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Using prediction and retrieval practice activities to improve student learning

When we think about learning, we typically focus on getting information **into students' heads**. What if, instead, we focus on getting information **out of students' heads**? (Agarwal & Bain, 2019)

Prediction activities and retrieval practice are two instructional strategies that we can use to help students pull information out of their heads. **These strategies are easy to implement and can be integrated into your teaching practices immediately**. Whether you teach large or small groups, tutorials, or labs, these methods can be adapted to fit any classroom setting.

Prediction activities boost student engagement & learning

Prediction-based learning involves asking students to make predictions about upcoming content or outcomes before presenting the correct information. The students are prompted to actively retrieve and apply their existing knowledge to generate predictions. After making a prediction, the students are provided with the correct answer or outcome.

Research has shown that when students generate a prediction before knowing the correct answer, they have a better memory of the correct response (Brod, 2021; Huelser & Metcalfe, 2011). Predicting stimulates curiosity and boosts surprise (Gruber et al., 2014). Students are curious to find out why their initial prediction is right or not right, and this enhances their engagement in the learning process. There is also an element of surprise when students discover that their prediction is not correct and this makes them pay more attention to the learning material.

There are various ways to incorporate prediction activities in your teaching:

- Use class polling to break up your lectures and ask students questions about the next topic you will cover. Pose the question, have them respond via a polling tool (e.g. Menti and Kahoot), and then invite paired or whole-class discussion of their responses before moving into your explanation.
- When presenting cases, problems, scenarios, experiments, or historical events, pause before revealing the conclusion. Ask students to predict the outcome or solution based on the information provided. After sharing the actual result, encourage students to reflect on the accuracy of their predictions and analyse the reasons behind their correct or incorrect assumptions. This approach can be summarised as: pause, predict, ponder.

- Close class by asking students to make predictions about material that will be covered in the next class session. This creates anticipation before the next class.

Retrieval practice activities enhance student retention & recall

Retrieval practice involves recalling information from memory without relying on notes or other aids. This technique is based on the principle that retrieving information strengthens memory and enhances long-term retention. When students engage in retrieval practice, they are essentially "pulling" information out of their minds rather than focusing on packing more information into it. Developing memory and recall skills adds an important value to the teaching and learning experience.

Here are some ways to incorporate retrieval practice activities in your teaching:

- At the beginning of a study-unit or topic, give students a brief pre-test to gauge the students' existing knowledge and skills. Consider using class-polling technology to make the assessment more interactive and efficient.
- Start your teaching session with a class brainstorming activity to help students surface their prior knowledge about the topic. Allow them time to think individually or work in small groups, and then work as a class to organise that knowledge in ways that will set up the learning to come.

  Similarly, you can begin your teaching session by asking students to remind you of the content covered in previous sessions. If you do this orally, give them a few moments to reflect before responding.
- Close your teaching session by asking students to write down the most important concept they learned during the lecture and one question or confusion that still remains in their minds.
- Conclude your teaching session by having students take a short quiz, answer written questions, or solve a problem related to the day's material.
- Give frequent, low-stakes quizzes (possibly every week) to reinforce foundational course content. Whenever possible, give short-answer questions or problem-solving tasks, requiring students to actively process and apply what they have learned.

Summary

Prediction-based activities effectively capture the students' attention during the initial stages of learning and foster curiosity for future learning. Although generating predictions promotes student engagement, the information they learn through this process needs to be reinforced. Regular retrieval practice helps strengthen these memory connections and ensures long-term retention of the material.

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