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Artigo Original

Active Methodologies in Distance Education: literature review

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Abstract

The purpose of this article is to map the empirical research that evaluates the results of the application of active methodologies in distance education. This is a scoping literature review that considered a review already carried out in Portuguese. The searches included Scopus and Web of Science. The filters comprised articles published in journals between 2015 and 2019 in English, Spanish or French. The application of selection criteria resulted in the inclusion of 13 articles. The studies focus on higher education and use a variety of methodologies, approaches and strategies for data collection and analysis. Flipped classroom and problem-based learning are the most used active methodologies in the studies. The articles report positive learning outcomes, which are more clearly visible, however, in the long run. The research results show that active methodologies can be used in the individual and autonomous study phase of students' learning. The conclusion suggests several future works to expand the results of the review.

Keywords: Problem-Based Learning. Project-Based Learning. Case Method. Distance Learning Methodology. Flipped Classroom.

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1. Introduction

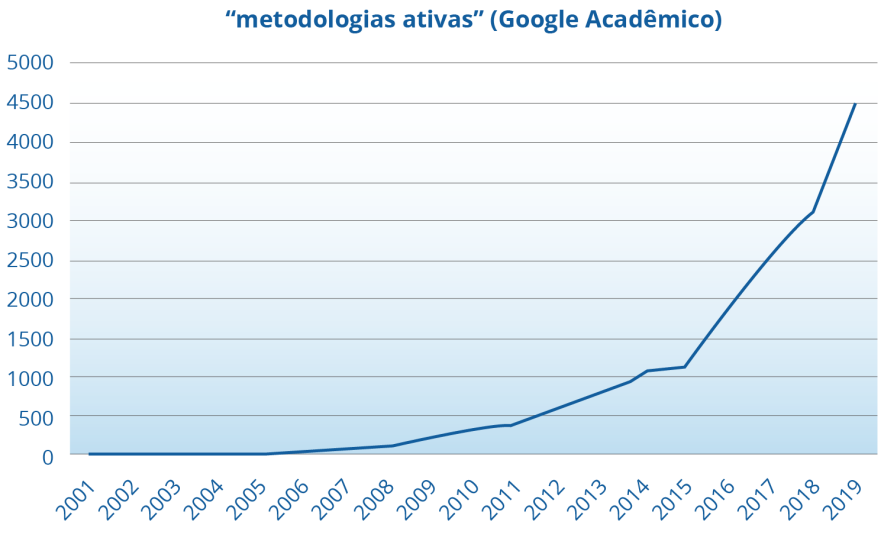
The theme of this article is the use of active methodologies in distance education (DE). The problem investigated comprises the students' learning results from the use of active methodologies in distance education. In this sense, it is important, from the beginning, to take into account Mattar's observation (2017, p. 65):

> […] active methodologies, although they almost always result in greater motivation and involvement of students in activities, do not generate learning improvement results when traditional assessments are carried out, such as tests that seek to measure the immediate retention of knowledge. However, when trying to assess the development of more complex skills, such as problem solving and transferring learning to reality, and even retaining knowledge more in the long run, the results of students who have used active methodologies are generally better than those who used traditional teaching methodologies.

The general objective of this article is to map the empirical research that evaluates the results of the application of some specific active methodologies in distance education. The justification for this research is the growth of distance education, intensified since the Covid-19 pandemic, and the consequent need to incorporate innovative methodologies into the teaching process, which seek to generate positive learning results. Thus, the central question of this article is: what are the results of using active methodologies in distance education?

In the last decade, and especially in the last few years, we have seen a marked growth in the use of the term "active methodologies", as shown in Graph 1:

Graph 1 - Citations of the expression "active methodologies" in Google Scholar



Source: Prepared by the author, based on a search carried out on Google Scholar in November 2020.

In Portuguese, important books have recently been published that address active methodologies from a general perspective (BACICH; MORAN, 2018; CAVALCANTI; FILATRO, 2018; MATTAR, 2017).

