Our Solution: The Student Cognition Toolbox
Teaching Students to Use and Transfer Effective Study Strategies

The Study Behavior Inventory (SBI)

Deep Strategies
- I space out my study sessions in the time leading up to the exam
- I relate what I am reading for the course to classroom sessions
- I test myself on course materials without referring to my course materials or notes, etc.
- I plan effectively for study time between classes
- I summarize in my own words information I learn from my study
- I explain concepts to a classmate/friend
- I create outlines, charts, diagrams, or tables, etc., to organize and help me see patterns in course information

Elaborative
- Self-explanation

worked examples

Distributive Practice (Spacing)

Test Enhanced Learning

Student Cognition Toolbox Modules

The purpose of this initial project was to develop and implement an online Student Cognition Toolbox (SCT) that:
1. instructed students on six research-supported study strategies
2. provided them with opportunities to use study strategies in university courses in which they were enrolled
Students’ performance on measures of their learning (CheckPoint Quizzes) were positively related to important individual differences:
1. SAT-Verbal
2. academic self-efficacy
The regression of Post Study Behavior Inventory deep processing on Student Cognition Toolbox CheckPoint Quiz scores was significant ($\beta = .23, t = 3.03, p < .003$), controlling for Pre-SBI deep processing ($\beta = .51, t = 6.76, p < .001$).
Model 2 $R^2 = .30$ (Pre-SBI only);
Model 2 $R^2 = .35$ (Pre-SBI and CheckPoint Quiz) ($N=118$)

Deep or Shallow Strategies?

Our prior findings have shown that students who report high use of deep processing study strategies and low use of shallow processing study strategies tend to perform better on exams.

Effective use?

Is that study strategy that your students use effective in promoting learning? It may depend on the learning goal/objective and the implementation of the strategies that render them effective or ineffective.

So, can instructors help students engage in effective and efficient studying?

It depends:

What kind of knowledge do students need to attain?
- Facts?
- Concepts?
- Principles?

What kind of learning processes are required for their learning objective?
- Memory and fluency?
- Understanding and sense-making?
- Induction and refinement?

What kind of study strategies will be most effective to meet learning their objectives?
- Quizting?
- Self-explanation?
- Problem solving?

Student Cognition Toolbox: Assessments

Did students increase their reported use of ‘deep’ study strategies after completing the SCT?
Yes.
For each of the seven deep strategy strategies, students rated the items higher following their completion on the SCT. It is implausible that this increased would have spontaneously occurred without the SCT instruction ($N=95$).

Did students who performed better on the SCT measure of learning (CheckPoint Quizzes) rate SBI ‘deep’ processing items higher than students who performed less well on the CheckPoint Quizzes (controlling for their pre-instruction SBI rating)?
Yes.
The regression of Post Study Behavior Inventory deep processing on Student Cognition Toolbox CheckPoint Quiz scores was significant ($\beta = .23, t = 3.03, p < .003$), controlling for Pre-SBI deep processing ($\beta = .51, t = 6.76, p < .001$).
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Summary and Future Directions

This project is being created in collaboration with the Open Learning Initiative at Carnegie Mellon University

Open Learning Initiative at Carnegie Mellon University

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Tour the SCT

Part 1
- Exposure to material to learn
- Exposure to presentation on the study strategy
- Practice using strategy in a variety of contexts
- Assessment on how well students learned the study strategy

Part 2
- Exposure to material to learn
- Exposure to presentation on the study strategy
- Practice using strategy in a variety of contexts
- Assessment on how well students learned the study strategy

Selected Study Strategies Module References:

**Introduction to Study Strategies**


**Practice Quizzing**


**Elaborative Interrogation**


**Worked Examples**


**Spaced Practice**


**Interleaved Practice**

