Changing education with active methodologies

Mudando a educação com metodologias ativas

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Giuliana Zardeto-Sabec
Aluna do curso de especialização em Metodologias ativas e Prática Docente na União Brasileira de Faculdades (UniBF).
Professora Doutora na Universidade Paranaense (UNIPAR)
Endereço: Praça Mascarenhas de Moraes, 4282 - Centro - CEP: 87502-210 Umuarama/PR
e-mail: giulianazardeto@unipar.br

Renan Almeida de Jesus
Professor Mestre na Faculdade de Ciências da Saúde de Unaí (FACISA)
Endereço: Av. Gov. Valadares, 1441 - Centro, CEP: 38610-000 Unaí/MG
e-mail: renanaj1988@gmail.com

Débora Gafuri Teixeira
Aluna do curso de Medicina da Faculdade Ingá de Maringá (UNINGÁ)
Endereço: Rod. PR 317, 6114 Parque Industrial 200, CEP: 87035-510 Maringá – PR
e-mail: gafuri_debora@hotmail.com

Mônica Michele Alexandre
Aluna do curso de Medicina da Universidade Paranaense (UNIPAR)
Endereço: Praça Mascarenhas de Moraes, 4282 - Centro - CEP: 87502-210 Umuarama/PR
e-mail: monica.ale@edu.unipar.br

Adival José Reinert Junior
Professor, Diretor geral e Orientador do curso de especialização em Metodologias Ativas e Prática Docente na União Brasileira de Faculdades (UniBF).
Endereço: Rua Olávo Bilac, 78 – Centro – CEP: 87780000 - Paraíso do Norte/PR
e-mail: tutoriaedu@ibfpos.com.br

ABSTRACT
Educational institutions that are attentive to the changes that are occurring in education are choosing methodologies and tools to accompany these changes. The methodologies prioritize the student's greater involvement in the classroom, as well as outside it, through project-based teaching methods, and in a more interdisciplinary way, the flipped classroom, methodologies based on activities, problems and games, where each student learns at your own pace and with others in groups and projects, with teacher supervision. Thus, the objective of the present study was to explain the
importance of teachers using active methodologies in the classroom. For the present work, articles and books were used, available in the Google academic® database. Since is a review article, no qualis capes research of the investigated articles was carried out. Therefore, it is concluded that the student's formation, generally, is focused on the centralizing role of the teacher and not on the role of facilitator of the process, where it is necessary to motivate students to learn and participate through different pedagogical strategies and not only through expositive classes. The application of the active methodology has increasingly shown to be efficient in achieving the objectives of the teaching-learning process.

Keywords: Qualification, remote education, learning, methodologies and education.

RESUMO
As instituições educacionais atentas às mudanças que estão ocorrendo na educação estão escolhendo metodologias e ferramentas para acompanhar tais mudanças. As metodologias priorizam o envolvimento maior do aluno em sala de aula como também fora dela, através de métodos de ensino por projetos, e de forma mais interdisciplinar, a sala de aula invertida, metodologias baseadas em atividades, problemas e jogos, onde cada aluno aprende no seu próprio ritmo e com os outros em grupos e projetos, com supervisão de professores. Sendo assim, o objetivo do presente estudo foi de explicar a importância dos professores utilizarem as metodologias ativas nas salas de aula. Para o presente trabalho foram utilizados artigos e livros, disponíveis na base de dados do Google acadêmico®. Como se trata de um artigo de revisão, não foi realizado a pesquisa qualis capes dos artigos pesquisados. Desta forma, conclui-se que a formação do aluno, geralmente, está focada no papel centralizador do professor e não no papel de facilitador do processo, onde é necessário motivar os alunos à aprendizagem e à participação por meio de diferentes estratégias pedagógicas e não somente por meio de aulas expositivas. A aplicação da metodologia ativa tem mostrado cada vez mais ser eficiente no alcance dos objetivos do processo ensino-aprendizagem.

Palavras-Chave: Capacitação, ensino remoto, aprendizagem, metodologias e educação.

1 INTRODUCTION
The current criticism to the traditional model of education, especially through expositive lessons, have led to the reflection on more horizontal and different pedagogical strategies, that are centered in the students and the teachers assume mediator roles, facilitating and stimulating the learning and no longer diffusers of knowledge (VALÉRIO et al., 2019). Therefore, the methodology used for the teacher, generally using repetitive strategies and expositive classes of knowledge transmission, has been replaced by innovative pedagogical practices, called active methodologies, which have been gaining a dialogical character, and these practices are built by those who do, where everyone is subject to the process (BRIGHENTI; BIAVATTI; SOUZA, 2015; PAIVA et al., 2016).

