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Original article

Didactic strategies to promote meaningful learning aimed at university students

Estrategias didácticas para promover el aprendizaje significativo dirigido a estudiantes universitarios

Estratégias didáticas para promover a aprendizagem significativa voltadas para estudantes universitários

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ABSTRACT
The ability to solve problems is very necessary to develop in Higher Education students, since it progressively allows them to potentiate their cognitive and metacognitive skills in the face of challenges or incidents that they may face in the near future, likewise, it is important that teachers generate lasting, significant learning in students so that they are able to transfer to other situations. Currently, the development of the ability to solve problems is not developed adequately. This problem is due to the lack of use of sufficient strategies to achieve the stated goals and, more often than not, teachers are not prepared to face these difficulties. Which have seriously affected the teaching process of students, currently this situation increases the gap due to the pandemic, that is why this research has been carried out due to the scarce educational resources used by the teacher in the virtual classroom to improve student learning and make these meaningful learning. This document is a systematic review article, descriptive type, qualitative approach, because the authors use their perception based on what was found on the respective topic, it also has a non-experimental method. Specifying its objective in: To carry out a logical trend analysis for the systematic vision of meaningful learning in higher education, as a guide for other investigations.

Keywords: significant learning; resolution capacity; cognitive habilyties; didactic strategy; higher education.

RESUMEN

La capacidad de resolución de problemas es muy necesaria para desarrollar en los estudiantes de Educación Superior, dado que permita de manera progresiva potencializar sus habilidades cognitivas y meta cognitivas ante retos o incidencias que pueda afrontar en un futuro cercano, asimismo, es importante que los docentes generen aprendizajes perdurables, significativos en los estudiantes para que sean capaces de transferir a otras situaciones. Actualmente, el desarrollo de la capacidad de resolución de los problemas no se desarrolla adecuadamente. Este problema se debe a la falta de uso de estrategias suficientes para lograr las metas planteadas y con mayor frecuencia los docentes no están preparados para enfrentar estas dificultades. Los cuales han afectado seriamente el proceso de enseñanza de los estudiantes, en la actualidad esta situación aumenta la brecha por la pandemia, por eso se ha llevado a cabo esta investigación debido a los escasos recursos educativos que usa el docente en el aula virtual para mejorar el aprendizaje de los estudiantes y lograr que estos sean un aprendizaje significativo. El presente documento es un artículo de revisión sistemática, tipo descriptivo, enfoque cualitativo, debido a que los autores emplean su percepción en base a lo averiguado sobre el tema respectivo, asimismo tiene método no experimental. Concretándose el objetivo del mismo en: Realizar un análisis lógico tendencial para la visión sistemática del aprendizaje significativo en educación superior, como guía para otras investigaciones.

Palabras clave: aprendizaje significativo; capacidad de resolución; habilidades cognitivas; estrategia didáctica; educación superior.

RESUMO

A capacidade de resolução de problemas é muitonecessária a desenvolver nos alunos do Ensino Superior, uma vez que irá potenciar progressivamente as suascompetências cognitivas e metacognitivasfaceaosdesafiosou incidentes que possamvir a enfrentar num futuro próximo, da mesma forma, é importante que os alunosprofessoresgeraraprendizagemdurado ura e significativa nos alunos para que sejamcapazes de se transferir para outrassituações. Atualmente, o desenvolvimento da capacidade de resolver problemas não é desenvolvidoadequadamente. Esse problema se deve à falta de utilização de estratégias suficientes para atingir os objetivos propostos e, namaioria das vezes, os professoresnãoestão preparados para enfrentar essasdificuldades. Que afetaram seriamente o processo de ensino dos alunos, atualmenteessasituação aumenta a lacunadevido à pandemia, por isso esta pesquisa foi realizada devidoaosescassos recursos educacionais utilizados pelo professor na sala de aula virtual para melhorar o aprendizado dos alunos e tornar essasaprendizagens significativas. Este documento é um artigo de revisão sistemática, do tipo descritivo, abordagemqualitativa, pois os autores utilizamsuapercepçãocom base no que foi encontrado sobre o respectivo tema, tambémpossuium método não experimental.

Palavras-chave: aprendizagem significativa; capacidade de resolução; habilidades cognitivas; estratégia didática; ensino superior.

