school management system (Yin, 2017). In addition, the GDCA offers easy access to digitized resources such as diagrams, handouts, teaching materials and information, thus optimizing teaching and learning. The resources provided by the GDCA can help teachers prepare and deliver more effective lessons, and students can use these resources to better understand the concepts being taught in class. Likewise, the construction of an innovative and sophisticated digital campus aims to digitize data flows and allow computerized information management of students, disciplines, universities, finances, etc., which can help optimize academic operations and improve overall efficiency. The implementation of digital academic knowledge management not only optimizes teaching and learning, but also improves the effectiveness of academic management.

[1] Elsa Josefa Pezo Ortiz, E-mail: dcampoverde@istte.edu.ec

[2] Helen Anabela Pazmiño Lucio, E-mail: epezo@istte.edu.ec

[3] Pazmiño Lucio Rolando Neptalí, E-mail: hpazmino@istte.edu.ec
[4] Tecnoecuadorian Higher Technological Institute, Ecuador, E-mail: rpazmino@istte.edu.ec

Key Components of Digital Academic Knowledge Management

Digital academic knowledge management comprises several key components that can optimize the use of information and knowledge to improve learning and teaching. One of the key components is the integration of digital technology in basic, secondary, higher education and everyday life, which can have a significant impact on knowledge management research. Another critical component is knowledge management processes, which have the ultimate goal of optimizing the use of knowledge. These processes can coexist and act simultaneously within a framework (Omona et al., 2021). Digital technology can also play an essential role in tracking potential solutions and as an integral element in climate change solutions (Dwivedi et al., 2020).

To optimize learning effects, electronic databases such as Google Scholar and the Institute of Electrical and Electronics are crucial (Charband & Jafari Navimipour, 2016). The emergence of fields of ideas is also an important component that allows optimizing resources related to knowledge management. Information managers can leverage digital technology to support initiatives aimed at accelerating digital transformation in various companies (Liebowitz & Wilcox, 2018). Effective content management is another critical component that allows the management of digital artifacts for knowledge management (García-Holgado & Cruz-Benito, 2020). Finally, innovative ideas and the sharing of optimal solutions to complex problems are essential benefits of digital academic knowledge management.

These benefits help users cope with the overwhelming amount of digital information available (Mohamed et al., 2015). Therefore, a comprehensive digital academic knowledge management framework must include all these key components to achieve resource optimization and improve teaching and learning outcomes in higher education institutions.

In this sense, digital academic knowledge management is a key tool to optimize teaching and learning. Through this technique we can improve the quality of education, make it more attractive and accessible for all students. It is related to the use of digital technologies such as virtual platforms, social networks, interactive environments and other electronic resources to facilitate learning. This form of knowledge management offers greater educational reach, as it provides a space where students can share their experiences, exchange opinions and ideas, and contribute constructively to academic content.

The Importance Of Academic Knowledge Management

Academic knowledge management is one of the most important practices to improve the quality of education and learning. This practice seeks to make the most of available resources, maximizing students' potential to achieve learning goals. To do this, it is vital to understand the importance of developing new tools that increase flexibility and internal and external response capacity, innovation and adaptation to frequent and unexpected changes in the environment (Canals, A., 2003). This management is achieved through the appropriate allocation of resources such as time, physical space and teaching materials. It also includes digital tools such as virtual teaching platforms and learning applications.

These tools help students optimize their time and resources by being able to access relevant content from anywhere and on any device. With good academic knowledge management, educators can offer unique and innovative experiences to develop new knowledge in their students. This allows them to better prepare them for the real world, where they will have to face similar situations once they have completed their educational cycle.

Digital Resources To Optimize Teaching

Digital resources offer new opportunities in the teaching and learning processes (García-Valcárcel Muñoz-Repiso, A., 2016). The integration of digital resources can help optimize teaching strategies and practices. However, institutions have a responsibility to ensure that the benefits of digital education outweigh the potential risks to students.

Digital technologies are having an increasing weight in educational processes (Muñoz-Repiso, AGV, 2007). Digital resources offer teachers and students the flexibility to create personalized learning experiences. Digital

academic knowledge management is one of the most important aspects to optimize teaching and learning. Here are some useful digital resources to optimize teaching:

Learning platforms: These platforms offer an interactive environment in which students can access multimedia content, assignments, forums and material to share with other students.

Collaboration Tools: These tools allow students to work together to complete projects, conduct online discussions, and share multimedia content.

