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Editors

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# Preface

In this edition of the International Conference on Management, Tourism and Technologies—ICMTT 2023, papers were presented in the areas of: Managements, Tourism, Marketing Strategies in Management, Tourism and Technology, and Technology.

We would like to give special thanks to the Universidad Distrital Francisco José de Caldas, Fundación Universitaria Internacional de la Rioja, and Universidad de Cundinamarca, for hosting us, as well as to all the members and collaborators, since without them this dream would not have been possible.

We had more than 200 papers presented, we spent 3 consecutive days in 5 parallel rooms, and more than 400 people passed through the event and generated an academic space that allowed the exchange of experiences to advance in the era of knowledge, where we have so much data that the important thing is to transform it into knowledge. Another of the great experiences that the event left us is that virtuality is definitely a reality, since many of our works were presented in this way.

We still have many challenges, but a very important one and on which we are working is how to get that academic relationship that gives us the presence in these events we can also make up for with virtuality, and this reflection has helped us to understand what a visionary as Mark Zuckerberg CEO of Meta has envisioned in what he called the Metaverse and just put an oculus to understand that virtuality needs these visions to achieve the great challenge we have set ourselves: How will we relate to other people in academic, social, or other contexts through virtual scenarios?

I hope to see you all at the next edition of the International Conference on Management, Tourism and Technologies—ICMTT 2024, in Cusco, Peru, and as we will not stop doing virtual sessions, the challenge is that we all have some oculus to see ourselves in our Metaverse.

May 2023

Carlos Montenegro
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# Contents

# Active learning methodologies in online teaching

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**Abstract.** Online teaching may be attractive, but by itself it is not enough to guarantee a quality teaching-learning process. Thus, considering the importance of online teaching in the field of education, it is understood that it is crucial to study the most appropriate active learning methodologies for this type of teaching modality. In this sense, the research aims to identify a set of active learning methodologies to be adopted for online teaching with the aim of contributing to the diversity and dynamism of the teaching-learning process in order to contribute to helping the student learn more and better. A systematic literature review is used to identify these methodologies in an online teaching context. The results suggest that these kinds of innovative methodologies seem to be suitable to motivate teachers in their classes, since they make the learning process more dynamic, motivate students to participate in the proposed activities and also allow the involvement of all the interveners in the construction of knowledge and, therefore, place the student at the center of learning.

**Keywords:** Active learning methodologies, online teaching, pedagogie, digital technologies, teaching-learning process.

## 1 Innovate with active learning methodologies

The educational context in which we currently live is quite complex, and constantly changing: Complex because teachers increasingly have a set of roles, functions, constraints and obstacles associated with the teaching function of the most diverse dimensions; Changing because it is clear the difficulty of education and its school communities to follow, in a timely manner, the various transformations that occur in society in general, but also in the way education happens today. It is not just a question of the difficulty in keeping up with the times, trends and technical-pedagogical innovations, it is a question of understanding and introducing them into the teaching-learning process, whether in the classroom context or in an online context. These innovations that we are referring to seem to occur in the three dimensions that support the teaching-learning process: technology, pedagogy and content, but also in the context where this

process takes place. Active learning methodologies seem to be the connecting link that articulates these three dimensions in a given learning context, contributing to innovation in the educational process.