Active methodologies can be defined as didactic strategies that seek to improve pedagogical practices, assisting in the critical training of students, at different levels of education and in the most varied areas (BARROS et al., 2018; VALÉRIO et al., 2019). These differentiated methodologies stimulate a critical-reflective learning process, where the focus is on the students, who are the protagonists of the classroom, building their knowledge and being encouraged to take a more active
role in their learning process (SOBRAL; CAMPOS, 2012; LIMBERGER, 2013; PAIVA et al., 2016).

Standardized teaching methodologies require standardized results. However, standards as results of teaching-learning in the current context are no longer so well accepted as in past centuries. The job market increasingly requires a professional with multi-skills and who knows how to work with several tools, in addition to an interdisciplinary view (MORAES et al., 2017).

Morán (2015) states that “active methodologies are starting points to move towards more advanced processes of reflection, cognitive integration, generalization, and re-elaboration of new practices”. The same author also maintains that learning takes place from practical examples, situations and problems that they have experienced in their professional lives, and it is possible to anticipate some experiences already during the course.

In Brazil, we live with educational contexts so diverse that range from schools and universities where students spend a large part of their time copying texts on the board to schools and universities that provide students and professors with the most modern information and communication resources. In the last few decades, the student's profile has changed a lot. Schools and universities have also changed and survive, nowadays, in a socioeconomic context that imposes ever higher expectations of performance. Among these extremes of diversity, we find schools that are in the 19th century, with teachers from the 20th century, training students for the 21st century world (BARBOSA; DE MOURA, 2013).

Thus, strategies that promote active learning can be defined as activities that occupy the students in doing something and, at the same time, make them think about the things they are doing in study - listening, talking, asking, discussing, doing and teaching - being encouraged to build knowledge instead of passively receiving it from the teacher (BARBOSA; DE MOURA, 2013).

In an active learning environment, the teacher acts as an advisor, supervisor, facilitator of the learning process, and not just as a single source of information and knowledge (BARBOSA; DE MOURA, 2013). The teacher's role is to help students go beyond where they would be able to go alone, motivating, questioning, guiding (BACICH; MORAN, 2018).

According to Pecotche (2011), regardless of the method or strategy used to promote active learning, it is essential that students make use of their mental functions of thinking, reasoning, observing, reflecting, understanding, combining, among others that, together, form the intelligence. In other words, the fundamental difference that characterizes an active learning environment is the active attitude of intelligence, as opposed to the passive attitude generally associated with traditional teaching methods (BARBOSA; DE MOURA, 2013).
Being a teacher in complexity and subjectivity means understanding that this identity comes from the construction of a conscience that is both individual and collective, understanding practice and theory as unique elements, considering external and internal factors for this development, the experiences in everyday life, in the construction of knowledge, memories that can be reworked and translated into practice (LIMA et al., 2020).

Thus, active learning occurs when the student interacts with the subject discussed, doing and teaching - being stimulated to build knowledge instead of receiving it passively from the teacher. In an active learning environment, the teacher acts as an advisor and supervisor of the learning process, and not just as a single source of information and knowledge. Initially, any method or strategy that promotes student involvement and active participation in the knowledge development process contributes to forming active learning environments (BARBOSA; DE MOURA, 2013).

In this sense, the requirement is to make the teacher aware to value reflection, curiosity, critical spirit, action, provisionality, questioning, thus requiring a reconstruction of the educational practice proposed in the classroom, through active methodologies. (COUTINHO et al., 2020). Therefore, the objective of the present study was to explain the importance of teachers using active methodologies in the classroom.

2 MATERIAL AND METHODS

This research was carried out through a literature review, where some articles on the topic were selected. However, the academic sources used to search for scientific articles were mainly from the Google Scholar® (Google Scholar), MEDLINE (Medical Literature Analysis and Retrieval System Online) and SciELO (Scientific Electronic Library Online) databases, using the keywords: remote teaching, active methodologies, education, learning, thus bringing together the main ideas about education today.

The aforementioned study corroborated the relevance of learning through active methodologies, as well as the concern if the student is learning, making it possible to build a critical analysis based on research already published in recent years on the subject. Thus, this study is justified, since teaching through active methodologies is effective for the student to learn, when compared to the expositive methodology.

