



## Active learning strategies to promote critical thinking

h-Index (December 2020): 38 i10 index (December 2020): 169 h5 index (December 2020): 18 h5 median (December 2020): 32 (Data were calculated on the basis of Google Scholar Citations. Click here to learn more. ) Overview: The use of active teaching techniques can lead to more effective, enjoyable and memorable learning outcomes. Students' attention often begins to drop after 10 to 15 minutes of lecture (Stuart, John, & amp; Rutherford, 1978); even after the first 10 minutes (Hartley & amp; Davies, 1978) the retention decreases significantly. This can be problematic if your class lasts for an hour and fifteen minutes! The use of active learning strategies can help. Most people learn better when they are actively engaged in material than when they passively listen to a speaker or read from a textbook. Active learning strategies have students to do things – analyze, create, play role-playing games, experience, reflect, etc. What is active learning? Neal (2010) defines active learning as educational methods in which students are involved in higher-order thinking (analysis, synthesis, evaluation). The term therefore primarily reflects what is going on in a student's head, regardless of whether the body (or mouth) is physically active or not. What are the basic elements of active learning? According to the Center for Teaching & amp; Learning at the University of Minnesota, the four basic active learning activities are the same elements you're likely to use in your class: Speaking and listening – students go beyond passive listening to report, analyze, and use what they hear, they are involved in active learning. Discussions and interactive lectures are useful strategies. Writing – Students organize their thoughts and reflections and prepare them for discussions. Look at these suggestions for informal writing activities from the University of Minnesota. Reading - Teachers often expect students to learn through reading. It's easy for students to get it done. Providing questions, summaries, opportunities for contributions or reflection, etc., can turn it into an active process. Students can often benefit from teaching about active reading. Active reading. Reflect - Class periods are often peppered with information. Students sometimes need time to process the material and connect it to what they have already learned. The about the applications and implications of new knowledge can help to develop higher thinking skills and metacognition. Prerequisites for active student engagement: Neal (2010) suggests that active learning takes some planning: Preparation Change student on the first day and in the curriculum Learn more about your students Use extracurricular tasks to prepare for active learning in class Preparing written instructions, worksheets, slides, etc., for the Motivation exercises Explain the pedagogical purpose of the exercise for students Create challenging exercises Let students summarize what they learned at the end of the exercise Absence of Anxiety. Feedback practice teaching aids (smile, eye contact, use student names, move around the classroom, etc.) Examples of active learning strategies (adapted from the Active Learning for the College Classroom at California State University, by Paulson & amp; Faust): Individual Activities: The One Minute Paper – This is a highly effective technique for reviewing student progress, both in understanding the material and in responding to course materials. Invite students to take out a blank sheet of paper, ask a question (either specific or indefinite), and give them one (or perhaps two - but no more) minutes to answer. Some example questions are: How does John Hospers define 'free will'? What is the activation energy for a chemical reaction? What is the difference between replication and transcription? And so on. Another good use of the minute paper is to ask questions such as what was the material as you imagined it to be. Muddiest (or Clearest) Point - This is a variation of the one-minute paper, although you might want to give students a slightly longer period of time to answer the question. Here you ask (at the end of a teaching period or during a natural pause in the presentation): What was the muddiest point in today's lecture? or, perhaps you could be more precise, ask: What (if anything) do you find unclear about the concept of 'personal identity' ('inertia', 'natural selection', etc.)? Affective Reaction – This is similar to the exercises mentioned above, but here you ask students to report their reactions to some facets of the course material – i.e. to give an emotional or value-based response to the material. Obviously, this approach is limited to the subject areas where such questions are appropriate (for example, one should not examine the affective reactions of students to vertebrate taxonomy). However, it can be a very useful starting point for courses such as applied ethics, especially as a precursor to theoretical analysis. For example, you can ask students what they think of Dr. Jack Kevorcanor's activities before you imagine what different moral theorists moral theorists to make it out of it. By having multiple views on the table before theory is presented, you can help students see the material in context and explore their own beliefs. It is also a good way to start a discussion about evolutionary theory or any other scientific field in which the general public often has views that violate current scientific thinking, such as paper vs. plastic packaging or nuclear power generation. Daily Journal - This combines the benefits of the above three techniques and allows for a more in-depth discussion or response to course material. You can provide students with the time they can complete their journal entries, or assign them as homework. The