

Title:

Retrieval Learning for Longer Retention and Application: Making It Work in the Classroom

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Abstract Summary:

This presentation will provide an overview of the research with retrieval learning, issues related to the use of retrieval learning, and potential strategies for implementation within the classroom. Data from a study by the author using one form of retrieval learning will be presented.

Learning Activity:

LEARNING OBJECTIVES	EXPANDED CONTENT OUTLINE
Discuss at least two research studies that support retrieval learning.	I. Definitions of retrieval learning and cumulative testing.
Describe three approaches to implementing retrieval learning in the classroom.	II. Overview of the post-secondary research with retrieval learning.
Discuss the results of one study using cumulative testing as a retrieval learning method with nursing students.	III. Issues identified in relation to implementation of retrieval learning.
	IV. Strategies for implementation: a. In the classroom b. Outside the classroom to support student study efforts c. As remediation.
	V. Methods of evaluation

Abstract Text:

Retrieval, according to Karpicke (2012), is the primary process for understanding and promoting learning. When knowledge is expressed, the process involves retrieval of the knowledge based on cues from the environment. Retrieval is a significant tool to enhance learning and the learning produced is long-term. The response provided by an individual to cues depends on the diagnostic value of the cues and the ability of the cues to assist in recovery of target information as opposed to competing options (Karpicke, 2012). Each time the knowledge is retrieved, it is elicited through cues from the present context, allowing application in varying circumstances (Moscovitch, 2007; Roediger, 2000). Learning is altered each time an individual retrieves information because each retrieval of information enhances one’s ability to retrieve it again.

Students tend to think that rereading notes and books will best prepare them for tests. Karpicke, Butler and Roediger (2009) asked students what they would do after reading through notes and text. Fifty seven

percent indicated that they would reread the content. Only 18% said that they would try to recall the material. Roediger and Karpicke (2006b) compared the outcomes for three groups of students using rereading only, rereading with one recall session, and one group with one read followed by three recall sessions. Students tended to think that the more they read, the better they would perform on the exam. However, the students with three sessions of active retrieval performed the best on the follow-up test.

Researchers have also found that the benefits of active retrieval are enhanced when students retrieve and then reread (Karpicke and Roediger, 2010). The researchers found that students who practiced retrieval one time after the initial reading of material doubled their long-term retention as opposed to the retention acquired through reading alone. Students who engaged in repeated retrieval with brief rereading periods increased their retention to 80%. McDaniel, Howard, and Einstein (2009) had similar findings from their research.

In the last few years, researchers have begun to focus on active retrieval and the promotion of meaningful learning. Meaningful learning is purported to produce mental models that are organized and coherent whereas rote learning is viewed as producing poorly organized knowledge. Two approaches have been used to measure the effect of retrieval learning on meaningful learning, using final assessment questions that differ from questions used in the original learning (Butler, 2010; Chan, 2009, Johnson & Mayor, 2009; Rohrer, Tatlor, & Scholar, 2010) and using critical thinking questions that test their ability to apply knowledge and solve new problems. Karpicke and Blunt (2011a) compared retrieval learning to the use of concept mapping as a study method. They found that retrieval learning produced the best outcomes on a follow-up test.

In the current educational environment, retrieval is still predominantly used for assessment and usually involves content recently presented and reviewed. This use of retrieval as an assessment promotes rote, transient learning. The use of retrieval as a learning process promotes long-term meaningful learning that can be recalled and applied in future situations. Each time a student retrieves knowledge, the ability to retrieve it in the future and apply it in varying situations is enhanced. Although there is a significant body of research within the last thirty years to support the use of retrieval learning (Blunt & Karpicke, 2014; Bridge & Voss, 2014; Deng, Gluckstein, & Larsen, 2015; Karpicke, 2012; Karpicke, Lehman, & Aue, 2014; Roediger & Butler, 2011; Weimer), it is still not a common strategy used in post-secondary schools. Students graduating from college are expected to be able to apply what they have learned in the job setting and are expected to pass licensing or certification exams that involve critical thinking. Schools are held accountable by licensing boards and accrediting agencies for producing graduates who can express what they have learned and apply it in varying situations. Retrieval learning provides a process to achieve these goals.

There are many methods that can be used to incorporate retrieval learning into the curriculum (Roediger & Pyc, 2012). The use of short weekly quizzes covering previously studied and tested content and the use of practice questions are good examples. Inclusion of cumulative mid-term and final exams is another example. Some researchers also suggest a mid-curriculum exam for recall of content from the first half of the curriculum (Kornell, 2010). The development of cumulative tests is time consuming, but for nursing programs, there are many standardized options. However, there is little research available with retrieval learning within nursing curricula. In one data base study with scores from 8,000 students, there was a significant difference in the exit exam scores for students who had taken a mid-curriculum exam and those who had not ($t=4.872$; $p<.000$). There was a moderate significant correlation between mid-curriculum scores and exit exam scores ($r=.420$; $p<.000$).

This presentation will provide an overview of the post-secondary education research, suggested strategies, available resources, and the results of one study with nursing students including a mid-curriculum and an exit exam.