INTRODUCTION

Currently, teachers have the responsibility to guide students to explore and develop new knowledge by facilitating student access to resources, which helps promote the development of skills and abilities. Similarly, based on the relationship between prior knowledge and new information, the skills necessary to understand, clarify and interpret information through the correct use of digital tools to achieve meaningful learning. That is, teachers must carry out teaching plans that affect meaningful learning, because this will constitute a model that allows them to face the situations that students will face in their careers or daily life in an orderly and coherent manner. (Garcia *et al.*, 2020).

Carranza and Montes (2018), refer that the development of problem-solving capacity is not developed adequately in higher education students whose cause is due to the fact that the pandemic has caused dramatic and potentially long-term changes in the teaching of science. undergraduate education, most teachers were not prepared and therefore did not adequately motivate students, knowing that this is the engine of meaningful learning that is influenced by emotions, beliefs, interests and values. Therefore, it is now suggested to carry out the inverted classroom strategy to achieve good learning in higher education students; That is why the main causes of low performance by university students is that they often have a job and other personal responsibilities, as well as unfriendly teachers in the teaching-learning process.

Likewise, the minimum level of the students is due to: lack of teacher methodology, little motivation of the students and also that they study and work, as well as the role of the teacher is key to developing said activity. Deficiencies in the educational teaching process can be manifested in university dropout. Currently, low academic performance in university students has become a problem, which means that they have two main difficulties: they do not know how to study and they do not know how to learn. Therefore, teachers should focus their work on developing teaching strategies that improve the skills to "learn to learn" in students**.** (Carmona Penton *et al.*, 2021).

Significant learning is the integration of new knowledge in the cognitive structure of the learner, presupposes certain conditions, namely, the presence of initial ideas to relate previous knowledge to the new one and, above all, that they be taken into account by the teacher. -mediator; the potential significance of the material, that is, a logically structured material and an active attitude, both of the student to learn and of the mediator to promote the construction of knowledge. Therefore, it can be expressed that it is essential to think about things in order to know them, since their representation implies new connections between them and man, which make their presence felt to the extent that other relationships are established, beyond reality. immediate.

As for the maximum degree of significance possible for learning, in theory there are no limits, since it is always possible, in principle, to add new meanings to those already constructed or to establish new and more complex relationships between them. In such a way that meaningful learning is not a question of all or nothing, but of degree. It is not possible to design an evaluation activity with the purpose of discerning if the learning that the students have carried out is significant or not, what is appropriate is to detect the degree of significance of the learning carried out, using activities and tasks that can be addressed or resolved. from different degrees of significance of the contents involved in its development or resolution Coll, 2014, cited in Contreras Oré. FA (2016)

Therefore, and continuing in this vein, for meaningful learning to materialize, a series of actions and/or cognitions are required in each of the students, which analyzes the reasons that have led them to carry out the learning activities, to review their previous experiences, to assess the effectiveness of the instruments used, their performance and detect the difficulties they have encountered and the means to resolve them, in addition to drawing conclusions that will help them face other learning challenges.

Therefore, the research problem is determined by the question that defines the research in the form of a question as follows: What are the appropriate teaching strategies to promote meaningful learning? What teaching strategies are being developed in university students in Latin America, 2017-2021?

MATERIALS AND METHODS

The article by relies on documentary analysis and logical trend analysis for the detailed systematic review of published bibliographies on a specific topic in order to summarize what has been written so far and its progress, as a guide for further research. In this case, in June 2021, a review of the general capacities was carried out in the following databases: SCOPUS, EBSCO and SCIELO. The Boolean operators " or " and "and" were used in Spanish. The search equations were: "significant learning", "didactic strategies". Likewise, the type of study is in accordance with the proposal of Fink (2013), cited in Diaz, Álvarez, M; Farradas López, O; Fundora Simón, RA and García González, M. (2021), which refers to a systematic review of the bibliography (RSB), conceiving it as an explicit and reproducible method that allows identifying, evaluating and systematizing the existing and complete body of a certain field or topic.

The procedure was carried out following the seven proposed steps: Research question (PI), database selection (BD), choose search terms (TB), apply filters and limits (FL), apply methodological quality (CM), synthesize the results (SR) and consolidate and produce the review (CPR).

The SR phase was based on what was proposed by Esteve and Gisbert (2011), cited in Varona Domínguez, F. (2021) when they refer to configurative review, and the PI and SR phase was based on Gough *et al.* (2012) cited in Travieso Valdés, D and Hernández Díaz, A. (2017) when referring to an aggregative review.

