

Evidence-based Strategies for Active Learning in Large Lectures

Seminar for CERA/ČAPV

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This document outlines key findings and strategies for implementing active learning techniques in large lecture classes. It covers student feedback on current teaching methods, principles of how students learn, and practical tips for engaging students through interactive activities, predictions, retrieval practice, and more. The goal is to provide instructors with evidence-based approaches to improve student learning outcomes and create a more dynamic classroom environment.

Key Findings from TUL International Mobility Report

Student feedback indicates significant dissatisfaction with traditional lecture methods:

- 50-75% of students find non-interactive lectures ineffective and monotonous
- Strong preference for interactive and practical teaching methods
- Desire for approaches that encourage critical thinking and discussion

Additionally, 80% of teachers acknowledge that current teaching methods at TUL lack student-centric engagement. This data underscores the need for a shift towards more interactive and engaging teaching strategies.

Principles of Student Learning

Strukov (2024) emphasizes the importance of student-centered activities in enhancing social and communicative abilities. Lovett et al. (2023) identified 8 key principles of student learning based on 60 years of research:

1. Students are diverse in their learning styles and characteristics
2. Prior knowledge influences new learning
3. Knowledge organization affects learning and application
4. Motivation drives learning effectiveness
5. Mastery requires practice and application
6. Students must learn how to learn
7. Consistent practice and feedback are essential
8. Classroom environment impacts learning

Creating an Engaging Classroom Environment

Safe Space

Create a comfortable environment where students feel safe to participate and make mistakes.

Instructor Style

Use eye contact, movement, and humor to encourage discussion and engagement.

Physical Comfort

Ensure proper temperature, lighting, and acoustics in the classroom.

Proximity

In large halls, encourage students to sit closer to the front and step off the stage to interact more personally.

Setting the Tone on the First Day

Establish an atmosphere of active engagement from the start:

1. Welcome students and share your passion for the subject
2. Empathize with students' perspective as newcomers
3. Use movement and eye contact to connect with students
4. Encourage office visits and after-class discussions

Begin with essential questions about the course's relevance to students' lives and careers. Use the "Think-Pair-Share" technique to promote discussion. Share learning objectives and course expectations clearly.

Prediction as an Engagement Tool

Benefits of Prediction

Asking students to make predictions engages memory, encourages critical thinking, and creates emotional investment in learning outcomes. It helps students identify knowledge gaps and apply prior knowledge to new situations.

Implementing Predictions

Use informal in-class predictions, closing predictions for the next lesson, and conceptual questions that build on prior knowledge. Provide fast feedback and induce reflection on predictions. Consider using online tools like the Harvard Implicit Bias test for self-reflection exercises.

Retrieval Practice and Memory Enhancement

The retrieval effect, also known as the testing effect, strengthens memory by practicing recall. Implement retrieval practice through:

- Opening questions about previous lessons
- Minute papers at the beginning or end of class
- Regular, low-stakes quizzes with multiple attempts

Explain to students that long-term memory is essentially unlimited, and frequent retrieval strengthens neural pathways. Encourage spaced practice and interleaving of topics to enhance long-term retention and skill development.

Chunking and Interleaving for Effective Learning

Chunking

Break lectures into manageable 10-15 minute sections, followed by pair work or discussion. Focus on one topic at a time, allowing students to process information in smaller chunks.

Interleaving

Mix practice of different skills or topics within a session. Use online quizzes that include questions from previous lessons. Encourage spaced practice over time for better retention.

Explain to students why these techniques are effective, emphasizing the benefits of spaced repetition and varied practice for long-term learning and skill development.

Flipping the Classroom

The flipped classroom model involves students encountering information before class, freeing up class time for higher-order thinking activities. While 57% of instructors surveyed found it successful, it's important to consider both pros and cons:

Pros

- Flexible format
- Self-paced learning
- More time for collaboration
- Closer instructor-student interaction

Cons

- Requires significant preparation
- Risk of unprepared students
- Need for carefully structured activities

Building Neural Connections

Learning involves creating and strengthening neural networks, connecting new information to existing knowledge. To facilitate this process:

- Encourage students to keep reflective journals
- Assign essays that integrate course concepts with real-life experiences
- Use scaffolding techniques to build on prior knowledge
- Provide opportunities for group practice and peer critique

When designing your course, brainstorm and prioritize the cognitive skills students need to develop, and plan how to scaffold these skills throughout the semester.

Motivating Students

Share Relevance

Explain how the course will benefit students in their future careers and lives.

Show Enthusiasm

Be passionate about your discipline and share personal stories of challenges and successes.

Be Approachable

Arrive early and stay late to connect with students. Create a positive classroom atmosphere.

Stay Current

Continuously learn about your discipline and best teaching practices.

Use topical stories and real-world examples to maintain student interest and demonstrate the practical applications of course material.

Conclusion and Implementation

Implementing active learning strategies in large lectures requires thoughtful planning and consistent effort, but can significantly improve student engagement and learning outcomes. Key takeaways include:

- Use a variety of interactive techniques like predictions, retrieval practice, and group discussions
- Break lectures into manageable chunks and interleave topics
- Create a supportive classroom environment that encourages participation
- Explain the rationale behind teaching methods to students
- Continuously refine your approach based on student feedback and learning research

By incorporating these evidence-based strategies, instructors can transform large lectures into dynamic, engaging learning experiences that foster critical thinking and long-term retention of knowledge.