Mobile Applications: Mobile applications can be used by students to access educational content from anywhere and at any time. Many companies offer built-in tools that allow teachers to easily share information with their students.

Technological Tools To Improve Learning

Technology tools, such as digital academic knowledge management software, can help optimize teaching and learning. Technological tools are very useful. There are those that provide storage, as well as those that offer entertainment and educational material (Salazar, JEC, et al., 2019). These programs make it easy to collect information from a variety of sources, work with data simultaneously, and allow for rapid exchange of content between students and the teacher.

In addition, digital academic knowledge management systems offer several advantages that can be improved:

The generation and sharing of content: These tools allow teachers to create specific teaching materials for their students and even share them with other educators.

Interaction between teachers and students: Technological tools provide the teacher with an interactive platform to receive feedback from students and monitor their progress.

Efficient time management: Modern systems allow teachers to automate certain tasks such as evaluation, activities, compliance certifications, monitoring, etc.

Teaching Strategies with Technology in the Classroom

The development of digital technology has opened the door to a new form of education: teaching with technology in the classroom. Digital technology has become an indispensable tool for learning and education, as it allows the teacher to teach classes in a more effective and interactive way.

At the same time, students have access to a wide range of digital resources and tools to optimize the learning process. To make the most of the potential of technology, it is important to build an effective learning environment with the aim of obtaining the best results such as:

Use innovative digital tools and resources such as tablets, smartphones and laptops to encourage creativity and motivate the student.

Incorporate different active methodologies, such as problem solving, critical analysis, group discussion and collaborative projects.

Digital Academic Evaluation and Monitoring

Digital academic monitoring and assessment offers an advantage to teachers, allowing them to measure their students' progress quickly and efficiently.

Technological advances and the development of virtual learning environments in the university environment have required modifying traditional teaching models, including methods for monitoring and evaluating academic progress (Cammón, Pasaco, López., et al., 2023). Advanced software allows teachers to create complex assessments with open-ended and multiple-choice questions, obtain real-time results, generate individualized scoring tables, and perform detailed analysis for each test.

Additionally, digital assessment can be combined with academic tracking tools such as time sheets, academic records, and detailed reports. These tools allow teachers to better understand their students and provide an overview of the progress they have made (and what they need to make).

Teachers can also use digital technology to improve communication with their students. Online forums, video conferencing and social media allow teachers to stay up to date with their students' academic progress and interact effectively with them.

Teacher Training In Digital Skills

Digital academic knowledge management requires that teachers have the knowledge to effectively and responsibly use digital tools and resources. This means that specific training in digital skills is required before teachers can carry out this management.

These skills allow them to manipulate technologies in the educational field to obtain information and process, interpret and express their ideas to others (Sandoval, JAR, 2013). To carry out this training, teachers must have an adequate understanding of the technology and software used to provide, develop and manage educational content, as well as to support interaction between end users such as the following:

Understand the basic technical infrastructure.

Use computer tools and educational software to support learning.

Correctly manage student information and their learning.

Learn how to deal with problematic situations related to the use of technologies.

Furthermore, adequate training in digital skills can allow teachers to work in interdisciplinary teams.

METHOD

The methodology used for this research is based on the method of action, allows the research process and seeks to identify practical solutions to improve the management of digital academic knowledge in a specific educational environment, for this the study indicators are identified which are relevant. and they have an effect on the management of digital academic knowledge, for this purpose it is based on qualitative methodology. For their part, Hernández Sampieri, R., Fernández Collado, C., & Baptista Lucio, P. (2018). "Qualitative mainly seeks dispersion or expansion of data or information." It is important to mention that in research it is necessary to carefully select the study method and population to effectively address the challenges and opportunities in the field of digital teaching and learning.

From the aforementioned it is deduced that this work focuses especially on the in-depth understanding of the experiences, opinions and perceptions of the participants, the survey, focus groups and content analysis are used to collect and analyze qualitative data on how it is managed and Share digital academic knowledge.

Study Population

In this research work, the study population in digital academic knowledge management can be diverse and vary depending on the objectives of the research or the focus of the project. The indicators are: teachers, students, Education Institution (IES) represented by its shareholders. Additionally, the indicator of the platform or LMS, also known as the educational tool of the web, is also considered important, below in table 1. The study population groups are shown:

Table 1.Study population groups.

Teachers	Students	IES	Web educational platforms and tools
twenty	70	3	This population indicator involves technologies related to educational platforms; they can also be part of the study population. The characteristics of these tools and their impact on teaching and learning can be investigated due to the great multimedia diversity and the compatibility of external resources such as: embedded code and HTML.

