


Peer-to-peer learning and collaborative knowledge building in face-to-face and online environments

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ABSTRACT

This paper presents a discussion about the method of peer instruction or peer instruction, as an active methodology. From the origin of the method in the early 1990s to the present day, this methodology has been successfully employed in several educational institutions, especially in higher education courses, as well as in basic education schools. This article aims to briefly discuss the use of the teaching method created by Eric Mazur who realized the need to bring better results to his classes through the active participation of his students. To this end, bibliographic research was used as a work methodology, since the field of reflection that is presented here is the result of the readings and contributions of several theorists who deal with the theme in question, that is, the active methodologies and among them, peer instruction. At the end of the preparation of this text, it was possible to conclude through the readings and studies that the peer instruction method can be easily applied in different learning environments, whether for face-to-face or online classes and without great costs, as it does not require technological resources to be executed.

Keywords: Active methodology, Peer instruction, Teaching, Learning.

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INTRODUCTION

Nowadays, we often see that students are constantly bombarded with information and news from digital media and even new technologies, a situation that can negatively influence their autonomy and motivation to study. Allied to this, we see that a considerable portion of teachers remain stuck in traditional teaching methodologies. However, active methodologies offer an effective pedagogical approach to dealing with this reality. Instead of just passively receiving information, with active methodologies students are encouraged to be actively involved in the learning process and among the various methodologies that escape the traditional bias, peer instruction can be mentioned .

We understand that active methodologies are based on a theoretical conception that goes back to Paulo Freire and other constructivist theorists, since the incentive to student autonomy and learning predominate. In this sense, it is important to highlight that

Promoting meaningful learning requires, first of all, a teaching methodology that is capable of involving the student as the protagonist of their learning, also developing a critical sense in the face of what is learned, as well as skills to relate this knowledge to the real world. Such a process seems to become possible with the use of what we call active learning methodologies (Pinto, et al. p. 78).

In this way, by promoting collaboration among students and actively involving them in the learning process, active learning methodologies not only improve the understanding of concepts, but also develop essential skills, such as critical thinking, communication, and teamwork. It is worth noting that the success of this approach depends on the teacher's ability to create a stimulating and inclusive learning environment, where students feel motivated to actively participate and contribute to collective learning.

Studies show that the adoption of active methodologies in classes contributes greatly to overcoming students' lack of autonomy and willingness to study, in addition to improving academic performance (Freeman, et al. 2014. p. 8012). By carrying out team projects or simulations, students learn to work together, share ideas and solve problems collectively, strengthening their social and communication skills and also increasing their motivation by feeling an integral part of an engaged and collaborative learning context.

The use of active methodologies is essential to engage and motivate students who may be more passive or less participative. These methodologies offer practical opportunities for students to be actively involved in the learning process, making them protagonists of their own educational development. Rather than simply absorbing information, students are challenged to apply knowledge in real-world situations, solve problems, and collaborate with peers. Not only does this encourage deeper learning, but it also fosters valuable skills such as critical thinking, creativity, and teamwork.



Thus, the present work aims to present a brief discussion about the use of the method created by Eric Mazur, *peer instruction*. To this end, bibliographic research was used as a work methodology, since the studies presented here do not deal with field research, or analysis of public policies, or interviews or even case studies, for example. Thus, the field of reflection that is presented here is the result of the readings and contributions of several theorists who deal with the theme in question.

To give substance to the present study, first of all, IP as an active methodology will be highlighted⁹, its origin, evolution and importance based on the reflection of several authors. Then, the use of this method in face-to-face or online classrooms will be discussed, as another of the different active methodologies that represent an effective educational approach to face the challenges imposed by the media and the advancement of technologies in the lives of students.

PEER INSTRUCTION AS AN ACTIVE METHODOLOGY

It is commonplace in different academic study environments today that the teaching and learning process undergoes important and profound changes. Schools and teachers need to adapt to the target audience that suffers every day from the interference of new media, social networks, technological advances and social arrangements that are formed in contemporary times. The student has always been the main target of concern and study by institutions and education professionals, however, with the changes that have been occurring, new questions and new concerns arise that need to be answered.

Thus, the school and teachers who use traditional methods to only transmit information no longer meet the expectations of the students, since access to information is no longer a monopoly of the teacher, but is within the reach of any student. In this, the teacher will not be completely replaced, his contact with his students face to face must continue, but it is up to the teacher to understand that there will also be digital interaction with his students, through different technologies (Moran, 2015, p.16).

One response to the challenges discussed above is the adoption of active methodologies in the classroom. The expression "active" is very significant to distinguish this methodology from others, as it involves and engages students in their own learning, making them protagonists of the construction of knowledge. These are situations in the classroom where the student is challenged to leave passivity and act actively. Like this

active methodologies seek to create learning situations in which learners do things, put knowledge into action, think and conceptualize what they do, build knowledge about the contents involved in the activities they perform, as well as develop cognitive strategies,

⁹ From now on, the acronym PI will be adopted to deal with *Peer Instruction*.



critical capacity and reflection on their practices, provide and receive feedback, learn to interact with colleagues and teachers (Valente, Almeida & Geraldini. 2017. p 459).

In this way, active methodologies are activities that promote participation, autonomy and the development of skills beyond the simple assimilation of information. These methodologies stand out for changing the traditional role of the teacher, who is no longer just the transmitter of knowledge to become a facilitator of learning. The idea is that the student becomes the center of learning and directly responsible for the construction of knowledge.