3 DEVELOPMENT

3.1. ACTIVE LEARNING

Learning is active and meaningful when we advance in spiral, from simpler to more complex levels of knowledge and competence in all dimensions of life. Current research in neuroscience shows
that the learning process is unique and different for each human being, and that each person learns what is most relevant and what makes the most sense to them, which generates cognitive and emotional connections (BACICH; MORAN, 2018).

Research shows that active learning is a very effective teaching strategy, regardless of the subject, when compared to traditional teaching methods, such as lectures. With active methods, students assimilate a greater volume of content, retain information for longer and enjoy classes with more satisfaction and pleasure. Experience indicates that learning is more significant with active learning methodologies (BARBOSA; DE MOURA, 2013).

In addition, students who experience this method gain more confidence in their decisions and in the application of knowledge in practical situations; they improve the relationship with colleagues, learn to express themselves better orally and in writing, acquire a taste for solving problems and experience situations that require making decisions on their own, reinforcing autonomy in thinking and acting (BARBOSA; DE MOURA, 2013).

The teachers’ role in the application of active methodologies changes, since they stop transmitting information to students, to lead or facilitate the discussion and / or practical activities of the previously studied contents. Likewise, the students take an active position, being encouraged to build their knowledge and their own conclusions (VALENTE, 2014; VALÉRIO et al., 2019).

If our teaching practice favors the students’ activities of listening, seeing, asking, discussing, doing and teaching, we are on the path of active learning. In general, the term active learning, which can also be understood as meaningful learning, is used in a vague and imprecise way. Intuitively, teachers imagine that all learning is inherently active. Many teachers consider that the student is always actively involved while attending an expositive class (BARBOSA; DE MOURA, 2013).

However, research in cognitive science suggests that students should do more than just listen, to have effective learning, to be actively involved in the learning process, the student should read, write, ask, discuss or be busy solving problems and develop projects. In addition, the student must perform high-level mental tasks, such as analysis, synthesis and evaluation (BARBOSA; DE MOURA, 2013).

Among the various strategies that can be used to achieve active learning environments in the classroom, we highlight the following: discussion of themes and topics of interest for professional training; teamwork with tasks that require collaboration from everyone; case studies related to specific professional training areas; debates on current topics; generation of ideas (brainstorming) to seek the solution of a problem; production of concept maps to clarify and deepen concepts and ideas; modeling and simulation of typical processes and systems of the training area; creation of websites or social networks for cooperative learning; elaboration of research questions in the scientific,
technological area (BONWELL; EISON, 1991), problem-based learning or projects (PBL), team-based learning (TBL), case studies (MORÁN, 2015), flipped classroom and gamification (OLIVEIRA, 2019).

3.2. PROBLEM-BASED LEARNING (PBL)

In Brazil, there is growing interest in this methodology and some schools and universities apply Project-Based Learning (PBL) regularly in their courses. This teaching method is based on the contextualized use of a problem situation for self-directed learning. While in conventional methods the objective is the transmission of knowledge centered on the teacher, on disciplinary content, in PBL, learning becomes centered on the students, who stop being a passive receiver of information to be an active agent for their learning. In this context, the teacher acts as an advisor or facilitator in work or study groups, in which the interaction between teacher-student is much more intense than in purely expositive classes (BARBOSA; DE MOURA, 2013).

In Problem-Based Learning (PBL), the teacher presents a problem close to the real or simulated one elaborated by experts in the area of knowledge, with fundamental themes that enable the student's preparation to work in professional life. The themes/content related to the problem are studied individually or collectively and are discussed in the group. The teacher will awaken in the students the feeling that they are able to resolve the issues, based on the research. This proposal "allows the student to use the acquired knowledge in a broader way, minimizing the occurrence of a fragmented education" (MACEDO et al., 2018).

PBL admits work sequences that may vary according to the level and type of education, with the area of knowledge and with the learning objectives that one wants to achieve. Generally speaking, PBL includes steps such as: beginning (initial understanding of the problem and clarifications to comprehend it broadly), generation of ideas (listing possible explanations or solutions, based on current knowledge), analysis (decomposing the problem in parts, identify relationships, functions, structures), elaboration of questions (questions to guide the investigation or research and to define well the problem to be solved), learning objective (what is expected to learn from the results of the work?), study (individual study and group discussion, with record of the process followed), synthesis and evaluation (synthesis / evaluation of the work developed and obtained results) and presentation (sample of the work developed for the group: results, processes, analysis) (BARBOSA; DE MOURA, 2013).