In the case of configurative review, the aim is to identify concepts that seek heterogeneity through repetitive patterns that can be synthesized into categories or concepts to be analyzed. For its part, the aggregative review is responsible for seeking evidence to show the decisions obtained in the different cases; often these reviews are based on the search for pre-established concepts and methods to generate a comprehensive review.

For this particular case and taking into account the above, a broad PI was proposed that responded to the aggregative nature, in order to identify an important body of bibliography that would allow answering the question posed from different perspectives and studies. In a second SR moment, it was necessary to establish categories of data analysis, which were a priori and emergent, by means of which it was possible to consolidate and identify certain elements that answered the proposed question coherently with the type of configurative review.

Therefore, this review describes the entire analysis of each category separately, and then relates the categories in order to answer the question that guides this research.

Sample

The initial results of the search for articles in the FL phase were composed as follows: Science Direct 155, Scopus 36 and WOS 65 articles, respectively. For a total of 256 articles as total population. Duplicates had to be removed and for this reason 242 documents remained. Following the initial process, an abstracting process was carried out (reading the title, abstract and keywords), by the researchers who read and observed separately. The purpose of this reading was to identify the final sample of articles that would be analyzed according to the affinity and cohesion with respect to IP.

Process

According to the model selected to carry out the systematic review, each of the phases of the procedure were followed, which are detailed in Table 1.

Table 1- Phases of the method and description of the procedures

PHASES	**DESCRIPTION OF THE PROCEDURE PERFORMED**
PI	The research question that guided the review was determined: **What are the appropriate teaching strategies to promote meaningful learning? What teaching strategies are being developed in university students in Latin America, 2017-2021?**
DB	The databases were selected: WOS (Web of Science), Scopus, and ScienceDirect.
TB	Search terms : Technology Assessment and ICT Assessment. Search equation : ("Technology Assessment " OR "ICT Assessment") NOT Medicine NOT Health In WOS (Web of Science), it was limited that the equation was in the title . In Science Direct and Scopus, the equation was limited to being in the title, abstract and keywords.
FL	Filters by knowledge area: Education Education Research, Multidisciplinary Sciences Education Scientific Disciplines and Engineering Multidisciplinary and Social science . All areas related to Health Sciences were excluded. Languages: English and Spanish Publication date: 2017-2021 Document type: Review and research article
CM	Each of the articles was reviewed through an abstracting process (reading the title, abstract and keywords), with the purpose of determining the definitive sample of articles that would be analyzed in depth. This procedure was carried out through a Cohen's Kappa coefficient (Cohen, 1968), in which the research team reviewed the aforementioned elements of each of the articles and a matrix was built that allowed obtaining the definitive sample of articles. to analyze.
MR	A hermeneutic unit was formed in the ATLAS.ti software, with the definitive sample, where each article is constituted as a primary document, the a priori categories were created and the respective semantic network was made. Then, a word count was made to identify and contrast possible emerging categories of analysis and an in-depth reading was carried out. Initially, an open coding of each document was carried out, and then an axial coding was carried out, which allowed establishing relationships between the categories and subcategories. Finally, a selective coding process was carried out, which allowed for a coherent response to the research question.
CPR	After having finished the analysis of all the documents, the preparation of the review article began, following the IMRaD format (Introduction, methods, results and discussion), which allowed having an organized and common structure (Wu, 2011).

PHASES DESCRIPTION OF THE PROCEDURE CARRIED OUT

PI The research question that guided the review was determined: **What are the appropriate teaching strategies to promote meaningful learning? What teaching strategies are being developed in university students in Latin America, 2017-2021?**

BD The databases were selected: WOS (Web of Science), Scopus, and ScienceDirect.

TB Search Terms: Technology Assessment and ICT Assessment. Search equation: ("Technology Assessment" OR "ICT Assessment") NOT Medicine NOT Health En WOS (Web of Science), it was limited to the equation being in the title. Science Direct and Scopus limited the equation to being in the title, abstract and keywords.