Active learning methodologies have been the object of study and research in the area of education and technology, especially in the context of online teaching. These methodologies have become increasingly popular in online teaching, as they allow greater student participation in the learning process and encourage the construction of knowledge in a collaborative way. These methodologies are absolutely central strategies in the teaching-learning process as they promote the centrality of the student in the process of acquiring knowledge and skills. Given that these methodologies contribute to changing the reality of the classroom, it is important to discuss the topic as a way of collaborating in its development, since much is said about the need for change in education, and it is necessary to invest in new methods to obtain better results [1]. So, what are active learning methodologies anyway? Active learning methodologies can be considered as forms of teaching in which students are encouraged to participate in the process more directly. In a way, the active methodology breaks with traditional approaches to what we consider to be educating. In active learning methodologies, the greater the student's involvement in the content discussed, the greater their ability to understand [2]. It is added that the trajectory of active learning must be guided by a final objective to be achieved, so that the student knows where he needs to go [3]. The active methodologies consist of a set of diverse proposals that have in common the fact that they oppose the expository methodology, considered responsible for the passive and heteronomous posture of the student [4]. Active learning methodologies "constitute pedagogical alternatives that place the focus of the teaching and learning process on the learner, involving him in learning through discovery, investigation or problem solving" [5]. These methodologies are teaching approaches that promote the active participation of the student in the construction of knowledge, rather than simply transmitting information. Active methodologies emerged to oppose the formal logic of teaching practices, which is based on passive methodologies in which the teacher is the main agent in this process, with the principle of providing students with different tools to collaborate with their comprehensive training [6]. But after all, what are the methodologies we are referring to?

- Problem-based learning: is a methodology in which students work in groups to solve real-world problems. The students need to identify and analyze problems, research relevant information, and propose solutions [7], [8];
- Project-based learning: is a methodology in which students work on projects that involve research, planning, and collaboration. The students need to apply skills and knowledge from various fields to create something new or solve problems [9]–[11];
- Cooperative learning: is a methodology in which students work in groups to achieve common goals. Each member of the group is responsible for contributing his or her own knowledge and skills, while at the same time learning from their peers [12];

- Flipped Classroom: is a methodology in which students watch recorded lessons at home, and use the classroom time to work on practical activities, discussions, and problem solving [13], [14];
- Game-based learning: is a methodology in which students learn by playing games. Games are designed to teach specific skills and concepts in a fun and interactive way [15], [16];
- Challenge-based learning: is a methodology in which students are challenged to solve complex problems and make difficult decisions. Students need to work in teams, research, and apply knowledge from various fields to find solutions [17], [18];
- Discovery learning: is a methodology in which students are encouraged to discover knowledge for themselves through experimentation and experimentation. Teachers provide guidance, but students are responsible for constructing their own knowledge [19].

In addition to the identified methodologies, there are many others that we will now identify: team-based learning, service-based learning, competency-based learning, simulation-based learning, debate-based learning, social media-based learning. Obviously each methodology has its own characteristics, benefits, and constraints, and may be best suited for different types of content or learning objectives. It is important to choose a methodology that best meets the needs of the student and the teacher, always taking into consideration the learning context.

Throughout the development of the research on learning methodologies it was interesting to realize that much of the literature points to active learning methodologies as something new and wonderful. In fact, most of these methodologies are already more than 20 years old. What is happening now is that they are being studied more by the scientific and educational communities and also implemented in the educational process.

Considering the importance of online teaching in the field of education, it is understood that it is crucial to study these methodologies for this type of teaching modality. In this sense, the research aims to identify a set of active learning methodologies to be adopt-ed for online teaching with the aim of contributing to the diversity and dynamism of the teaching-learning process in order to contribute to helping the student learn more and better.

## 2 Method

Identifying the most appropriate active learning methodologies for online teaching-learning process is the objective of this research. For this, a systematic review of the literature is adopted, which is supported by the following set of criteria (keywords): (i)Type of documents: scientific articles; (ii) Language: Portuguese and English; (iii) Keywords: “active learning methodologies in online teaching”, “active learning meth-

odologies online", "active learning methodologies in e-learning"; (iv) Bibliometric database: Scopus and Web of Science; (v) Other databases: Google Scholar; (vi) Period: last six years (January 1, 2017 to January 1, 2023). Whenever duplicate articles were found, only one of them was considered, the other being excluded outright. In addition to the formulation of the review question and research criteria, the literature review took into account the selection and evaluation of studies, data extraction and also the analysis, interpretation and presentation of results.