Note that at each stage of application of PBL the student has the opportunity to be involved in tasks that favor the assimilation and fixation of knowledge, starting from the initial understanding of the proposed problem, going through the phases of analysis and search for a solution until the
presentation of the work and analysis of the results. PBL seeks to transform a problem as a basis of motivation for self-directed learning, emphasizing the construction of knowledge in an environment of mutual collaboration (BARBOSA; DE MOURA, 2013).

PBL is a student-centered educational method. As we can see, PBL differs greatly from conventional methods of learning. Therefore, it is to be expected that both teachers and students take on different roles than they are used to in conventional education. In this context, the responsibility for learning must be attributed to them explicitly, without diminishing the teacher's responsibility. It is equivalent to saying that the responsibility of learning is, ultimately, of the student (BARBOSA; DE MOURA, 2013).

The contributions of active methodologies allow us to predict that, instead of students leaving school or university with the illusion of having learned something just because they were exposed to content in expository classes, we will have students who have experienced profoundly significant learning situations in their lives. If they miss a topic, they will know where to find it and what to do to learn it. Only in this way can we create a generation of students with real pleasure in the search for knowledge, with the clear notion that the function of learning does not end when they leave school and that they will always be ready to face new problems and conduct innovative projects (BLIKSTEIN, 2010).

Learning through research and projects today, with technology, can gain strength with the breadth of information and scripts previously defined by the teachers in materials of their own authorship, such as WebQuests, for example, which become problem-based learning to be resolved and steps to be taken (LAZARO; SATO; TEZANI, 2018). These methodologies, for Masetto (2012), “encourage the apprentice to seek information, data and necessary materials. They help you select, organize, compare, analyze and correlate data and information; making inferences, raising hypotheses, checking them, proving them, reformulating them and drawing conclusions”.

In this sense, PBL encourages students to develop skills to manage their own learning, to actively seek information, to integrate knowledge, to identify and explore new areas, with which the student acquires tools to develop technical, cognitive and attitudinal skills for professional practice. In this way, this method is characterized by fostering meaningful learning, articulating previous knowledge with that of other students in the group, the inseparability between theory and practice, respect for student autonomy, working in small groups, the development of reasoning critical and communication skills, and continuing education (SILVA et al., 2019).
3.3. FLIPPED CLASSROOM

An active methodology widely used today in the academic environment is the flipped classroom, where the contents and instructions, for example, articles, texts or video-lessons, are passed on to students before the face-to-face classes, preferably in an online environment, so that students can previously study the materials made available by teachers. In the subsequent face-to-face moments, in the classroom, the contents or activities are discussed and worked on (VALENTE, 2014; VALÉRIO et al., 2019).

Initially the contents are made available in the form of texts, videos, music, among other activities to be carried out at home, before class. After that, in the classroom, the pupils dedicate their study hours to group research to solve problems, answer questions, to debate and to exchange ideas (LAZARUS; SATO; TEZANI, 2018).

For Moran (2014) the dynamics of the flipped class comprises “concentrating on the virtual environment, that is, on what is basic information and leaving the most creative and supervised activities to the classroom”. The class ends up being composed of three moments: a pre-class moment that will provide the student's first contact with the content to be developed; the class itself, where teachers and students develop problem situations or case studies related to the subject, in addition to discussions, reflections and doubts; and a post-class with questions for the student to verify if the learning on the subject worked was accomplished.

Thus, with the aid of Digital Information and Communication Technologies (DICT), in this teaching strategy, the student has access to the support material, which is available on the educational platform, to study the contents and answer the questions. In the classroom, the teacher takes up the most problematic questions, the difficulties raised by the students and proposes practical activities, which include the student's role as author of knowledge and not merely a receiver, such as: problem solving, projects, discussion and research in group, among others (LAZARO; SATO; TEZANI, 2018).