For Mattar (2017, p. 22), the active methodologies:

> […] invite the student to abandon his receptive position and participate in the learning process from new and different perspectives, as a decision maker, creator, player, teacher, actor, researcher and so on; somehow, he ceases to be a student.

The author lists and discusses in his book the following active methodologies: inverted classroom; peer instruction; case method; problem-based learning; project-based learning; search; games-based learning and gamification; design thinking, peer review; and self-assessment. This article does not study peer instruction, as the searches performed in the literature review did not return any articles on the topic. Nor

does it address the active methodology that Mattar (2017) calls "research", which has a very general character. Game-based learning is also not studied, since, due to the importance it has acquired in education and the complexity of its configuration, including more recent gamification, it demands a specific and autonomous review. Garone's thesis (2019), for example, carried out a thorough review of the literature on the use of games in distance education. Design thinking, being a specific methodology and often focused on professional practice, is not addressed either. Finally, peer review and self-assessment are not studied, whose classification as active methodologies can be questioned. Therefore, this article discusses: inverted classroom, case method, problem-based learning and project-based learning, which are among the most recognized active methodologies.

In the flipped classroom, what was traditionally done in the classroom (especially the display of content) is now done at home (through, for example, student access to videos), while traditionally done as homework, usually individually, is now done in the classroom, usually in groups (BERGMANN; SAMS, 2016). In this sense, it can be said that the inverted classroom introduces (or intensifies) a distance component in the teaching and learning process. Valente (2014), for example, discusses the use of the inverted classroom in blended learning, which involves the combination of classroom activities and distance learning. This provokes an interesting question: is it possible to conceive the use of the inverted classroom in distance education? Wouldn't there be an overlap here? This article also seeks to answer this question.

In the case method, which differs from the research methodology called "case study" (case study; cf. YIN, 2018), students discuss and present solutions to cases proposed by teachers, acting as policy makers. decision. Teachers, in turn, act as planners, hosts, moderators, devil's advocates, colleagues and judges (HBS, online); they do not get to teach, but rather, more precisely, to facilitate students' learning. These are important steps in the design and implementation of the case method: adequate knowledge about students, careful preparation of activities, interactive conduct of discussions and assessment, which can be formative and / or summative (MATTAR, 2017).

In problem-based learning, in turn, students learn in small groups with the support of tutorial sessions. The problems are proposed in order to contribute to the students to identify their learning needs, while the tutorials must be based on a defined set of learning objectives. Mattar and Aguiar (2018) differentiate problem-based learning, problematization and the case method, which have several points in common and, therefore, are often confused.

Finally, in project-based learning, students work by investigating or answering an authentic, engaging and complex question, problem or challenge (PBL, online). One of the important characteristics of this methodology is the final product - a project, which must be delivered by students and, for some authors, publicly disclosed. Schneider, Zanette and Cechella (2016), for example, present the report of an experience using the project-based learning methodology in a discipline offered at a distance, which was positively evaluated by the students.

Fonseca and Mattar (2017) carried out a literature review in Portuguese on the use of active methodologies in distance education, covering the period from 2006 to 2016, the results of which are incorporated into this article. The searches on Google Scholar were carried out with the expressions "active methodologies" and "distance courses". The initial search returned 206 results. Then, only studies that evaluated the use of active methodologies in the context of distance education were selected. As a result of the application of selection criteria, 21 publications were included in the review, with 5 master's dissertations and 16 articles.

In addition to analyzing the theoretical foundation of the texts, Fonseca and Mattar (2017) identified the types of active methodology used. A common methodology in the studied literature was the inverted classroom. The case method was identified in only one of the texts. The result of using problem-based learning, the methodology most addressed in studies, is more critical learning; however, the fact that students miss practical classes is identified as a negative aspect. Finally, project-based learning also proved to be an active methodology commonly applied in distance education, requiring students to build knowledge.