Source: Daniel Campoverde

Instrument

The survey composed of 12 questions is used, these are related to the variables of the categories according to the study group. To reinforce the data, the Likert scale of categorical action is used as a method. For their part (Osinski, IC, & Bruno, AS, 1998) mention: "The category scale is used widely, it has a great advantage in that it has less ambiguity of answers, greater proximity of the answers to the researcher's objective, allows you to collect information in less time" (p. 623). The purpose of the Likert scale is to know the levels based on people's perception of agreements or disagreements on a study topic. The questions were adapted according to the following levels:

Totally disagree

Disagree

Indifferent

Okay

Totally agree

Procedure

It was considered a set of ordered actions of operations and logical sequences of activities in which important indicators were involved such as: participants and an e-learning platform, applications or desktop and web computer programs that allowed the necessary information to be collected for analysis purposes. .

It is important to mention the development of each of the activities that always maintain digital management interaction.which is very relevant to optimize time, learning, space, economic resources and most importantly easy accessibility for problem solving. Below is the set of activities that were carried out sequentially:

Activity 1.Assembly [TECNOECUATORIAN VIRTUAL STATION] mission control on the Moodle platform.

Activity 2.Selection of specialized synchronous software for data collection through surveys (Google Forms).

Activity 3.Development of questions under categorization of variables of the study indicators and levels (Likert Scale).

Activity 4.Distribution of variables according to study categories, compared and merged with the most relevant surveys.

Activity 5.Selection of specialized software (RADAR) for graphic analysis using the radial methodology.

RESULTS

The results obtained are presented based on the activities carried out, they have the effect of experimental practical development.

ASSEMBLY

In the case of the first activity, the implementation was carried out in an exclusive space on the Moodle platform. This virtual learning environment (EVA) presents some advantages of user-machine interaction due to the diversity of resources maintained by the platform and its great compactness of extensions or plugins, this allowed the coupling of a great diversity of multimedia elements and support applications such as the cloud, Google Sheets, GIFs, Powtoon, Genially.

The activities and instructions within the Tecnoecuatoriano station have an effectsequential cyclical: Discovery, Understanding, Collaboration and Practice (DCCP). Figure 1 shows the cyclical structure of strategic support necessary for the development of the missions to be fulfilled.

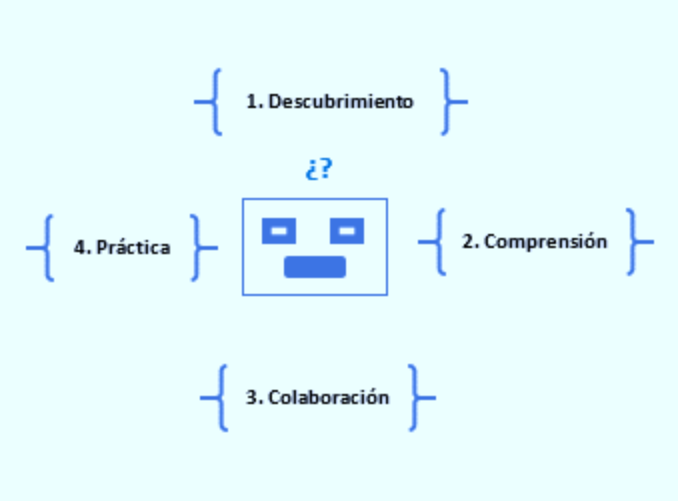

Figure 1.Sequential cyclic representation(DCCP).

Source: Daniel Campoverde

Once the cyclic process has been applied, the Tecnoecuadorian station, mission control, is configured as shown in figure 2.