According to Valente (2014), the basic rules for applying the flipped classroom methodology are: classroom activities should involve questions, discussions that make the student apply and deepen the content learned online; students must be evaluated and receive feedback from them, after face-to-face activities; online and face-to-face activities should be graded, to encourage participation; online materials and classroom activities must be well planned. However, the implementation of the flipped classroom and other active methodologies in schools and universities bring many application challenges, from structural issues, such as classroom configurations, to pedagogical concepts, such as ways of doing, beliefs, both of teachers, as well as the students (WALL; PRADO; CARRARO, 2008).
A problem to be faced by the teacher in the flipped class is to make the student create the habit of accessing the materials made available for them to be consulted before classes. Often, a large part of the students who participate in this proposal do not access the materials and the quality of the class is impaired, as the teacher has to retake all the material that would be essential for the understanding of subsequent works (LAZARO; SATO; TEZANI, 2018).

3.4. GAMIFICATION

Gamification is also an active methodology to be worked on in class. It is defined as the use of games and it has been used as a pedagogical strategy in different fields of action, aiming to motivate students to action, assist in solving problems and promote learning in language well known by students, who tend to interact with this type of entertainment in their lives (FARDO, 2013).

This resource consists of the incorporation of elements and characteristics of a game into the different areas of knowledge, that is, phases, characters, scoring systems. In order to develop the necessary strategies, it is important to solve different problems, work in groups, deal with the competition, set goals and targets, make attempts at mistakes and successes. When we think about the great acceptance of video games by young people, we understand that this technique has a wide motivational content (LÁZARO; SATO; TEZANI, 2018).

The transition from the board game, which depended on the players' physical presence, to the virtual game, which brings together several connected users to interact and compete, to mark the process of game innovation in recent times (LAZARO; SATO; TEZANI, 2018). On the one hand we have educational games, "where the content and curriculum are made available or juxtaposed", and on the other hand there is the gamification that consists of "incorporating elements of games, such as levels and emblems in activities other than games" (JOHNSON et al., 2013).

Therefore, game design elements such as: collaboration, motivation, interaction, phases, feedback, among others can be incorporated and used in the educational area for learning content (LÁZARO; SATO; TEZANI, 2018). Some universities have been using simulations of real situations in subjects, for students to experience skills that integrate the chosen profession (JOHNSON et al., 2013).

3.5. MIND MAPS

Mind maps, also known as concept maps, are used to assist the ordering and hierarchical sequencing of teaching content, in order to offer appropriate stimuli to the student. Mind maps can be used as an instrument that applies to different areas of school teaching and learning and the proposal to work with them is based on the fundamental idea of Ausubel's Cognitive Psychology
(1980) which establishes that learning occurs by assimilation of new concepts and propositions in the student's cognitive structure.

According to this theory, the following aspects are relevant, namely: the inputs for learning, the learning materials and new ideas and concepts must be “potentially significant” for the student. This theory of assimilation by Ausubel (1980), as a cognitive theory, seeks to explain the internal mechanisms that occur in the minds of human beings. This theory emphasizes verbal learning, as it is predominant in the classroom.

As a learning tool, the mind map is useful for the student, for example, for: taking notes, solving problems, planning the study and / or writing large reports, preparing for assessments and identifying the integration of topics. For teachers, they can be powerful assistants in their routine tasks, such as: pointing out key concepts and relationships among them in order to reinforce understanding and learning. According to Kawasaki (1996), it is important: to choose the theme to be addressed, to define the main objective to be pursued, to define the presentation of the topics, placing them in a hierarchical sequence with the necessary interconnections and to give knowledge to the student. The mind maps accentuate the aspect of comprehension and the hierarchical sequences of sentences that are constructed activate memory schemes that help in understanding the meaning of the studied content, facilitating their integration into practical contexts (RODRIGUES; BARNI, 2009).

It is verified that mind maps are a great methodology for students, because they can relate the concepts learned and structure new knowledge with the existing ones and more efficiently.

3.6. OTHER TOOLS FOR LEARNING

According to Castro-Filho et al., (2014):

"Learning happens through interaction between students, who raise questions, conduct investigations and teach each other both in person and using computational environments. (...) some of the advantages offered by technology to aid collaborative learning are: the ease with which information and communication technology allows you to create, move, share information in the form of texts, images and videos, and the ability to interact and produce collaboratively, providing new forms of learning." (CASTRO-FILHO et al., 2014).