The review by Fonseca and Mattar (2017) identified a relationship between participation in the proposed activities and the students' learning results. In general, the results found were positive, with active methodologies contributing to develop critical and reflective thinking, ethical values, group work, autonomy and protagonism. The literature review concluded that the active methodologies are capable of promoting an adequate teaching and learning process in distance education, but also pointed out negative points from the students' perspective, among which are: problems of adaptation to the new methodology; difficulties in using virtual learning environments; lack of reasoning in the discussions; difficulty in developing autonomy; and evasion. The authors conclude:

> The challenge presented in this balance of strengths / weaknesses is to be able to associate characteristics of active methodologies with the advantages and resources of virtual learning environments and ICTs. For Sardo (2007), this can provide a creative, innovative learning experience that meets the expectations of 21st century educators and students (FONSECA; MATTAR, 2017, p. 194).

The next section of this article outlines the methodology used in this literature review. The third section presents and analyzes the results of the review, discussed in the following section. The Conclusion summarizes the course of the article and highlights its contributions, in addition to reflecting on its limitations and pointing to future work.

2. Methodology

This is an exploratory, qualitative and documentary research, which involved a bibliographic review and searches on the internet. A scope literature review was carried out, in the way that Vosgerau and Romanowski (2014) conceptualize mapping reviews and that Paré et al. (2015) conceptualize the reviews that seek to synthesize the previous knowledge. The general objective of a scope review is to "summarize the existing literature on a topic of specific interest, to provide readers with

a broad and comprehensive basis for understanding the current state of knowledge in this area" (PARÉ et al., 2015, p. 185, our translation) and "to raise indicators that provide paths or theoretical references for new research" (VOSGERAU; ROMANOWSKI, 2014, p. 174). The product of this review can be called "state of knowledge" (ROMANOWSKI; ENS, 2006), since only a specific sector of publications on the subject was included in the analyzed literature, namely, articles published in journals.

The searches were carried out on two of the main international interdisciplinary bases, Scopus (Article title, Abstract, Keywords) and Web of Science (Topic - search the title, abstract, the author's keywords and Keywords Plus), on October 20 2020. The search expression used was as follows:

"Distance Education" OR "Online Education" OR "Distance Learning" OR "Online Learning" AND "active methodologies" OR "active methodology" OR "active learning" OR "flipped classroom" OR "flipped learning" OR "peer instruction" OR "case method" OR "problem based learning" OR PBL OR "project based learning"

The following filters were applied to searches:

a. sources: articles published in journals;

b. date: publications in the last five years (from 2015 to 2019);

c. languages: English, Spanish or French (considering that we start from the results of a similar and recent review of literature in Portuguese).

The following selection criteria have been defined:

a. use of active methodology in distance education;

b. empirical research, involving some type of data collection (qualitative and / or quantitative) and analysis of the results.

The data extraction, carried out in a form prepared by the author in Microsoft Word, specifically comprised the following items:

a. methodology used in the research;

b. participants and sample;

c. data collection instruments;

d. data analysis strategies;

e. type of active methodology studied;

f. results and conclusions;

g. several.

The analysis involved the comparison between the data extracted from the articles, the results of the review carried out by Fonseca and Mattar (2017) and the theoretical framework presented in the Introduction.

3. Results

The initial search, with the application of the filters indicated in the previous section, resulted in 37 articles (12 in Scopus and 25 in Web of Science). The removal of duplicate results and the application of the selection criteria to the reading of the titles and abstracts of the articles reduced the results to 17. The application of the same selection criteria to the full reading of the articles reduced the results to 13 texts. Chart 1 lists the articles included in the literature review, in alphabetical order of the first author's surname.

Chart 1 - Articles included in the literature review

Authors	Title	Journal	Date
ARTEAGA, Isabel Hernández; MUÑOZ, Mtro Jorge Andrés Suárez; BASTIDAS, Mtro Martín Emilio Navarro.	Evaluación de las características del ABP en el programa de ingeniería de sistemas bajo la modalidad de educación a distancia.	CPU-e, Revista de Investigación Educativa	2016
BRIDGES, Susan.	An emic lens into online learning environments in PBL in undergraduate dentistry.	Pedagogies: An International Journal	2015
COLE, Andrew W.; LENNON, Lauren; WEBER, Nicole L.	Student perceptions of online active learning practices and online learning climate predict online course engagement.	Interactive Learning Environments	2019
FERRER-TORREGROSA, Javier; JIMÉNEZ-RODRÍGUEZ, Miguel Ángel; TORRALBA-ESTELLES, Javier; GARZÓN-FARINÓS Fernanda; PÉREZ-BERMEJO, Marcelo; FERNÁNDEZ-EHRLING, Nadia.	Distance learning ects and flipped classroom in the anatomy learning: comparative study of the use of augmented reality, video and notes.	BMC Medical Education	2016

