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Experts as teachers: Can we Abate the Disconnect between Expert and Student?

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ABSTRACT

Studies have found that experts often fail as good teachers, mainly because there is a lack of communication within their specific area (Feldon, 2007). Experts may routinely underestimate how difficult a task can be for a newcomer (Hinds, 1999) and even when attempting to make a task easier, they omit information a novice would find valuable (Hinds, Patterson, & Pfeffer, 2001) because they unintentionally assume that non-experts are aware of and possess knowledge that only those already familiar in the field might have, and would thus know what they are talking about. Furthermore, there are factors controllable by the professor, and not the students, that can determine a degree of student success (not to imply that student's don't need to take their share in responsibility for their learning). The lecture style and format of a classroom can change the outcome of how much students learn. For example, the use of active learning exercises or videos during lecture can improve students' recollection of material (Lawson, 1995, VanderStoep et al), and the implementation of multiple-choice versus short answer exams can have an effect on how students study and learn subject material (Scouller, 1998). It is important that professors and experts be aware of these factors, and manipulate them as they see fit (ie. improve efficiency and quality of learning). However, it has been found that the correlation between teacher experience and effectiveness is statistically low (Hattie, 2009 p.118), implying that most experts fail to pass on their expertise to upcoming generations. This should serve as a red flag to most, especially because the extreme cost of a college education should guarantee quality education. As a student here at URI, I have witnessed the good and the bad professors. As a future college professor, I recognize the need to implement a personal formal training, not only of the field of expertise, but also on how to *communicate* that expertise. This requires empathy and understanding towards the student experience. My project involves being trained as an academic coach through the Academic Enhancement Center, where I work with students individually to determine the roots of their academic struggles, so that we can later develop plans on how to negate the causes. This allows me to observe a wide variety of students' experiences from many different backgrounds, because realistically, a student's struggle is much more complicated than them "not studying enough." Furthermore, I am exposed to the science of learning, which explains how students can learn information efficiently, and, equally as important, how they can *apply* that information to real world problems. I can use this information to my advantage to design lesson plans that will strategically and efficiently prime students for their exams. Finally, through the conduction of a study skills and a test-taking strategies workshop both catered towards freshman enrolled in the College of Environmental and Life Sciences, I gain real experience leading a classroom, thus exposing myself to the everyday troubles that experts must overcome in the classroom setting (such as getting disinterested students to pay attention to lesson material), while also applying all that I have learned through this project. These workshops are designed to help students within the AEC and CELS community succeed academically, whose success will be measured by a Survey Monkey questioner.

BACKGROUND

- The science of learning:
 - Distributing study time with large gap intervals, active-studying techniques, and interleaving increases material retention quantitatively and for a longer duration (Rohrer & Pashler, 2007).
 - Active studying techniques include quizzing yourself, drawing diagrams from memory, creating charts to compare and contrast different concepts, teaching material to other classmates, creating potential exam questions, and making flowcharts to connect different topics to each other and to the big picture.
 - Active studying is more effective than passive studying (Lawson, 1995, VanderStoep et al), which includes rereading or rewriting notes, rereading the text, having another individual teach explain to you, or going over problems you did previously without redoing them.
- Interleaving is a technique that involves mixing up subject material as opposed to blocking subject material. In other words, as opposed to "aabbccdde" students arrange topic material to look more like "abcdebdaef."
- Test-taking strategies: Strategies differ for exam type.
 - Example of a multiple-choice type strategy: When presented with a question in which two of the answers are opposite of each other, one of the answers is correct, while the other is wrong, regardless of any other options. This narrows your choices to 2 answers, resulting in a 50/50 probability.
 - Example of a true/false type strategy: words like "sometimes, often, ordinarily, or generally" open up the possibilities of making accurate statements. On the contrary, absolute keywords such as "no, never, none, always, ever, entirely, or only" imply that the statement must be true 100% of the time and usually indicate "false" answers.
 - Example of a short answer strategy: never leave anything blank! Tossing in basic keywords or formulas can result in partial credit.