This study is further supported by exploratory research because researchers, supported by the previously defined set of criteria, identify active learning methodologies. Qualitative data were recorded in the investigator's diary according to previously defined criteria. Subsequently, they were treated, analyzed and categorized in Microsoft Excel with the aim of identifying the various senses of response. The following table identifies the selected articles:

| Authors | Year | Title |
|---|---|---|
| Aguillon, S. M., Siegmund, G. F., Petipas, R. H., Drake, A. G., Cotner, S., & Ballen, C. J. | 2020 | Gender differences in student participation in an active-learning classroom |
| Ballen, C. J., Wieman, C., Salehi, S., Searle, J. B., & Zamudio, K. R. | 2017 | Enhancing diversity in undergraduate science: Self-efficacy drives performance gains with active learning |
| Borrego, M., Nguyen, K. A., Crockett, C., DeMonbrun, M., Shekhar, P., Tharayil, S., ... & Waters, C. | 2018 | Systematic literature review of students' affective responses to active learning: Overview of results |
| Buil-Fabrega, M., Martínez Casanovas, M., Ruiz-Munzón, N., & Filho, W. L. | 2019 | Flipped classroom as an active learning methodology in sustainable development curricula |
| Carlos, V., Reses, G., & Soares, S. C. | 2023 | Active learning spaces design and assessment: a qualitative systematic literature review |
| Carvalho, A., Teixeira, S. J., Olim, L., Campanella, S. D., & Costa, T. | 2021 | Pedagogical innovation in higher education and active learning methodologies–a case study. |
| Cavichioli, F. C. T., do Nascimento Filho, H. M., Borges, D. T. M., Blanes, L., & Ferreira, L. M. | 2021 | Educação continuada e metodologias ativas em cursos a distância em enfermagem: revisão integrativa da literatura |
| Cho, H. J., Zhao, K., Lee, C. R., Runshe, D., & Krousgrill, C. | 2021 | Active learning through flipped classroom in mechanical engineering: improving students' perception of learning and performance |
| Cortiano, S. A. M., & de Menezes, G. G. | 2020 | Metodologias ativas de ensino utilizadas nas diversas áreas do conhecimento: uma revisão sistemática da literatura |
| Dominguez, A., Alarcon, H., & García-Peñalvo, F. J. | 2019 | Active learning experiences in Engineering Education. |
| Gomes dos Santos, I., Teodoro, R., Sadoyama, G., & Sadoyama, A. | 2020 | O uso de metodologias ativas no ensino de ciências: um estudo de revisão sistemática |
| Hartikainen, S., Rintala, H., Pylväs, L., & Nokelainen, P. | 2019 | The concept of active learning and the measurement of learning outcomes: A review of research in engineering higher education. |
| Hartwig, A. K., Silveira, M., Fronza, L., Mattos, M., & de Araújo Kohler, L. P. | 2019 | Metodologias ativas para o ensino da computação: uma revisão sistemática e um estudo prático |
| Hwang, G. J., Yin, C., & Chu, H. C. | 2019 | The era of flipped learning: promoting active learning and higher order thinking with innovative flipped learning strategies and supporting systems |
| Hyun, J., Ediger, R., & Lee, D. ( | 2017 | Students' Satisfaction on Their Learning Process in Active Learning and Traditional Classrooms |
| Jacobovski, R., & Ferro, L. F. ( | 2021 | Educação permanente em saúde e metodologias ativas de ensino: uma revisão sistemática integrativa |
| Jurado, S. R., Vidal, V. G. A., da Silva, A. V., da Silva Moreira, A., Bassler, T. C., & Sanchez, A. | 2019 | Metodologias ativas no ensino de estudantes de enfermagem: uma revisão sistemática |