HSIAO, Chia-Chang; HUANG, Anna Y. Q.; HUANG, Jeff C. H.; LU, Owen H. T.; YIN, C. J.; YANG, Stephen J. H.	Exploring the effects of online learning behaviors on short-term and long-term learning outcomes in flipped classrooms.	Interactive Learning Environments	2019
JEONG, Jin Su; GONZÁLEZ-GÓMEZ, David; CAÑADA-CAÑADA, Florentina; GALLEGO-PICÓ, Alejandrina; BRAVO, Juan Carlos.	Effects of active learning methodologies on the students' emotions, self-efficacy beliefs and learning outcomes in a science distance learning course.	JOTSE: Journal of Technology and Science Education	2019
MARTÍNEZ GARCÍA, Miriam; ROMERO FAZ, David.	Aprendizaje Basado en Problemas mediante un modelo de Teleenseñanza.	Education in the Knowledge Society	2016
ROMERO, Maria del Carmen; BUZÓN-GARCÍA, Olga; TOURON, Javier.	The flipped learning model in online education for secondary teachers.	JOTSE: Journal of Technology and Science Education	2019
SAHLI, Faouzia.	L'apprentissage par problèmes appliqué dans le cadre d'une formation à distance: pédagogie active et E-learning au service de l'enseignement supérieur.	frantice.net	2015

SAN CRISTÓBAL, Mara Sacristán; MARTÍN R., Déborah; ASENCIO, Enrique Navarro; FIGUEROA, Javier Tourón.	Flipped classroom y didáctica de las matemáticas en la formación online de Maestros de Educación Infantil.	Revista Electrónica Interuniversitaria de Formación del Profesorado	2017
SWART, Arthur James	Distance learning engineering students languish under project-based learning, but thrive in case studies and practical workshops.	IEEE Transactions on Education	2015
WEBB, Ashley; MOALLEM, Mahnaz.	Feedback and Feed-Forward for Promoting Problem-Based Learning in Online Learning Environments.	Malaysian Journal of Learning and Instruction	2016
WU, Wen-Chi Vivian; HSIEH, Jun Scott Chen; YANG, Jie Chi.	Creating an online learning community in a flipped classroom to enhance EFL learners' oral proficiency.	Journal of Educational Technology & Society	2017

Source: Prepared by the author.

As can be seen from Chart 1, no author has more than one article among those analyzed. In addition, two journals have two articles published: Interactive Learning Environments and JOTSE: Journal of Technology and Science Education; the rest, just an article. And the dates of publication of the articles are thus distributed: 2015 (3), 2016 (4), 2017 (2), 2018 (0) e 2019 (4).

Data were extracted from these 13 articles following the indications in the previous section.

A variety of methodologies were used in the studies, including descriptive research, ethnography, case study, survey and quasi-experimental research. Approaches vary between qualitative, quantitative and mixed methods.

The 13 articles explore the context of higher education, that is, none of them are aimed at basic or corporate education. There is a concentration on the exact courses (engineering, mathematics and computing), in addition to two courses in the health area and one in each of the following areas: environmental sciences, administration, mathematics teacher training, instructional technology and English.

There is a predominance of data collection through questionnaires and the evaluation of students' learning results, with less use of interviews, observation and document analysis. However, two alternative data collection strategies are employed.

Hsiao *et al*. (2019) initially criticize the use of questionnaires in which the evaluation is carried out by the students themselves: "the results of self-referenced questionnaires and qualitative measures can be influenced by personal perception and fail to capture the reality of the student's involvement during the learning process "(HSIAO et al., 2019, p. 1162, our translation). In the study, data on student behavior are collected in the learning environment itself, in this case, the edX MOOCs platform, through several variables, such as: logs, actions and searches performed by the student, videos watched, etc.

