Active Learning in Online Courses

What is active learning?

Active learning is an umbrella term for learning tasks that require students to engage deeply with course material. Understanding complex ideas and integrating them into existing knowledge requires significant mental attention and effort. Highly successful students tend to have study habits that keep them mentally active during passive learning tasks, such as readings or lectures.

However, many students have misconceptions about what helps them learn, and most would benefit from more structured activities that *require* this kind of mental activity, helping them direct their attention and effort effectively.

Active learning approaches typically include:

- Early and ongoing practice applying concepts
- Pausing regularly in reading/listening tasks for consolidation activities
- Exercises with immediate feedback (from tutor, peers or automated)
- Discussion in pairs or small groups

For more examples of class-based active learning approaches, see the Active Learning at King's blog.

The evidence for active learning

A large body of evidence has demonstrated the advantages of active teaching approaches over traditional passive lectures in undergraduate courses. A notable example is Freeman *et al.*'s (2014) meta-analysis of 225 studies comparing student performance in active vs passive conditions in undergraduate STEM courses. They found average test scores improved around 6%, and average failure rates reduced from 34% to 22%. Active learning has also been found to be particularly effective for underrepresented minorities (Eddy & Hogan 2017).

The most effective interventions often required students to complete readings and individual preparative activities before class, plus collaborative activities during class. On the other hand, problem-based learning (self-directed small-group learning in response to a real life complex case) was not consistently effective. It is thought to work better with students who have prior knowledge to draw from; more directed activities are quicker and more reliable for less experienced students.

The research is not yet substantial enough to recommend particular activities for specific subjects or student groups - there is a lot of scope for educators to experiment with a range of creative approaches. However, there is some evidence that active learning works via the following elements:

- Motivating students to spend additional time studying, and to space out their time on a topic. There is strong separate literature on the effectiveness of **repeated and spaced practice**.
- **Early practice applying ideas** may make students more receptive to conceptual explanations.
- Opportunities to **articulate** their thinking in discussion or written tasks.

As well as directly helping students understand material better, this may also support learning via:

- Additional opportunities for **feedback**, which may either provide early reassurance and build students' confidence and motivation to continue the course; or show where they need more help or practice.
- **Collaborative** tasks can build a better sense of belonging. This, in turn, is important in motivating students to stay on their programme and put in the work needed to do well.

On the other hand, these approaches intentionally require **more effort** from the students, which they can resist, and not all students enjoy collaborative working. It's important to explain how active learning approaches are likely to benefit them, as well as making the purpose of individual tasks clear.

Active learning in online courses

When implementing active learning in fully online courses, we need to adapt to students' varied schedules and time zones, meaning fewer opportunities for students and educators to interact together in real time - both formally and informally. Alternative ways to support feedback, discussion and collaborative tasks are vital to avoid the isolation distance students often feel and keep them motivated. King's Online recommend the following strategies to encourage active learning in online courses:

Course design

Structure: online activities and resources can be sequenced to ensure students:
- are prompted to think for themselves before receiving expert explanations
- have spaced opportunities to practice and improve key skills.

Explanatory text: divided into short sections or articles, with graphics and video/animation to highlight key concepts, and frequent prompts to pause for reflection, practice and questions.

Worked examples/cases: real world problems help students better understand concepts and how to apply them to varied contexts, as well as modelling how to analyse and solve problems in this field.

Questions & practice activities: particularly those that prompt students to:
- compare two examples and their similarities/differences
- speculate on the causes of a situation/phenomenon or predict its outcomes, and explain why
- reflect on the key arguments and inferences of core readings/videos.

Immediate feedback: via automated feedback and model answers or even interactive simulations and educational games.

Assessments that motivate students to engage deeply and regularly with the course material.

Course facilitation

Webinars: real-time online seminars can be designed and facilitated to encourage student participation through conversation, student presentations, live polls and virtual whiteboards. (Webinar software can also be made available to students to self-organise virtual study groups.)

Discussion forums allow students more time to reflect before articulating their ideas or responding to others. The educator plays an important role in modelling and prompting good discussion, but they are most effective when students proactively debate with or challenge each other.

Educator's feedback can be an important motivation for students to complete formative activities and assignments, particularly if it's personalised. Access to model answers and additional tips and explanations may also incentivise activity completion.

Student-directed activity

The success of active learning approaches also depends on gaining students' buy in. Most online teaching material is self-paced, allowing students to pause whenever they want to reflect or integrate new ideas with their existing notes, and to revisit any difficult sections as many times as they need. However, they could choose to skip the prompts to reflect and practice, and there is less social pressure to complete activities.

Better student engagement has been seen when educators directly reiterate the benefits of active learning, and it's important that we make the purpose of individual activities clear to them.

References

Brame, C., (2016). Active learning. Vanderbilt University Center for Teaching. https://cft.vanderbilt.edu/active-learning/

Eddy, S.L. and Hogan, K.A., (2014). Getting Under the Hood: How and for Whom Does Increasing Course Structure Work? *Cell Biology Education 13*, 453–468. https://doi.org/10.1187/cbe.14-03-0050

Freeman, S., Eddy, S.L., McDonough, M., Smith, M.K., Okoroafor, N., Jordt, H., Wenderoth, M.P., (2014). Active learning increases student performance in science, engineering, and mathematics. *Proceedings of the National Academy of Sciences 111,* 8410–8415. https://doi.org/10.1073/pnas.1319030111.