Setting Students Up for Success: A Short Interactive Workshop Designed to Increase Effective Study Habits
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Abstract
Introduction: Research shows that students generally utilize ineffective learning techniques such as massed practice and rereading. We developed an interactive workshop to teach first-year medical students highly effective learning techniques. Students often believe they know what works best for themselves. To impart effective strategies, we must disprove any current ineffective strategies. During the workshop, we employ activities designed to keep students engaged and reveal flaws in common study practices. Methods: The workshop occurred during the first week of an integrated basic science course that provides a foundation for our integrated curriculum. In addition to presenting evidence supporting effective techniques, we also realized a practical aspect that needed to be addressed—the limited time available to medical students. Thus, we concluded the workshop by distilling principles into approaches they could immediately put into practice—before, during, and after lecture. Focusing on the most effective techniques made the approaches more palatable to students facing vast quantities of preparatory material. Results: A postworkshop survey requested feedback for improvement and also included a table allowing students to indicate their interest and help needed for implementing each technique. This gave our Director of Academic Success invaluable insight as she developed additional workshops for first-year students. Discussion: Although study skills workshops are commonplace, this module is distinct in that it forces students to evaluate the effectiveness of their learning strategies and provides scaffolding for adopting highly effective study techniques. Ultimately, the goal was to educate our new students on implementing effective study techniques.

Keywords
Workshop, Orientation, Study Skills, Academic Support, Learning Technique, Learning Theory

Educational Objectives
By the end of this session, learners will be able to:

1. Explain weaknesses and strengths in different study techniques.
2. Identify how effective study techniques can be incorporated in their studies.
3. Have exposure to activities that support evidence-based study techniques by disproving ineffective techniques.
4. Utilize effective study techniques.

Introduction
When considering the role of study habits in medical school, there are two important associations that are unfortunately at odds with one another. First, it is well known by cognitive psychologists that the study habits most often utilized by students, such as massed practice (cramming) and highlighting textbooks, are the least effective techniques. Second, many studies have shown a relationship between the efficacy of study techniques used and academic performance. When taken together, these two associations mean that many students are spending a lot of time using low-efficacy learning techniques. Interestingly, studies
have also shown that students’ study habits develop throughout medical school, and that learning in the clinical years may be very different than in preclinical years.\textsuperscript{10-13} We developed an interactive workshop intended to teach first-year medical students evidence-based study techniques, such as spaced practice and metacognitive note taking, that would set them up for success in an integrated medical school curriculum.\textsuperscript{14} We realized students often believe they know what works best for themselves, and to impart effective strategies meant we must disprove their current ineffective strategies. The workshop was designed to show students evidence supporting effective study techniques. During the workshop, we employed activities designed to keep the students engaged and, more importantly, reveal flaws in common study practices. The workshop was given during the first week of a semester-long integrated basic science course (which included the foundations of all of the basic science disciplines). After the workshop’s first implementation, we added a longitudinal aspect (a second, 1-month postworkshop), where we sought to show the temporal aspect of memorization.

In addition to presenting the evidence behind effective study techniques, we also realized a practical aspect that needed to be addressed—the limited time available to medical students. Thus, near the end of the workshop, we distilled the principles into a few approaches students could immediately put into practice—before lecture, during lecture, and after lecture. For example, when we discussed the minimal value of highlighting and underlining and presented alternative methods, we also gave the short version: “If you don’t have time to read all of the slides, and all of the text before class, start by reading the learning objectives for the lecture and identifying any terms you don’t know.” Reducing the larger techniques into smaller alternatives made some of the approaches more palatable to students facing vast quantities of preparatory material.

The 1-hour workshop did not allow enough time to go into detail or cover all effective strategies. We used the workshop to go over strategies we believed would offer the greatest impact and provided a handout that gave more detail and additional references to the students after the workshop. We also requested feedback from students as to how the workshop could be improved or what additional aspects could be addressed for the next student cohort. Included in the most recent version of the survey was a table listing all of the learning techniques discussed (based on the most common themes to arise from previous iterations of the workshop/survey). Using this table, we asked students to tell us their interest in implementing each technique (e.g., “I’m not interested in this study technique,” “I previously used this technique, and it didn’t work for me,” “I am interested in this technique, but need more information on it,” etc.). This information was invaluable to our Director of Academic Success, who delivers additional focused sessions on topics such as time management and study skills. It allowed her to tailor the sessions to the needs and interests of the current student cohort. It also provided us with feedback as to which techniques might need more attention during the workshop.