| | | |
|---|---|---|
| Karabulut-Ilgu, A., Jaramillo Cherrez, N., & Jahren, C. T. | 2018 | Karabulut-Ilgu, A., Jaramillo Cherrez, N., & Jahren, C. T. (2018). A systematic review of research on the flipped learning method in engineering education |
| Khan, Arshia, et al. | 2017 | Active learning: Engaging students to maximize learning in an online course |
| Leandro, A. C. S.; Maia, E. C.; Alves, I. C.; Santos, L.P.C.; de Andrade, T. C. F.; de Moura, C. F. S.; Viana, O. M.; Shzu, M. A. M.; Lisniowski, S. A.; de Paula, A. S. | 2021 | Adaptação de estratégias online para metodologias ativas de aprendizagem na educação STEAM |
| Lima, J. V., Júnior, M. D. M. A., Moya, A., Almeida, R., Anjos, P., Lencastre, M., ... & Alencar, F. | 2019 | As Metodologias Ativas e o Ensino em Engenharia de Software: uma revisão sistemática da literatura |
| Macedo, K. D. D. S., Acosta, B. S., Silva, E. B. D., Souza, N. S. D., Beck, C. L. C., & Silva, K. K. D. D. | 2018 | Metodologias ativas de aprendizagem: caminhos possíveis para inovação no ensino em saúde |
| Martinez Casanovas, M., Ruiz-Munzon, N., & Buil-Fabrega, M. | 2022 | Higher education: The best practices for fostering competences for sustainable development through the use of active learning methodologies |
| Misseyanni, A., Papadopoulou, P., Marouli, C., & Lytras, M. D. (Eds.). | 2018 | Active learning strategies in higher education |
| Pereira, C. S., & dos Santos Junior, G. | 2018 | Metodologias de ensino para a formação de engenheiros no ensino superior: uma revisão sistemática |
| Plump, C. M., & LaRosa, J. | 2017 | Using Kahoot! in the classroom to create engagement and active learning: A game-based technology solution for eLearning novices |
| Portela, N. M., Costa, J. M. B. D. S., & Magalhães, G. S. D. G. | 2020 | A experiência com o uso do e-learning na aprendizagem baseada em problemas de um curso de medicina. |
| Rocha, C. J. T. D., & Farias, S. A. D. | 2020 | Metodologias ativas de aprendizagem possíveis ao ensino de ciências e matemática |
| Valente, J. A., Almeida, M. E. B. D., & Geraldini, A. F. S. | 2017 | Metodologias ativas: das concepções às práticas em distintos níveis de ensino |

**Table1:** Articles from the systematic literature review

As can be seen in the previous table, of the total 47 articles identified, 29 were selected and, therefore, 18 were excluded for not meeting the requirements defined for conducting the systematic literature review.

## 3 Discussion of results

As shown in the literature review section, there are several active learning methodologies that can be used in online teaching, and the choice of methodology will always depend on the course objectives, the students' needs, the availability of resources, in other words, the learning context itself. Some examples of active learning methodologies that are often used in online teaching include project-based learning, collaborative learning, problem-based learning, and the flipped classroom. However, according to the systematic review conducted, it is collaborative learning and the flipped classroom that are the most frequently used active learning methodologies in online teaching, due to their effectiveness in promoting active student participation, engagement, and skills development that can be transferred to real-world situations. These methodologies have a number of pedagogical advantages that ensure quality and innovation in the teaching-learning process. Thus, collaborative learning promotes social interaction, which can increase students' motivation and engagement in learning. Group collaboration can help students improve their social skills, such as communication and conflict resolution.

Collaborative work can also lead to greater knowledge retention and deeper learning [20]. Flipped classroom methodology can lead to an increase in student satisfaction and engagement in learning, The flipped classroom can also help personalize learning, allowing students to learn at their own pace and focus on the topics that are most challenging for them.

Assessment in these two methodologies can occur in different ways, as long as it is in line with the learning objectives and the methodology used. In the collaborative methodology, collaboration and knowledge sharing among group members should be encouraged. Peer evaluation should take place, in which the students themselves evaluate the work of their colleagues with previously established criteria in order for it to be a fair and objective evaluation. Individual performance evaluation, in which each student is evaluated in relation to his or her own performance and not in relation to the performance of the other group members. It is also possible to combine these two forms of evaluation, for example, by evaluating learners' individual performance and then conducting a peer evaluation to assess each learner's contribution to the group.