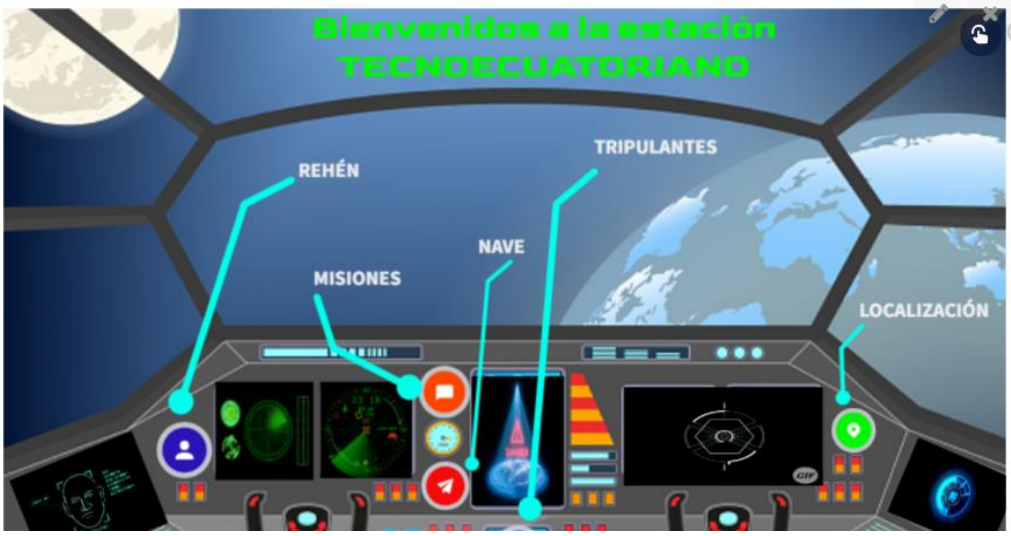

Figure 2. Tecnoecuadorian mission control base instruction room.

Source: Daniel Campoverde

The station is made up of three mission-type activities which required the intervention of 19 specialist teachers and a teaching instructor in charge of guiding the students or participants in what way and what resources to use to fulfill those three missions that range from basic, intermediate and advanced. Mission one: investigating traces-understanding of terms <<topic of the discipline or subject>>; mission two: overcoming time <<answer a knowledge overcoming test in a short time>>; mission three: deciphering codes with the synchronous Excel app of the context or career <<handling basic and complex functions to solve context problems>>.

These missions must be supported by the following phases:

Phase 1. Subject selection.

Phase 2. Career selection

Phase 3.Selection of a technological resource for interaction between students from the cloud with the support of Google Sheets that allows network collaboration and teamwork.

At the control station, the instructor selected the subject that corresponded to the course being taught by the nineteen specialist teachers, then selected the complex topics that caused frustration to the students, topics that were difficult to understand easily in a regular class.

Figure 3. Programming mission one investigating footprints.

Source: Daniel Campoverde

According to figure 3. The instructor proceeded to configure mission one: investigating footprints. In a Genially synchronous web application, a short relevant and precise reading of the complex topic was coupled, then a glossary of unknown terms was selected to be later discovered in a captious way by the students.

Some trainees delayed, others completed it within the established time and were also compensated with points in favor by the same system. Mission one is the gateway to leaving traces and understanding knowledge about the unknown. This helps students better identify and understand complex concepts and definitions in the learning process.

The way the students accomplished the mission was with the support of technological resources, including a smartphone and QR code reading applications to view the access code. The same devices and applications are used to continue with mission two as can be seen in figure 4.

Figure 4. Time overrun.

Source: Daniel Campoverde

For the development of mission two: overcoming time, several topics of complex dimension were considered but overcome and fully understood by the students. Kahoot! was used a multimedia instrument capable of measuring time and at the same time evaluating the knowledge acquired. For this purpose, a group of 30 nursing

students was selected and they were subjected to answering 10 questions about technological materials and resources used to carry out an operation of a patient in the shortest time possible.

Maximum score in the activity is 80,000 points which were as follows: of the 30 participants, 5 obtained high scores in descending sequence: P1= 20,000, P2= 18,000, P3= 12,000, P4=10,000, P5= 5,000. In this process, the participants with high scores were considered and by occupying the 65,000 of the 80,000 points distributed in this case, P1, P2, …P5 remain. While the other 25 participants who occupied the 15,000 points distributed from P6, P7, ...P30 are disqualified and are returned to receive academic reinforcement tutoring. Because mission two has a temporary effect, it is considered a medium level; once it is completed, it gives way to continue actively participating and be able to complete mission three according to figure 5.

Figure 5. Cracking codes.

Source: Daniel Campoverde

Figure 5 shows the instructions of mission three: Deciphering codes: for the participants it was the most difficult, it is the one that allows the student to overcome their frustration when understanding a topic and possible problem solving. The instructor scheduled a practical case study allied to the health context.

The idea is to analyze and collect information from medical records of a clinic called Malware, which did not have technological resources. The idea is to solve this problem and rescue that information from its patients before spoiling it and therefore for that health institution it can be fatal. lose such important information.

Figure 6. Access to One Drive from computers.

Source: Daniel Campoverde

Figure 7. Wildcards or quick access buttons.