Ultimately, the goal was to educate our new students on study techniques that offer the greatest payoff in retention. We have seen students who succeeded in their undergraduate studies utilizing cramming and highlighting and becoming woefully unprepared for the difficulties of an integrated curriculum where the binge and purge is no longer a viable strategy. This workshop would be relevant to and easily implemented within many educational frameworks, including traditional medical school curricula, integrated curricula, board exam preparation, residency transition, and nonmedical undergraduate or graduate degree programs.

**Methods**

For the last 3 years, we have delivered the workshop to our first-year medical students during the first week of a semester-long integrated basic science course. The workshop combines an engaging PowerPoint presentation (Appendix A, notes for facilitator provided in Appendix B) and interactive study skills activities (Appendix C). No specific skills are required for implementing this workshop, although familiarity with the references cited in the handout (Appendix D) is encouraged. We feel that the placement of the study skills session is ideal within our curriculum but also acknowledge that multiple time frames of implementation could be beneficial to undergraduate, graduate, and continuing learners.
We invited all first-year students to attend the initial workshop, which was given during 1 hour of a lunch period. Upon entering the lecture hall, students were given the activity packet (Appendix C, with the cover sheet instructing them not to open until asked) and a blank 4×6 card. At the beginning of the hour, we displayed a slide containing eight 3- and 4-digit alphanumeric combinations (Activity 2: memorization) for 2 minutes and instructed the students to memorize the combinations without writing anything down. We have altered the alphanumeric combinations accordingly with each presentation of the workshop (as detailed on the slide notes). At the end of the 2 minutes, we began the session in earnest. We completed Activity 1 (the penny exercise) as it appears in the presentation. Please see slide notes for all activity instructions. Approximately halfway through the session, we returned to Activity 2 as prompted in the slides and used the activity packet (Appendix C). During the session, we discussed the highlights of study techniques to use before, during, and after a lecture. We referred throughout to our study skills handout (Appendix D), which contains additional details and examples to support the techniques discussed during the session. At the end of the session, we provided the students with an anonymous feedback questionnaire. This enabled the students to immediately reflect on their individual lessons learned and intended techniques to try, and provided us as facilitators with unanswered questions and concerns that could be addressed in future review sessions. Open-ended questions from each feedback opportunity were qualitatively analyzed by two separate researchers for consistent themes.

Approximately 1 month after the initial workshop, a 30-minute follow-up workshop was offered during a lunch-hour review session. All first-year students were again invited to attend. We passed out an activity packet that was similar to the one used during the first workshop, again with the cover sheet instructing them not to open until asked. We began the session by asking the students to fill out the table of alphanumeric combinations they had previously memorized during Activity 2 of the initial workshop. We then reviewed the techniques previously introduced during the initial workshop and facilitated a discussion centered on the study techniques they had successfully implemented in their first month of medical school, as well as those they had struggled with. At the end of the session, we again provided the students with an anonymous feedback questionnaire, this time including a question to denote whether they had attended the initial workshop.

Both workshops were simple to implement, cost-effective, and very well received by the student participants.

This resource includes the PowerPoint presentation (Appendix A) and activity packets (Appendix C) used during the workshops, as well as the handout provided after the workshop (Appendix D). The postworkshop survey is the last page of the activity packet (Appendix C). For ease of implementation, we have also provided facilitator notes both on the PowerPoint slides and in a notes document (Appendix B). We have also provided a workshop materials list and time line (Appendix E). Because of copyright issues, all of the figures presented to the students have been removed and replaced by placeholders with references. For the first activity, a blank 4×6 note card was provided with the activity packet; this was collected at the end of the session to enable scoring of the activity.

**Results**

For 3 years, students have given feedback indicating they truly enjoyed the incorporation of activities into the module, as it helped prove the effectiveness of the evidence-based methods rather than simply provide theory. After the first implementation of the workshop, we added a longitudinal aspect where we sought to show the temporal aspect of memorization. Students commented that the activities were influential and that they were surprised to see how they suffered from fluency illusion. We were pleased to see such an impact from a single, 1-hour session. To date, a total of 240 students have provided feedback through the anonymous workshop survey, with the majority (87.1%) feeling that they learned something about their study habits. Of the 240 students who completed surveys, 77.5% identified specific points they learned from the workshop. These specific learned points, as analyzed through qualitative analysis, spanned the topics covered in the workshops (Table).
### Table. Qualitative Feedback on “Did You Learn Anything About Yourself From the Session?” (N = 186)