In the case of the study by Bridges (2015), students' activities are recorded by screen recordings using the Camtasia software. In a second step, interviews are conducted in which students watch their own videos and are encouraged to reflect on their online behavior, which ends up contributing to the construction of an emic perspective in the research, that is, that includes not only the the researcher's view, from outside the experience, but also the student's view, from within.

In addition to learning results, quantitative measures and comparisons between control and experimental groups, data analysis in the articles included in the review involves specific statistical procedures, such as regression and multiple correspondence. But the data of some works are also analyzed by qualitative categories, which seek to evaluate, for example, the interaction in the virtual environments, the satisfaction and the perception of the students.

Table 1 shows the distribution of active methodologies by the articles included in the literature review.

Table 1 - Methodologies studied in the articles

Methodology	Qt
Flipped classroom	5
Problem-based learning	5
Case method	1
Project-based learning	1
Active methodologies from an overview	1

Source: Prepared by the author.

All works that analyze the influence of active methodologies in the involvement and / or in the students' learning process report positive results. Several factors are described that present improvements, such as evasion (MARTÍNEZ GARCÍA; ROMERO FAZ, 2016) and the development of skills (SAHLI, 2015; WU; HSIEH; YANG, 2017). An association is identified between greater participation in activities and student learning outcomes (SAN CRISTÓBAL *et al.*, 2017). Another relationship is detected between the students' more positive perception of the active methodologies used and better results of involvement and learning (COLE; LENNON; WEBER, 2019; ROMERO; BUZÓN-GARCÍA; TOURON, 2019). Ferrer-Torregrosa et al. (2016) also identify better results with the use of more interactive technologies (in this case, augmented reality - grade 7.19 of students) compared to videos (grade 6.54) and images with annotations (grade 5.60).

It is also important to note that more than one study points out that the improvement in learning from the use of active methodologies in distance education does not occur in the short term, but in the long term. Hsiao et al. (2019, p. 1160, our translation), for example, identify that "students' online learning behavior does not have a significant effect on short-term learning outcomes, but it does have a significant effect on long-term learning outcomes term ", while Sahli (2015) concludes that the use of problem-based learning in distance education favors the involvement of students in the construction of knowledge in

the long term.

Finally, it is noted that the study by Arteaga, Muñoz and Bastidas (2016) concludes that, although the principles of problem-based learning are registered in the institution's pedagogical documents, they are not present in didactic materials or practices teaching, to the point that teachers and tutors are unaware of the methodology.

4. Discussion

It should be noted initially that the 13 articles included in this literature review study the use of active methodologies in higher education. If that, in principle, could be expected, since distance education is mainly aimed at the adult audience, after the covid-19 pandemic, blended learning tends to play an important role in basic education, implying more moments of distance activities . Thus, especially considering that the active methodologies are already being used in face-to-face basic education (cf. eg BACICH; MORAN, 2018; VICKERY, 2016), growth in the practices of using active methodologies in basic distance education, thus constituting a new and rich field for research.

It was observed the use of a diversity of methodologies in the articles included in this literature review, from qualitative to quantitative. Research on the application of active methodologies in distance education lends itself to the use of mixed methods (CRESWELL; CLARK, 2018; CRESWELL; CRESWELL, 2018), thus enabling the analysis of qualitative data to be combined with statistical analysis of quantitative data, collected, for example, through questionnaires and tests or reports issued by the virtual learning environments themselves. This possibility - and the need - for mixed methods research, however, calls attention to a gap in education research in Brazil: the lack of studies that use quantitative methodologies, due to a failure in the training of researchers (GATTI, 2004, 2012).