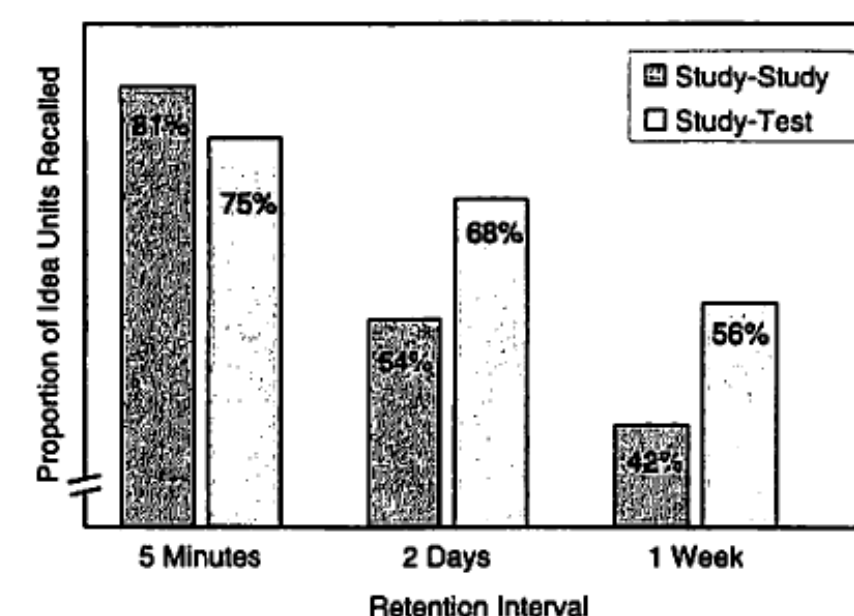
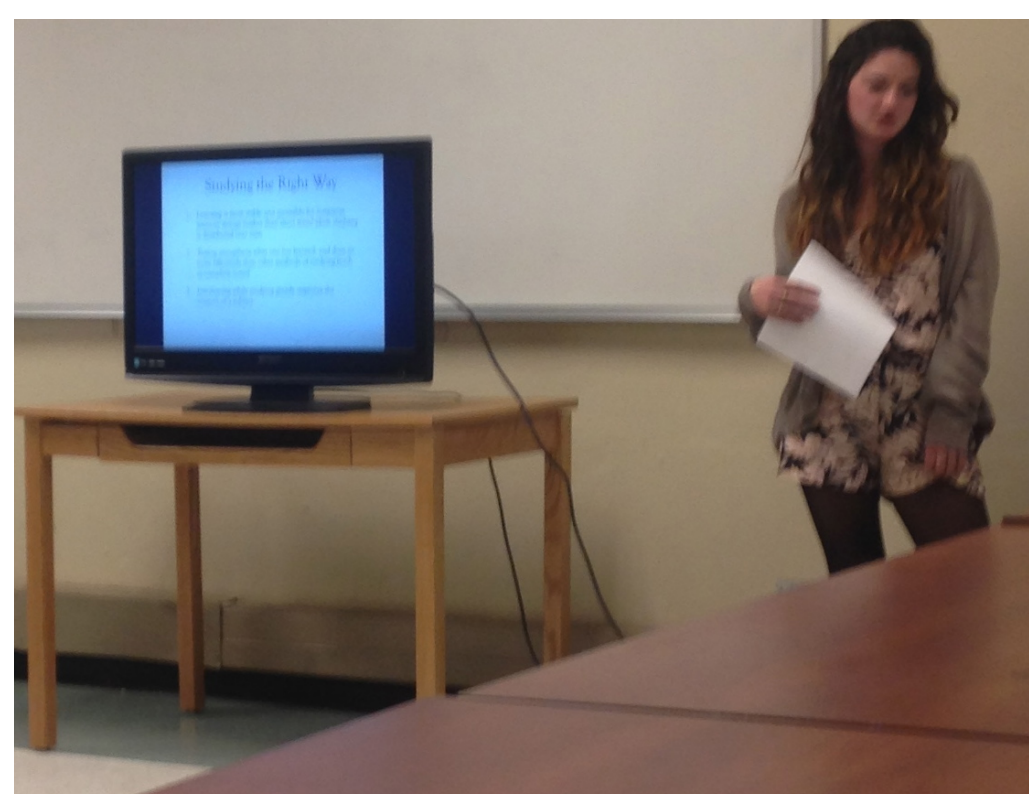


FIGURE 1. Testing rewards the rate of forgetting. In this study by Roediger and Karpicke (2006a), college students read a passage and then, after a 2-minute delay, either reread the passage (the study-study condition) or wrote as much of the information as they could recall (study-test). Respondents were given a final test after a test delay (or "retention interval") of 5 minutes, 2 days, or 1 week. The initial test depressed final test scores after a 5-minute delay ($d = 0.52$) yet improved final test scores after a delay of 2 days ($d = 0.95$) or 1 week ($d = 0.83$). Error bars represent standard errors of the mean. Adapted from Roediger, H. L., & Karpicke, J. D. (2006). Test-enhanced learning: Taking memory tests improves long-term retention. *Psychological Science*, 17, 249–255.