only drawback of this approach is that the feedback is not as immediate as with the one-minute paper (and other tasks you collect on the day of each lecture). But with this approach (especially when assignment entries for homework), you can ask more complex questions, such as: Do you think determinism is right, or that people have free will? Do you explain your answer or do you believe that Dr. Kevorkina's actions are morally correct? What would John Stuart Mill say? And so on. Or you've found students and discuss reports on scientific studies in popular media on topics relevant to course materials, such as global warming, the ozone layer, and so on. Reading Quiz - Sure, this is a way to encourage students to read assigned material! Active learning depends on whether students' understanding of readings (so that you can measure their level of sophistication as a reader). In addition, by asking the same questions about multiple reading quiz questions, you provide students with guidance on what to look for when reading assigned text. If you have questions like What color were Esmereldas eyes? Ask (as my high school teacher liked to do), tell the student that it's the details that count, while questions such as what reason was Esmerelda for Sebastian's murder? questions of justification. If your goal is to teach (and not just force) you, carefully choose questions that identify both who has read the material (for your sake) and what is important in reading (for their tums' sake). ClarificationBreaks – This is a simple technique that aims to encourage active listening. During a lecture, especially after saying an important point or defining a key term, stop it, let it sink in and ask (after you have waited a little!) whether someone needs to have it clarified. You can also circulate in the room during these breaks to look at students' notes, answer questions, etc. Students who would never ask a question in front of the whole class can ask questions during a break in clarification while you are looking at each other. Answer to a demonstration or other teacher-centered activity – Students are asked to write a paragraph that was with I was surprised that..., I learned that..., or I wonder about... This allows students to think about what they actually got out of the teacher's presentation. It also helps students realize that the activity is designed for more than just entertainment. Coupled Activities: Discussion - Students are asked to mate and answer a guestion either one at a time or as a couple. This can be easily combined with other techniques such as those under Q&A or Critical Thinking Motivators above. For example, if students have responded to statements such as whatever a society thinks is morally correct is true or wrong, they may be asked to compare answers to a limited number of questions and discuss statements on which they disagreed. In science, students can be asked to explain some experimental data that supports a theory that has just been discussed by the lecturer. In general, this works best when students are given explicit instructions, such as.B. Tell each other why you chose the answer you chose. Note Comparison/Share – One reason some students perform poorly in class is that they often don't have good notes. That is, while listening attentively, students do not always know what to write a paper. One way to avoid some of these pitfalls and let students model good notes is to occasionally compare notes. The teacher can immediately stop teaching after covering a crucial concept, and let students read each other's notes to fill in the gaps in their own notes. This is particularly useful in introductory courses or in courses for non-majors or special admissions students. Once students see the value of supplementing their own notes with others, they are likely to continue the practice outside of class time. Assessment of another student's work - Students are asked to complete an individual homework assignment, students are asked to complete an individual homework assignment or short paper. On the day of the assignment, students are asked to complete an individual homework assignment or short paper. or students can be assigned to partners they work with throughout the semester Each student then takes the work of his partner and gives critical feedback, standardizes or evaluates the arguments, corrects errors in problem solving or grammar, and so on, depending on the type of task. This is a particularly effective way to improve student writing. Small group activities: For more complex projects where many minds are better than one or two, two, want students to work in groups of three or more people. Students working in groups help each other learn. In general, it is better to form heterogeneous groups (in terms of gender, ethnicity and academic performance) especially if the groups will cooperate over time or on complex projects; However, some of these techniques work well with in each cooperative groups, and then circulate through the room to answer questions, ask more questions, keep the groups at work, and so on. After a reasonable amount of time for group discussions, students are asked to share their discussion points with the rest of the class. (The following discussion can be conducted using the Questions and Answers techniques described above.) Active review sessions—In the traditional class review centres, students ask guestions and the instructor answers them. Students spend their time copying answers instead of thinking about the material. In an active review session, the instructor asks guestions and discuss any differences between the proposed solutions. Work on the board – In many problem-solving courses (e...B logic or critical thinking), instructors tend to review homework or teach problems themselves. Because students learn more by doing