In addition, as we have seen, the studies by Hsiao et al. (2019) and Bridges (2015) present alternatives to the collection of data by questionnaires answered by the students themselves and to the evaluation

of learning results through grades in tests or tests. The online behavior of students is an essential source for studying the effects of applying active methodologies in distance education; information extracted from virtual learning environments can be combined, for example, with data collected in stimulated recall interviews, as used by Bridges (2015). Netnography (KOZINETS, 2020), a systematic methodology that includes techniques and procedures for collecting, analyzing and interpreting data, aimed specifically at the study of online tracks, can constitute an important support for this type of investigation.

The main question proposed in this literature review was: what are the results of using active methodologies in distance education? Both the literature review conducted by Fonseca and Mattar (2017) and this review identified several positive results from the use of active methodologies in distance education, among which the development of critical and reflective thinking, autonomy, the role of students and diverse skills . The negative results identified by Fonseca and Mattar (2017), such as problems of adaptation to the new methodology, difficulties in using virtual learning environments, lack of reasoning in the discussions and difficulty in developing autonomy had less weight in the articles analyzed in this review, being that, in the study conducted by Martínez García and Romero Faz (2016), for example, one of those included in this review, there was an improvement in relation to evasion through the use of problem-based learning.

Both reviews identified a relationship between increased participation in activities and students' learning outcomes. This review also identified an association between the students' perception of the active methodologies used and the results of their involvement and their learning (COLE; LENNON; WEBER, 2019; ROMERO; BUZÓN-GARCÍA; TOURON, 2019). Thus, it is important to provide strategies to motivate students to carry out activities and understand the proposed active methodologies - that is, to train students - which, in turn, as both literature reviews have shown, tends to influence learning outcomes. . And it is important to remember the need for continued training of teachers and tutors, to avoid the problem that Arteaga, Muñoz and Bastidas (2016) identified: the lack of knowledge, on the part of these teachers, of the

principles of an active methodology that was registered in the institution's pedagogical documents education.

Another important relationship identified by the two reviews was that these learning results may not be clear in the short term, but they tend to be more visible in the long run. Mattar (2010) comes to the same conclusion when studying the effects of the use of games on education. First, it is important to recognize that traditional summative assessments, such as multiple-choice tests, that seek only to measure the memorization of content, may not see changes caused by the use of active methodologies. In addition, active methodologies tend to generate greater retention of learning, which is more evident in evaluations carried out in the long run. In this sense, it is worth repeating that the study by Hsiao et al. (2019, p. 1160, our translation) identifies that "students' online learning behavior does not have a significant effect on short-term learning outcomes, but it does have a significant effect on long-term learning outcomes". Thus, in the design of evaluations of the results of the types of research explored in this article, mechanisms should be provided to examine the situation of students in the medium and long terms, and not only at the end of the interventions.

The association between technologies and methodologies also tends to produce more solid learning results. The study by Ferrer-Torregrosa et al. (2016), for example, identified significant differences in the grades of students who used the inverted classroom supported by augmented reality, compared to students who used videos and images with annotations, in addition to significant differences in other variables analyzed. Considering that distance education intensively uses diverse technologies and tools, the design of the use of active methodologies in distance education must necessarily involve planning its articulation with the most appropriate technologies for each methodology.

Finally, it is worth exploring another issue raised in this article, about the possible relationships between the inverted classroom and distance education. At first, as already mentioned, the inverted classroom introduces or intensifies a distance component in the study, thus characterizing blended learning (VALENTE, 2014). But it is also possible to conceive the inversion, in the DE itself, between synchronous

and asynchronous activities, in other words, asynchronously the student can access the contents indicated by the teacher, to prepare for synchronous interactive and collaborative activities, counting then on the teaching support. . But the articles analyzed in this literature review pointed to yet another possible combination between an inverted classroom - and active methodologies, in general - and distance education.