METHODS

- Academic Coach Training: Training for this position began during the Fall semester and continued through the end of Spring semester. Trainings were hour-long intervals conducted once a week. Preparation for each meeting included reading both primary and secondary articles and Ted Talks on the science of learning and teaching. Discussions revolved around individual interpretations of each article or video, and also on problematic student situations and how to personalize an academic coaching session towards each student's needs.
- Academic Coach Sessions: Sessions were one-on-one with students who were struggling academically. In these sessions, students provided a background of their college experience, and explained why they sought academic help (ie. study skills, time management, motivation, anxiety/stress management). Strategies that would promote academic success were constructed.
- Workshop 1: Study Smarter, Not Harder
 - Students were shown a PowerPoint presentation with material presented in the background section of this poster.
 - Students read a short article and then divided into two groups. One group reread the article after a 20 minute interval, while the other group was quizzed on the material (without the ability to reread). After another 40 minute interval, both groups took a quiz, and results were scored.
 - Students formed two groups based on enrollment in either BIO 101 or 102. Each group read an article on information relevant to their class material and performed a short active studying activity to dissect and digest the material.
 - Students filled out a weekly agenda as a time-management activity. Class hours, work hours, clubs, eating times, etc. and a minimum of 6 hours each week to account for studying were entered. 3 of these study hours were for studying current information, while the other 3 were for reviewing past material.
- Workshop 2:
 - Students were asked to discuss their current methods of taking specific types of tests. A follow up discussion with the entire group went into why these methods are effective, and additional methods were provided.
 - Students were given a small quiz designed to test their understanding of the material presented to them, designed to articulate each different type of exam question and how to tackle it, even if the students do not know the relevant content necessary to answer the question.
 - A BIO 101 practice exam was reviewed and dissected for upper-level thinking on material.



Bottom left: Students in the "Study Smarter, not Harder" workshop take a practice quiz to experience for themselves how effective the implementation of quizzes while studying can drastically improve understanding, retention, and the ability to recall material, which will improve final test results down the line.

Upper left: Me teaching active studying techniques. Right: A pancake bar increase student attendance.

RESULTS

- Workshop 1:
 - Quizzing while studying: the group who quizzed themselves while studying performed much better on the final quiz than those who reread information from the article.
 - Active studying: BIO 101 students explained material to the other students. Students from the 102 group created a phylogenetic tree to visually display evolutionary relationships between plant types.
 - 83.3% of students found the workshop to be beneficial towards academic success and thought that their grades would improve after implementation of the study skills. 66.7% incorporated new study techniques into their studying habits.
- Workshop 2: 100% of the students found this workshop to be extremely helpful, specifically they found the test-taking strategies might give them an advantage on a future exam. They also enjoyed the review exam and claimed they felt more prepared for the exam after participation in this workshop.

DISCUSSION

- Gained information on the science of teaching and learning:** This serves as professional growth, as it has increased my understanding on the implications of classroom format and student success. I am now conscious of the responsibility of a professor to prime their classroom for efficient teaching.
- Developed an understanding of the college student experience:** This is important in developing an understanding of the diverse issues that factor into an individual's academic success past the notion that student's simply "need to study more." Such knowledge contributes to an increased empathy towards students and their unique needs, which will ultimately influence the regulation of individual lesson plans in future classroom settings.
- Gained experience in teaching a classroom setting:** Lesson plan development requires asking myself, "Why are my students performing poorly, and what can they learn from me?" Carrying out the workshops strengthened my public speaking and leadership skills, and increased my ability to present myself as a personable mentor for creating a positive, relaxed environment in which timid students can feel more comfortable. I also gained experience on keeping students engaged in the classroom setting.
- Professional development as a future professor.** My classrooms will be constructed with the student experience in mind, facilitating the process of transforming students into experts themselves. Furthermore, in a future classroom setting, empathy and a personable nature will translate into an increased perception of approachability that students will have of me, minimizing the communication or human relationship disconnect between professor and student.

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