rather than watching, this is probably not the optimal scenario. Instead of illustrating problems solving, students have the problems. If there is not enough panel space, students can continue to work out problems as a paper and pencil group or computers if appropriate software is available. Concept Mapping – A concept map is a way to illustrate the relationships between terms or concepts discussed in the course material. Students create conceptual maps by connecting individual terms by lines that indicate the relationship between each related term. Most terms in a concept map have multiple connections. Developing a concept map requires students to identify and organize information and establish meaningful relationships between the information. Visual Lists - This prompts students can typically create more comprehensive lists than they would alone. This method is especially effective when students are asked to compare views or list the pros and cons of a position. One technique that works well in such comparisons is that the students draw a T and use the left and right sides of the crossbar with opposing positions (or Pro and Con). They then list everything they can imagine that supports these positions on the relevant side of the vertical line. Once they have created the most thorough list possible, ask them to analyze the lists of questions that an action is morally correct if it leads to more benefit than harm), students can use the T method to list all (potential) benefits and damages of an action, and the requirement to complete the T usually leads to a more thorough presentation of the consequences of the action in question. In science classes, this would work well with issues such as massive vaccination programs, nuclear power, elimination of chlorofluorocarbons, reduction of carbon dioxide emissions, and so on. Jigsaw Group is asked to complete a discrete part of a task. When each member completes their assigned task, the parts can be merged into a finished project. For example, students in the group could then be entrusted with the study of the economy, political structure, ethnic composition, terrain and climate or folklore of the assigned country. When each student has completed their research, the group reformes to complete a comprehensive report. In a chemistry course, each group of students was able to explore a different form of power, etc.). Then the groups are reformed so that each group has an expert in a form of electricity generation. They then deal with the difficult problem of how much emphasis should be placed on each method. Role Play - Students are asked to negotiate a part. In doing so, they get a better idea of the concepts and theories discussed. Role-playing exercises can be used by the simple (e.B. What would you do if a Nazi came to your door and you hid a Jewish family in the attic?) to the complex. Complex role-playing can take the form of a play (depending on time and resources); For example, students studying ancient philosophy could be asked to recreate the examination of Socrates. Using various sources (e...B. Plato's Dialogues, Stones The Trial of Socrates and Aristophanes' The Clouds), student teams can and defending Socrates to the accusation of youth corruption and treason; Each team can present witnesses (e.B.s in the dialogues) to construct their case and prepare questions for cross-examination. Panel discussions - - Discussions are especially useful when students are asked to give class presentations or reports to include the entire class in the presentation. The student groups are assigned a topic to the research and asked to prepare presentations (note that this can be easily combined with the jigsaw method described above). Each panelist is then expected to give a very short presentation before opening the word to questions from the audience. The key to success is to carefully select topics and give students enough guidance to ensure they are well equipped for their presentations. You can also prepare the audience by assigning them different roles. For example, when students present the results of their research on different forms of energy, some of the other students may play a role as concerned environmentalists, transport officials, commuters, etc. Debates - Formal debates provide an efficient structure for class presentations. Students are assigned to the discussion teams, given a position in defense, and then asked to make arguments in support of their position on presentation day. The opposing team should be given the opportunity to refute the argument(s) and, if time permits, the original moderators asked to respond to the rebuttal. This format is particularly useful in the development of reasoning skills (in addition to teaching content). Games - Many will mock the idea that you would literally play games in a university environment, but occasionally there is no better teaching tool. In particular, there are some concepts or theories that can be illustrated more easily than discussed, and in these cases a well thought-out game can more easily convey the idea. For example, when students are introduced to the concepts of natural laws and the scientific method, it is difficult to convey the nature of scientific work and the deception of inductive hypotheses through lectures. Instead, students play a few rounds of the induction game, in which playing cards are turned up and either added to a running series or discarded in accordance with the donor's preconceived nature law. Students are asked to discover the law of nature by formulating and testing hypotheses as the game progresses. To learn more about these strategies, contact the Center for Excellence in Teaching and Learning or contact Suzanne Lafleur for advice with one of our scientific specialists.

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