FL Filters by knowledge area: Education Education Research, Multidisciplinary Sciences, Education Scientific Disciplines and Engineering Multidisciplinary and Social science. All areas related to Health Sciences were excluded. Languages: English and Spanish Publication date: 2017-2021 Document type: Review and research article

CM We proceeded to review each of the articles through an abstracting process (reading the title, abstract and keywords), with the purpose of determining the definitive sample of articles that would be analyzed in depth. This procedure was carried out through a Cohen's Kappa coefficient (Cohen, 1968), in which the research team reviewed the aforementioned elements of each of the articles and a matrix was built that allowed obtaining the definitive sample of articles to be analyzed.

SR A hermeneutical unit was created in the ATLAS.ti software, with the definitive sample, where each article is constituted as a primary document, the categories were created a priori and the respective semantic network was made. Then a word count was made. to identify and contrast possible categories of emerging analysis and proceeded with an in- depth reading. An open coding of each document was initially carried out, and then an axial coding was carried out, which allowed establishing relationships between the categories and subcategories. Finally, a selective coding process was carried out, which allowed for a coherent response to the research question.

CPR After having finished the analysis of all the documents, the preparation of the review article began, following the IMRaD format (Introduction, methods, results and discussion), which allowed having an organized and common structure (Wu, 2011).

Likewise, as stated by (Cohen, 1968), cited in Lara Díaz, LM, Pérez Padrón, M. C and Martínez Casanova, LM (2021), in which a matrix was filled out in which it was recorded, if the article should be included or not. In this process, the result of the compared reading indicated a coefficient of 0.94, with a standard deviation of 0.025 and an agreement index between both observers between 0.895 and 0.993, which shows a strength of agreement classified as very high. good. In this way, the definitive sample was composed of 52 articles that were read in depth and analyzed in the ATLAS Ti software with the following distribution: Science Direct 19, Scopus 25 and in WOS 8.

RESULTS

Having an identified documentary corpus of 52 articles, a hermeneutical unit was created in the ATLAS software. You. There, each of the articles were registered as primary documents, the categories and subcategories of a priori analysis were created, which were constituted from the research question. Then a word count was carried out, in order to identify possible emerging categories and subcategories and contrast the categories that were already defined.

Therefore, grounded theory is applied to data analysis, not in order to build theory, but in order to have sufficient clarity in the analysis procedures and perform a systematic data

interpretation. In this case, it is proposed to start from open coding. Understanding this as the process where each text is addressed in order to carry out an in-depth study that allows understanding the process in light of the existing categories and subcategories, but also identifying possible categories that emerge from the data. Here too, memos were used, which helped to understand the reason for a coding and possible personal understanding that would later be collated by the researchers. In this first phase, there was a list of new subcategories that were not available before and that enriched the analysis.

Strategies

The evaluation strategies analyzed in the bibliography are research reports that are developed with students of various educational levels and different topics. It is necessary to highlight that many of these strategies are not explicit, but must be inferred from the method or methodology that each study reports. Among these strategies it is possible to find team-based learning, web-based learning, computer-based expertise, problem- and task-based learning, simulators and technologies applied to the strategies in a consensual manner by the teaching staff.

Most of the identified strategies propose group or team work, which supposes a major challenge for the evaluation process, since normally the final product was conceived collectively and determine the contributions of each student in that project or in the solution to the problem. problem is not simple.

Starting from the above, it is possible to develop evaluative practices based on the student's experience with a problem situation; as named by Kim *et al*. (2016), strategies such as task-based learning (ABT), problem-based learning (PBL) or project-based learning (ABP) start from a cognitive challenge for students, with the purpose of generating critical thinking and scientist in contexts other than school and placing them in real examples of companies or everyday life. For this reason, the student body requires creative ideas, communication for teamwork and other 21st century skills that have to do with the proper use of technology to solve, in a pertinent way, the situation they face in their practice.

Taking into account the strategies mentioned above, electronic portfolios regain importance, a useful tool for students and for teaching staff, since there it is possible to demonstrate performance and monitor the entire process; they are tools that accompany and support group work and, therefore, the commonly presented strategies. Portfolios allow students to present, in an organized way, their work and what they have done, clear evidence of the process and a very important element in the evaluation process.

It is evident that the change in educational practices has encouraged the in-depth analysis of students in real life situations, where ICTs play an important role as they are immersed in evaluation strategies.

Other strategies found that make advanced use of technology are computer-based expertise, where, from the combination of strategy and ICT, it is achieved that, through the approach of real problems and their decisions, the teaching staff can accommodate to important feedback, relying on the analysis made by a software to analyze results, in the evaluation process. In this same way, students are led to see beyond an initial analysis, through argumentation and the correlational analysis of computation.