Source: Daniel Campoverde

Figure 8. Mission accomplished compensated

Source: Daniel Campoverde

Figure 6 shows how this space was configured and a file was uploaded to One Drive that can be compacted with Google Sheets or known as a synchronous opening spreadsheet or collaborative online work. In that file the information of the clinic incorrectly which has generated discomfort in the clinic and patients and to put an end to that problem the participants worked as a team, only then with the help of basic Excel functions were they able to decipher the access code (xxxxxx) to enter that clinic .

In Figure 7, it is evident that while they were advancing in the solution of the problem, it was difficult for them to continue moving forward. For this reason, it was necessary to suggest to the 5 students to find wildcards among themselves: quick access buttons and advanced Excel functions to find a key again. (xxxxxx) super complex hidden that allows the transformation of the empirical and traditional processes of the clinic to a new way of managing information with a digitalized approach, easy access to the clinical history, optimization of time, and above all automation of information with the help of web applications.

In figure 8. A score of 10 points is evident, this means that the students managed to overcome mission three, which means that they are prepared to solve problems in the context based on their acquired knowledge, it helped strengthen the learning and critical thinking of The students and, above all, acquired digital-oriented technological skills for the transformation of processes that have not yet been fully resolved by some organizations.

Distribution Of The Variables.

To determine an analysis, it is important to mention that the method of action used was very significant, it allowed the identification of the different variables that emerge from each group or category of study. To do

this, the scoring technique from 1 to 5 is used to measure each of the variables. With 1, the least relevance and 5, the maximum relevance.

These variables, according to Table 2, are distributed in a structured manner in order to assign scores according to the comparison with the data obtained from the respondents through the categorization of levels of the Likert scale. The most relevant ones were taken into consideration to merge them and represent them according to the table.

Table 2. Variables according to study categories.

Variables	VMAX	Teachers	Students	IES	Web platforms and tools
Job satisfaction and motivation	5	4	3	4	5
Continuous training	5	3	2	3	5
Workload and stress	5	1	5	3	3
Online learning	5	1	4	2	5
Inclusion and educational equity	5	2	5	2	5
Motivation and performance	5	1	3	3	5
Interactive knowledge management	5	1	5	5	3
Digitization of information	5	1	5	5	3
Technological innovation in education	5	2	5	5	5
Effectiveness and usability of content	5	1	4	2	4
Personalization of learning	5	2	5	5	5
Data security and privacy	5	1	3	3	4

Source: Daniel Campoverde

Graphic Analysis Using The Radial Methodology

According to figure 9. The radial diagram shows and analyzes the distribution of the variables according to the focus groups: Teachers, Students, Educational Institutions and Platforms and tools. The radar allows you to visualize the relative relationship between the different categories. For example, if the value of a category is further from the center of the graph, it means that category has a higher value compared to the others.

In that sense, the category according to the behavior of the radar that stands out the most is that of Platforms and tools. This is due to the growth of online education and access to a large amount of digital resources.

