

Introduction of Educational Psychology

→ **Abstract:** More and more people are enrolling in higher education than ever before. As a consequence of higher education, most students will take more math classes, with increasing difficulty. More often than not, students have received appropriate math instructions prior to college, but are not retaining vital information that future math courses add on to. Can classes be taught in a way to help students retain more information? This project first addresses theoretical approaches in the literature before considering a study conducted at Kent State University. In the study, sections of remedial math classes were divided into control and experimental groups taught by the same instructor. The experimental group were required to spend the same amount of time over additional sessions, and did not receive extra instructional time. The study suggests that compulsory review will increase total student mastery.

→ **Constructivism**

- Theory strongly influenced by Lev Vygotsky
- Observes students must construct their own knowledge—it is not possible for information to be “deposited” into students

Zone of Proximal Development

- Implies there are prerequisite skills for advancing through topics

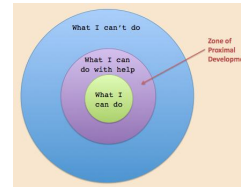
vs.

→ **Cognitive Load**

- Theory pioneered by John Sweller
- Observes that learning a new skill requires a certain amount of thinking on the part of the learner, who has limited short term memory resources
- If you overload someone they will not be able to gain the knowledge
- The most effective teaching strategies are those that reduce cognitive load to manageable levels

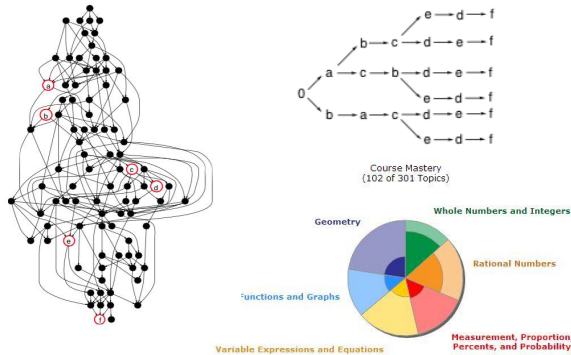
Worked Example Effect

- Giving a student a framework for solving a problem will reduce cognitive load and so improve learning



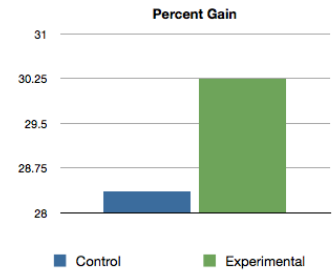
→ **ALEKS**

- Online software for learning math skills
- Creates “Knowledge Structures” individually tailored to students
- Gives student example problems to gauge their understanding of topics
- As Students gain mastery Aleks will move on to different topics, using a flow diagram to determine what the student has mastery of and what topic should be selected next
- Similar theoretical basis as ZPD (Zone of Proximal Development)
- Lets students construct their own paths



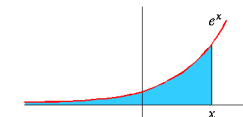
→ **Methods**

- Classes were divided into control and experimental groups, taught by the same instructor
- Experimental group used **Distributed Practice** but had no additional time or effort used
- Hypothesis: the experimental group will show higher mastery in Aleks because of **Distributed Practice**



→ **Conclusion**

- 1-2% gain in learning achieved without any additional effort
- Math skills build upon each other, a small gain will accumulate quickly
- Techniques like distributed practice can be combined with other methods
- Even a small 1-2% gain is substantial when you are measuring the knowledge of a large group
- The two different schools of thought—Sweller vs. Vygotsky—might not be as different as once thought



→ **Rawson And Dunlosky: Study Tips**

• Widely cited paper discussing beneficial learning techniques

Low-Utility	Medium-Utility	High-Utility
<ul style="list-style-type: none"> <li>• Summarization</li> <li>• Underlining/Highlighting</li> <li>• Mnemonic Devices</li> <li>• Imagery</li> <li>• Re-Reading</li> </ul>	<ul style="list-style-type: none"> <li>• Elaborative Interrogation</li> <li>• Self-Explanation</li> <li>• Interleaved practice</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Distributed Practice</b></li> <li>• <b>Practice Testing</b></li> </ul>