For their part, the simulators develop important changes in their application and in

the evaluation; they are part of a practice that tends to develop through a virtual medium. Many of these virtual representations tend to be faithful to the environments they wish to represent or the activities they wish to simulate. This ICT intervention must always be accompanied by an evaluation strategy that can be: traditional tests, both pre and post depending on the objective, resolution of problems within the context, repeaters or trainers.

It is necessary to understand that simulations can help in the understanding of certain concepts of theory in practice, generate expertise and practice with the use of technology (Williams *et al*., 2011), cited in Fernández Otaya, FA; Garcia Gonzalez, M; Dios Castillo, CA and Rios Campos, CA (2022). In this same sense, the evolution of the strategies applied to the evaluation towards an automatic evaluation through new technologies can be understood from the hierarchical analytical process (APH in its acronym in English) in charge of directing the evaluation of the student body through its answers and the training that is given to the software to generate a deep analysis in the given answers.

With the advancement of artificial intelligence, expert systems, simulators and strategies, strategies have also been developed for the participation of different contexts and learning, as is the case with gamification and serious games. Serious games are games that involve an educational sense, where there is previously a learning objective, in addition, it is necessary for the student to remain in continuous participation (Jagodziński & Wolski, 2015), Martínez Rodríguez, D., Díaz Crespo, G. (2021).

Gamification is a strategy that maintains the most important characteristics of the game, such as the challenge, the points and the reward to include them in an educational environment and promote, in a different way, the learning or the educational process that is to be applied, without forgetting that the process should be recognized by the term "fun", methodologies in which work is done from the concept of evaluation combined with an implementation strategy and ICT mediation. This mediation can commonly be observed in web 2.0 tools, understood as videos, edublogs, social networks, online tests and portfolios, depending on the target population and the context of the practice (Singh, 2013), cited in Lara Díaz, LM, Pérez Padrón, M. C and Martínez Casanova, LM (2021)

Some examples of the above can be seen in web learning, where interactive videos are integrated and used, which place the student within a video viewing process, but in an active way, since they must view the video and have interaction through it. through emerging questions that are presented, with the purpose of corroborating that the video is being carefully viewed by the student body.

Tools such as Facebook, Twitter, edublogs make sense in learning, since they generate a collaborative interaction between participants. It can be said that applications such as social networks, being connected to a large number of the population, can be directed as a center for building opinions and developing analysis, they are a powerful tool (Ritchie, 2016). In addition, if an interaction between student-teacher, student-content and student-student is carried out, it is possible to generate a virtual learning environment mediated by an ICT tool such as Facebook.

As has been seen in the results, there are technologies that take the interaction and the teaching-learning and evaluation processes far beyond the traditional. For example, the simulation shown in its different levels of interaction can become technology to support the evaluation, or in itself, be taken as a clear evaluation

strategy. In the same way, expert systems become evaluation strategies and a type of evaluation in themselves. At this point, artificial intelligence and simulation complement each other to form evaluation systems that adapt to any strategy or that are constituted as a complete strategy in which evaluation is integrated, from the criteria of Wang, 2014, Torres Miranda, T (2021).

DISCUSSION

Through the review carried out and from the results obtained, it is possible to consider that the strategies mediated or that have used technologies are present in each evaluation carried out, understanding that it is not possible to carry out the evaluation without a clear implementation strategy, where the ICT, at certain times, allow to be really a mediator between student learning and what the teaching staff wants to teach. In the same way, it was found that when technologies are included without a defined educational meaning and without a context, they become a distraction from the final objective and, therefore, get in the way of the teaching and learning process.

For example, the articles of the Educare Electronic Magazine of the Center for Research and Teaching in Education of the National University, Costa Rica, are shared under the terms of the Creative Commons License: Attribution, Non-Commercial, No Derivative Works 3.0 Costa Rica. Additional authorizations to those defined here can be obtained by email: educare@una.cr Educare Electronic Journal (Educare Electronic Journal).

It can be concluded that the most used tools to mediate evaluation processes are web 2.0 tools; The combination of this technology and a pedagogical strategy can achieve the development and evaluation of the expected competence in the student body. In practice, competencies generate a much deeper and clearer analysis of what is intended to be evaluated, since when thinking about competencies, not only the concept but also the necessary skills must be evidenced; Basically, what is generated with a competency is: a) knowledge and b) ability through the previously established rubrics. Adapting ICT to these types of strategies leads to a higher level of inclusion and analysis, so called instructional technology or the inclusion of educational technology.