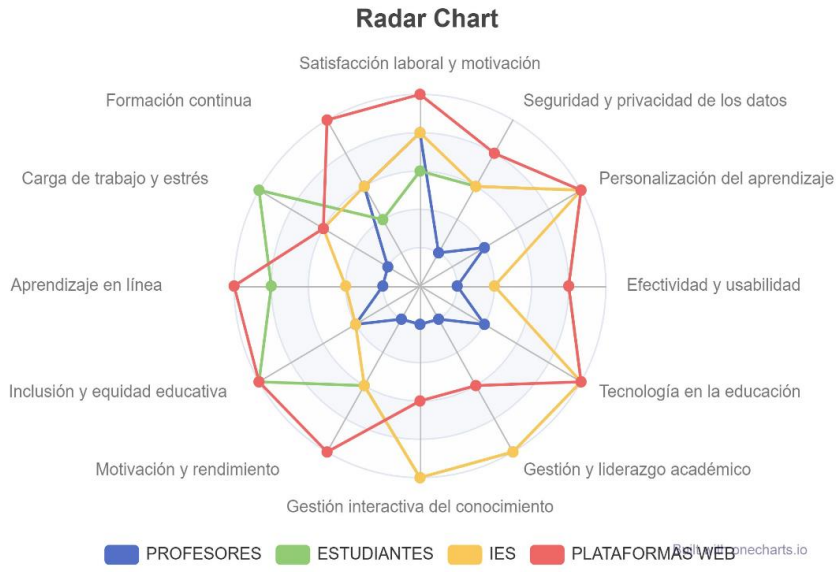

Figure 8. Radial representation of the study variables

Source: Daniel Campoverde

Discussion Of Results

When analyzing the variables presented using the Radar Chart software in figure 8. Their values assigned to each category (Teachers, Students, Higher Educational Institutions (HEIs) and Web Platforms/Tools), some more relevant aspects stand out, especially in the category Web platforms and tools, two variables stand out: the first regarding the personalization of learning maximum value (5) according to the values in table 2. It emerges as the most relevant aspect, this highlights the importance of offering educational content adaptable to the individual needs of students, while the second variable technological innovation in education (5) and data security (4) focuses especially on prioritizing an approach towards the implementation of cutting-edge technology to improve the quality of education through processes that tend to be key to optimizing teaching and learning:

Access to Digital Resources*:* One of the fundamental pillars for managing digital academic knowledge is guaranteeing access to quality digital resources. This implies having an adequate technological infrastructure, as well as educational platforms and tools that facilitate the creation, organization and distribution of educational materials in digital format.

Curation and Organization Of Content: In a digital environment, the amount of information available can be overwhelming. Therefore, it is essential to develop content curation and organization skills. This involves selecting, filtering and evaluating available resources to offer students relevant, quality materials that promote meaningful learning.

Collaboration and Active Participation*:* Digital academic knowledge management encourages collaboration and active student participation. Digital tools offer multiple opportunities for interaction and exchange of ideas, which can enrich the teaching and learning process. Virtual learning environments, discussion forums, and collaborative activities are examples of resources that promote active student participation.

Evaluation and Feedback: Digital academic knowledge management also involves establishing effective evaluation and feedback mechanisms. Digital platforms offer various tools to assess student performance, such as online questionnaires, progress tracking, and the ability to provide individualized feedback. This allows teaching to be adapted to the specific needs of each student and to continually improve the educational process.

Digital Skills Development: To make the most of digital academic knowledge management, it is important to develop digital skills in both teachers and students. This involves not only knowing how to use digital tools and resources, but also understanding how to evaluate the validity of online information, how to collaborate effectively in virtual environments, and how to stay up-to-date in a constantly evolving digital world.

In the teachers category they show a high level of job satisfaction and motivation score (4) compared to other variables. This is essential, as job satisfaction can significantly impact their performance and the quality of the teaching they provide. Another important variable, although not the highest value, the importance given to continuous training score (3) suggests a willingness to continue learning and updating methodologies and knowledge, which can improve the quality of the education they offer.

In the IES category, two highly important variables stand out: IES highly value technological innovation in education score (5) which suggests a focus on the implementation of cutting-edge technology to improve the educational process. Interactive knowledge management (5) also stands out as a relevant aspect for HEIs. This may involve an organizational structure that promotes collaboration and information sharing.

In the category of students, it can be noted that educational inclusion and equity is a critical issue, with a very high score. This indicates a strong awareness of the importance of equal access to education and the inclusion of students of diverse backgrounds and abilities. Adaptation to online learning is a priority, but it is not given as much importance as inclusion. Motivation and performance are considered, but are not the main concerns in this context.

Finally, the educational institutions category shows how school leadership and management are a high priority, which suggests that the significant influence they have on the success of an institution is recognized. Other aspects according to this category are the school climate and educational culture, which are also considered important, but slightly less than management and leadership.

One of the main aspects that causes concern and that can be noticed on the radar is that in educational institutions, even today, technology in education is not perceived as the highest priority in this context. It is suggested to make the most of technology in education for the management of digital academic knowledge, this can be seen as an issue of increasing importance, reflecting the need to effectively integrate technology into the educational process.

CONCLUSION

Digital academic knowledge management is key to optimizing teaching and learning. This new perspective and approach will drive the modernization of digital academic programs, improve the training of students and employees, increase efficiency in the assimilation of information and allow the achievement of better learning outcomes. Creating an environment suitable for change, innovation, collaboration and creativity will become an integral part of optimal digital academic knowledge management.

The use of the action method allowed the study categories to be identified in an organized manner and through the use of variable distribution techniques it was possible to obtain a clearer and more specific overview of the objective to be met.

The use of the radar diagram was appropriate because it provided an overview of the priorities and areas of interest in the educational field for teachers, students, educational institutions and educational web platforms/tools. It allows us to identify the strengths and areas for improvement in each group and can be useful for decision-making and strategic planning in the educational field.

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