New ways of learning and teaching lead educators to reflect on the possibilities of integrating digital technologies into teaching. Activities such as: group and individual projects, challenges and games, are part of the Active Methodologies, which are "starting points to advance to more advanced processes of reflection, cognitive integration, generalization, re-elaboration of new practices" (MORAN, 2015), placing the student as the main agent of their learning.
Google software has been inserted into the activity to promote collaborative work. Through the various applications that the platform provides free of charge, students were able to build a project with moments of study and leisure, both in the school environment and at home (SANTANA; FERREIRA, 2018). The online application Google My Maps (unlike Google Maps, which has applicability only for consultation) allows students to enter their own information and experiences, enabling the construction of a "collaborative map", along with the Google Sites platform to expose the map created jointly by the class (SANTANA; FERREIRA, 2018). Developing activities that stimulate creativity and collaborative work makes learning meaningful, so knowledge is built by each individual in a personalized way. Reinventing the classroom is a challenge that is part of the new role of the teachers, who should not only mediate, but also encourage and be an encouraging agent, to open the horizons of their students (SANTANA; FERREIRA, 2018).

Another tool widely used in undergraduate courses, mainly at a distance as a strategy for interaction of students around a relevant theme of the content of the discipline is Peer Instruction, which is a teaching method created by Professor Eric Mazur, from the Department of Physics of Harvard University, USA, and disseminated in various institutions of higher education in Brazil and mainly in the modality of distance education. This allows the teachers to improve the teaching-learning process and have detailed access to the academic development of each of their students and apply the placement of problems, at the same time difficult, complex, challenging and useful, that is, centered on the reality of students with some kind of meaning for students (MAGALHÃES et al., 2017).

Mazur (2015) argues that:

"The basic objectives of Peer Instruction are: to explore the interaction among students during expositive classes and to focus students’ attention on the concepts that serve as the foundation. Instead of teaching with the level of detail presented in the book or in the lesson notes, the lessons consist of a series of short presentations on the keypoints, each followed by a conceptual test- small conceptual questions covering the subject being discussed. At first, students are given time to formulate their answers, and then they should discuss them among themselves. This process (a) forces students to think based on the arguments being developed and (b) gives them) the teacher included) a way to evaluate their understanding of the concept."

For the application of Peer Instructions in face-to-face education, it is necessary to adapt a classroom with a system that allows students to send their answers and allows the teacher to access and quantify such responses in real time (CROUCH; MAZUR, 2001). The school history of the teacher education process is based on the model of expository, repetitive classes and with the valorization of the contents that are passed on and subsequently charged through mechanical exercises and tests (MASETTO, 2012). According to Tardif (2012) "students go through teacher
training courses without modifying their previous beliefs about teaching. And when they start working as teachers, it's mainly these beliefs that they reactivate to solve their professional problems."

Teachers, therefore, repeat this millennial class model until today, even in colleges where, generally, they end up working with numerous classes and often avoid using different techniques or practices, such as active methodologies (LAZARO; SATO; TEZANI, 2018).

The development of technology allows people, including teachers and students, to have access to numerous information, including information about their field of work or study. However, these same teachers who use technology for research and personal issues, do not have the skills to use it with a pedagogical nature for their classes (LAZARO; SATO; TEZANI, 2018).

Developing activities that stimulate creativity and collaborative work makes learning meaningful, so knowledge is built by each individual in a personalized way. Reinventing the classroom is a challenge that is part of the new role of the teacher, who more than mediating, should encourage and be an encouraging agent, to open the horizons of students. Thus, we have a generation that uses technology as entertainment, however does not know how to use it for more specific purposes such as the classroom. Anyway, for active methodologies, associated with the use of DICT, to give favorable results in Higher Education, it is essential that the professor has knowledge of these methodologies, what are their uses and benefits, know how to use DICT and above all have creativity and discernment in pedagogical intentionality and lesson planning.

4 CONCLUSION

Meaningful and contextualized learning, building knowledge, skills and competences, cooperative work, problem solving, carrying out projects that transform ideas into results, etc. are some of the proven benefits of both methodologies. However, it is not just about doing things, regardless of criteria, choices, plans, learning objectives, guidance and careful monitoring. It is necessary to think about what you are going to do, do what you thought and think about what you did. What is sought is the practice of a conscious attitude towards the reality that we want to modify and the knowledge and skills that we want to acquire. The training of students is usually focused on the centralizing role of the teacher and not on the role of mediator / facilitator of the process, where it is necessary to motivate students to learn and participate through different pedagogical strategies and not only through dialogue lectures. Thus, the application of the active methodology has increasingly shown to be efficient in achieving the objectives of the teaching-learning process. It is important to reaffirm that students who are exposed to active methodologies have very positive learning experiences and the knowledge acquired through this route is of unquestionable value in their training process.
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