It was possible to consider that the evaluation strategies used are of a different nature, depending on the context in which they are developed and their application population, according to the above, some of these strategies such as learning, self-regulated and student-centered can be analyzed. These three learnings, taken as strategies, are understood as the active and main participation of the student body through data manipulation, analysis and continuous practice, through an audiovisual medium that generates reinforcement from time to time and constantly evaluates.

To cite some of the technologies that have been used as strategies, since ICT is a mediation and tool for improving evaluation processes, it is possible to speak of web and face-to-face courses, which use instructional materials such as guides, books, articles and interactive activities, as instruments to strengthen the topics worked on.

In addition to the above, in these strategies and activities, through web tools, competence-type materials arise, such as portfolios or e-portfolios, which not only help students to acquire responsibility for their learning, but also to carry a record for your working life. In addition, it receives the help of the evaluative prospective, whether summative or formative, of the teaching staff, since neither of the two evaluation

intentions is wrong, but depends on the integration that the teaching staff wants to experience between the use of the portfolio as strategy and on the summative and formative evaluation process (Cusi *et al*., 2013), García Acosta, JG and García González, M. (2022). This is seen, then, as a step towards improving the evaluation.

In addition to the strategies and ICT that have been used in the research reviewed, there is an important point between what is to be developed and the expected result, here the type of evaluation plays an important role. There are many combinations of evaluations, consistent with the type of learning environment, whether face-to-face, e-learning, blended learning and mobile learn.

The main finding that has been presented throughout the entire text is the existence of a correlation between the type of evaluation, the strategy used to develop the class and the ICT or technology used to mediate the entire process. If this intersection is reached, one could speak of a coherence in the teaching and learning process that will ensure the success of what was planned.

Finally, there is an extremely important item, without which the evaluation (strategy, type of evaluation and ICT), would not make sense: feedback. Feedback was a term that was continually repeated in each of the articles in this review, which becomes, in a certain way, unified but distinguished, through its characteristics and the time of application. Feedback is understood as a crucial aspect of evaluation, in such a way that students are given relevant information with which they can adapt their learning after an educational event.

As previously described, it can be mentioned that technology can contribute a lot to the complex evaluation process, since it allows knowing in what interval of practice a reinforcement should be suggested and can provide previously unthinkable accompaniment by a teacher, because now a machine could do it, however, it is necessary to note that, on many occasions, to determine these instants, ICTs are used as support tools to analyze the results and monitor the student body, using learning analytics . (Wilson *et al*., 2016).

The strategies found in this review, understood as the methods that are used to carry out an evaluation process, present improvements regarding the change in the practice of the teaching staff, the population of students to whom the process is to be applied, the context in the subject to intervene and, finally, a technological change in the tools and in the use given to ICT.

It is concluded that an instrumental use of ICTs still predominates, based on replacing paper with a technological tool. As in the case of questionnaires that continue to evaluate the appropriation of concepts or theory, but now they do so through some technological tool. This supposes an improvement to the process, but it is not substantial, although it answers, in some way, the question posed in this investigation.

It was possible to find evaluation processes in which the use of ICT was developed in such a way that it generated an impact on the subjects and topics involved, without turning all this interaction into a distraction towards the objective to be achieved with the evaluation, such as the case of serious games. On some occasions, the fact of having ICT as a tool generated a different participation towards the concept of evaluation, where both the teaching staff and the student body were participants in their own learning process; this was evidenced in the continuous evaluation and peer evaluation aided by electronic portfolios, within face-to-face learning environments.

It is clear that technology opens up many possibilities when evaluating, but everything will depend on four relevant elements that must be taken into account. The context or learning environment where the educational process is carried out, the strategy that guides the classroom or pedagogical practice, the types of evaluation that are to be favored and that are in accordance with the proposed strategy and, finally, the ICT or technologies that are available. It is evident that many technologies used in the teaching and learning process, such as the case of portfolios, become the main evaluation tool; in the same way it happens with serious games, simulators and other types of resources that, in themselves, carry out processes of transmission, evaluation, reinforcement and feedback.

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The authors have participated in the design and writing of the work, and analysis of the documents.