Although we naturally tend to consider that active methodologies imply interaction and collaboration, different articles included in this review pointed to the possibility of conceiving that the "active", in the inverted classroom, can be located at the time of the individual study at a distance. Romero, Buzón-García and Touron (2019), for example, conclude that the inverted learning model itself improves students' autonomous and active learning, and the moment of individual study involved in this methodology generates better performance and learning results. Ferrer-Torregrosa *et al.* (2016), in turn, discuss didactic strategies to improve autonomous and individual study in the inverted classroom. The results of the study showed that augmented reality, when used independently by students, enabled a higher level of learning than videos or images with annotations. In the same direction, the study proved the following hypothesis: "Autonomous learning with augmented reality is more valued in the students' metacognitive perception than the use of videos or notes on the same subject" (FERRER-TORREGROSA et al., 2016, p. 6).

But this finding is not limited to the inverted classroom methodology. Arteaga, Muñoz and Bastidas (2016), on the one hand, are interested in the problem-based learning strategies to promote autonomous learning and self-learning, for example, in the proposal of contextualized and practical exercises. On the other hand, Bridges (2015) studies the effects of using online resources, especially digital learning objects, to support students' activities in the individual and independent study phase - and at a distance - of problem-based learning.

Therefore, if we can affirm, like Cole, Lennon and Weber (2019), that teachers should not believe that active learning can only take place in face-to-face classrooms, neither should we conceive that, in distance education, the design of active methodologies only apply to interactive

and collaborative activities in the teaching and learning cycle.

5. Conclusion

This article started from a literature review on the application of active methodologies to distance education courses, carried out at Google Scholar in Portuguese, and presented the results of a new review on the same topic, whose searches were carried out on the Scopus and Web of Science in English, Spanish and French. In both reviews, problem-based learning and the inverted classroom stood out in frequency, compared to other active methodologies.

One of the main contributions of this article was to present several positive learning results associated with the use of active methodologies in distance education. Other findings of this study also stand out: the importance of using mixed method approaches in these investigations; alternative instruments and strategies for data collection; guidelines for assessments of learning in the medium and long term; articulation between technologies and methodologies; and the recognition that the design of active methodologies can involve the phase of autonomous study at a distance.

Both literature reviews have limitations, basically linked to the breadth of searches (search expressions, databases, dates and languages). In order to expand the results, several proposals for future studies can be made following the methodology used in this article.

First, it is worth remembering that several active methodologies discussed by Mattar (2017) were not included in this review: research, game-based learning and gamification, design thinking, peer review and self-assessment. All are important and justify specific investigations on their applications in distance education. In addition, authors such as Cavalcanti and Filatro (2018) propose other types of active methodologies, for which literature reviews that use the methodology proposed here can also be carried out.

On the other hand, it is worth investigating more carefully why studies using peer instruction in distance education have not been identified. Considering that peer instruction can be classified as a type of interactive classroom, which appeared in several works in the two reviews, a research could propose to carry out more searches to identify whether this active methodology has been used only in education in person.

The insignificant incidence of research using the case method in distance education may be due to the indiscriminate use of the expressions "case study" and "case study", despite the differentiation between a teaching and research methodology. In this sense, it is worth investigating whether searches with both expressions will no longer return examples of the use of the case method in DE, even because all procedures, from the proposal of the cases, through the division and monitoring of the groups, to the presentations and discussions can be carried out quite effectively in virtual learning environments.

It is also curious that project-based learning had an insignificant representation in the results of this literature review, and that, in the article in which it was specifically studied (SWART, 2015), it generated significantly lower grades than other methodologies, such as workshops practices and case studies. A specific investigation is needed here, as, as in the case method, the project-based learning procedures can be carried out and monitored effectively in virtual learning environments.

The use of problem-based learning also deserves a specific investigation, but for another reason: the fact that it stood out, in the frequency of the results, in both reviews. Both surveys show that work with problems in distance education has been recurrent and has generated positive learning results, which justifies expanding these surveys.

New literature reviews and expansions of those already carried out can be conducted in new databases, in addition to Google Scholar, Scopus and Web of Science, for example: the international, generic and multidisciplinary databases Academic Search and EBSCOhost; the bases that cover many national journals, such as SciELO and Portal de Periódicos Capes; and ERIC, aimed specifically at the area of education. Considering that we started from a literature review in Portuguese

that covered until 2016, an update of this review may constitute another type of future work. In all of these cases, an improvement in search expressions would also be essential.

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