In the flipped classroom methodology one should encourage the student to be autonomous and to develop critical and reflective skills. A common form of assessment in the flipped classroom is formative assessment, in which students receive continuous feedback throughout the learning process. This can occur through review and discussion activities before or during the online class, comprehension tests or practical exercises, which allow the teacher to assess each student's individual progress and provide constructive feedback. Another form of assessment in the flipped classroom is summative assessment, which takes place at the end of a learning period or a specific topic. In this case, different assessment instruments can be used, such as tests, individual or group work, projects, presentations, among others. Whatever form you choose, it is important that the evaluation is fair, transparent and aligned with the learning objectives of the collaborative learning methodology.

Learning methodologies in online environments seem to present additional challenges to those already present in face-to-face modalities. The assessment process we talked about earlier is an example of this! Lack of interaction and engagement, as it is more difficult to keep learners engaged and motivated in a virtual environment, where interactions are limited and distractions are greater. Also, learners' lack of technical skills or connectivity problems can limit participation and access to content. Lack of direct supervision of learners can lead to procrastination and lower quality of work delivered. Also, lack of social interaction between students and teacher can lead to a sense of isolation and a lack of building networks of support and collaboration. Overcoming these challenges requires teachers to use effective pedagogical and technological strategies, such as using interactive distance learning platforms, promoting collaborative activities, and communicating clearly and frequently with students. Technical and emotional support for students to learn and to feel motivated and engaged in the online learning process is also of utmost importance.

## 4 Conclusions

Active learning methodologies bring many challenges for teachers and students, but they can also offer many benefits. One of the main challenges is the need to change the way classes are planned and delivered. Instead of relying on lectures and memorization of information, teachers need to create activities and projects that engage students and promote active learning. This can require more time and resources for planning and preparation, as well as being more challenging for teachers to assess student performance. Students, in turn, may find it difficult to adapt to a more independent and collaborative learning environment that requires more initiative and personal responsibility. However, when implemented well, active learning methodologies can be very effective in promoting meaningful learning and information retention.

The research also allowed verifying that these methodologies contribute to educational innovation, since they challenge the student to also be responsible for his own learning process. In fact, it places the student as the builder of their learning with the guidance of the teacher, but also with the contribution of colleagues. In this sense, active learning methodologies provide a great service to education as they innovate the educational process, contributing to dynamism, difference and diversity in the ways in which knowledge can be transmitted and built.

Active learning methodologies can significantly contribute to improving the quality of online teaching. This is because these methodologies have as their central objective the active involvement of the student in the learning process, which can increase their motivation and interest in learning, favoring the development of skills and competencies relevant to their training as a professional. These methodologies can thus favor the interaction between students and between them and the professor, the collective construction of knowledge and the exchange of experiences and knowledge, contributing to the formation of more prepared and qualified professionals to face the challenges of the labor market. However, the implementation of active learning methodologies in online teaching can face some challenges, which need to be overcome so that the benefits of these approaches are effectively achieved. One of the main challenges seems to be teachers' adaptation to this new methodology, which requires a more guiding and facilitating posture, rather than just transmitting content. Another challenge is the need to adapt the technological resources and infrastructure of educational institutions, so that they support active learning methodologies. In addition, assessing student performance can become a challenge, as active learning methodologies generally value participation and the process of collective knowledge construction, which can make it difficult to apply traditional assessments based on tests and tests. Obviously, these challenges can be minimized with good organization and planning, as well as a collaborative approach between teachers, students and educational institutions.

It is necessary to be open to changes and seek creative and innovative solutions to overcome challenges. Gone are the days when the teacher was a simple transmitter of knowledge! Today we find ourselves in a completely globalized world, where the education sector plays a central role in societies, in their development and in their progress in the most diverse economic sectors. In this way, the school becomes a vital space for the development of communities and students. Adopting innovative methodologies to

ensure that the student participates, analyzes, reflects, performs, produces, collaborates, cooperates, socializes, debates, shares and gets involved in the teaching-learning process is to say to the student: yes, you matter! And actually, it really matters!

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