In this context, it is appropriate to highlight the trajectory of the active methodology developed by Eric Mazur in creating the Harvard, in 1991. Its creation was marked by dissatisfaction with the model traditionally adopted by educational institutions. When faced with the students' lack of interest and passivity in his physics classes, Mazur realized that merely expository classes did not promote meaningful learning, leading him to question the effectiveness of the traditional model adopted by him and other teachers since always (Madeira, 2017, n.p).

Motivated by the desire for transformation in the way of teaching, Mazur immersed himself in research on active learning in search of alternatives that would put students at the center of the process. In this way, the methodology created by the author aims to "involve students in cooperative activities of content discussion to make learning effective" (Ferreira & Moreira, 2017, p.4) Thus, the exchange of ideas promotes collaborative learning, the construction of knowledge and the identification of doubts among students. In this sense, Eric Mazur and Catherine Crouch themselves point out that the IP method manages to involve practically the entire class and not just those more motivated and diligent students who usually stand out in traditional teaching classes (Crouch & Mazur, 2001, p. 970).

Undoubtedly, with greater student participation in classes, teachers are not limited to just transmitting information, but focus efforts on optimizing the content to be worked on without the need to detail, but on "presenting the key points of the content in a short way" (Ferreira & Moreira, 2017, p.4). Araújo and Mazur corroborate the discussion by stating that

Instead of using class time to transmit in detail the information present in the textbooks, in this method, classes are divided into small series of oral presentations by the teacher, focused on the main concepts to be worked on, followed by the presentation of conceptual questions for students to answer first individually and then discuss with their classmates (Araújo & Mazur, 2013, p. 367).

In this sense, the IP contributes appropriately to the proposal inherent to all active learning, which is to remove the student from the passive role and mere receiver of knowledge and to become the main actor of his teaching-learning process. In addition, by "receiving immediate, real-time feedback on students' learning" (Chicon, et al., 2018, n.p.), the teacher is able to adapt the strategies



and essential content throughout the stages of IP execution to ensure that the student's learning is built throughout his or her trajectory and effort.

PEER-TO-PEER INSTRUCTION IN FACE-TO-FACE AND ONLINE LEARNING ENVIRONMENTS

We live in a world in constant transformation and with this education seeks to keep up with the fast pace of change, seeking innovative methodologies that promote meaningful learning and actively engage students. It is in this scenario that IP emerges as an important and innovative tool, capable of transforming face-to-face and online classrooms into dynamic and collaborative environments.

In the face-to-face modality, the use of IP can be introduced in a significant or even impactful way, since during class, the teacher can present key concepts and then propose challenging questions to students. Instead of simply answering, students discuss among themselves in small groups to arrive at a consensual answer. This interaction promotes collaboration among students, encouraging them to explain and deepen their understanding of the topics covered and in addition to retaining the subject worked, students gain in self-esteem and proficiency when teaching each other (Azevedo, et al., 2022, p. 5). Similarly, the PI methodology can be successfully applied in online classes.

According to Morán (2015, p.22), "one of the most interesting models of teaching today is to concentrate in the virtual environment what is basic information and leave the most creative and supervised activities to the classroom". However, through digital resources, it is possible to develop online classes that are as attractive as face-to-face ones, either by creating discussion forums, chat rooms, or even video rooms to allow interaction between students. During a virtual class, the teacher can ask challenging questions using tools such as online polls, real-time quiz platforms, or even through the strategy of using games or gamers (Ferreira & Moreira, 2017, p.5). Students then can discuss their answers in virtual groups, sharing ideas and opinions while developing their communication and critical thinking skills.

Peer instruction, therefore, reveals itself as an innovative and effective methodology, capable of transforming teaching and learning into a dynamic, collaborative, and meaningful process. Through careful implementation and adaptation to different educational realities, IP has the potential to drive student success and prepare future generations for the challenges of the ever-changing world.

Like any other active methodology, it is worth noting that the IP proposes that the student adopts a more autonomous and active posture in the face-to-face classroom, and it is sometimes necessary to sensitize students so that they get involved and start to have active behaviors (Silva, et al., 2019, p. 439 as cited in Ribeiro, 2016, n.p).



FINAL CONSIDERATIONS

The active *Peer Instruction* methodology offers an effective approach to foster active student participation and enhance understanding of concepts. By encouraging collaboration among students and the discussion of ideas, PI not only encourages critical thinking but also creates an engaging learning environment. This methodology can be easily implemented in both physical and virtual classrooms, taking advantage of the technological tools available to facilitate interaction between students. Its flexibility and adaptability to different educational contexts make it a valuable strategy for promoting a more dynamic and student-centered education.

Therefore, PI stands out among active methodologies by allowing students to take a more active role in their own learning, while also developing essential interpersonal and collaborative skills. Its applicability in different environments, whether virtual or face-to-face, significantly expands the dynamics of the classroom and promotes a more participatory and effective education. In an ever-evolving educational landscape, *Peer Instruction* stands out for offering students the opportunity to learn collectively and cooperatively, overcoming frequent barriers in the traditional relationship between teacher and student.

Thus, *Peer Instruction* stands out as a promising strategy for cultivating a more interactive and meaningful learning environment, successfully adaptable to both face-to-face and online classes.



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