| Specific Learned Point Identified by Students | 2014\(^a\) (%) | 2015\(^b\) (%) | 2016\(^c\) (%) |
|---------------------------------------------|----------------|----------------|----------------|
| Would like to try the new tips              | 21.43          | 13.59          | 18.52          |
| Fluency illusion happens to me              | 14.29          | 18.45          | 19.44          |
| Connections are important                   | 0              | 15.53\(^d\)   | 12.96          |
| I overrate my ability to memorize           | 10.71          | 14.56          | 2.78           |
| Typing notes may not be beneficial          | 14.29          | 3.88           | 6.48           |
| I need to be more engaged in class          | 14.29          | 2.91           | 4.63           |
| Spaced retrieval makes connection easier    | 0              | 6.80\(^d\)    | 6.48           |
| Memorization alone is not helpful           | 0              | 10.68\(^d\)   | 1.85           |
| How much I thought I knew vs. what I actually know | 7.14 | 0.97          | 3.7            |
| Using others’ study materials is not helpful| 0              | 2.99\(^d\)    | 8.33           |
| Time spent (cost/benefit) and sleep         | 0              | 0              | 3.70\(^d\)    |
| I need to trust myself more                 | 0              | 0              | 1.85           |

Data are shown as percentage of students commenting on item in year, with some students commenting on multiple items.

\(^a\) n = 29.
\(^b\) n = 103.
\(^c\) n = 108.
\(^d\) Increased emphasis on concepts likely contributed to emergence of new comments.

For Activity 1 (the penny activity), on average, the students overestimated their memory by 100% and overestimated the ability of the top performer in the class by 350%. Revisions to Activity 2 (the memorization activity, used in the fall 2015 initial workshop and 1-month post workshop) proved to be instrumental in demonstrating the importance of developing connections to material rather than rote memorization. Initially, the activity was designed to split the class by giving two different sets of alphanumeric combinations. One set had inherent meaning, while the other set was the same alphanumeric digits but organized into different combinations to negate any inherent meaning. This setup did not yield our intended results of demonstrating the misnomers of memorization, as we failed to fully appreciate the memorization/test-taking skills many medical students have (at least in the short term). We revised the activity to have one set of alphanumeric combinations for the whole class but included combinations with decreasing amounts of inherent meaning. The students were most readily able to reproduce the combinations with inherent meaning (e.g., NCAA vs. QCY) both initially and during the 1-month postworkshop. In the revised workshop, decreasing numbers of students were able to reproduce the combinations with much less apparent inherent meaning. This enabled the facilitators to easily transition to a brief discussion of the importance of chunking and background knowledge in gaining new knowledge.

**Discussion**

Starting with students matriculating in 2014, we have provided a 1-hour study skills workshop during the first week of class to assist students beginning our integrated medical curriculum. We used the workshops to go over strategies believed to offer the greatest impact and provided a detailed handout to the students after the workshop that featured more detail and additional references. We found that the introduction of the short study skills workshops, combined with continued reinforcement of effective practices throughout lectures and review sessions, better prepared our medical students for success in an evolving, integrated curriculum.

We have made the conscious decision to keep participation in the workshop anonymous and collect only nonidentifiable data from the activities and survey. Our drive to implement the workshop was to assist our students in transitioning to medical school, and thus, we did not want to potentially discourage student participation by adding a graded research aspect. It is noteworthy that we have routinely seen approximately 90% of the class attend the workshop even though it is held during the lunch hour and no incentives (e.g., food, course credit, etc.) are offered.

We appreciate the sparsity of extra time in medical students’ schedules and find that a lot of information can be successfully imparted in a short, well-planned session. Including student interventions that ideally incorporate hands-on demonstrations of effective study skills early in the inception of a course or program.
serves to bolster student success in today’s evolving curricula. We encourage all users of these workshops to revise the activities to be most useful with their intended audience, as the hands-on demonstrations are crucial to imparting the importance of good study techniques in a short workshop.

Over the past 3 years, the workshop has been well received and undergone only minor changes. One of the primary limitations is that the 1-hour workshop did not provide enough time to go into detail or cover all effective strategies. We have been able to overcome this limitation by giving students a handout with greater detail on the study strategies and by working with our Director of Academic Success as she plans future academic skills workshops for the students. We also initially found that the short duration of the workshop allowed students to perform well on the alphanumeric memorization activity, undercutting the message we hoped to promote. After careful revision, the activity became very effective in demonstrating the importance of making connections to prior knowledge. Another change made between the second and third iterations of the workshop was the replacement of open-ended questions in the postworkshop survey with a table incorporating trends observed from previous surveys. We believe this has reduced the effort barrier in completing the surveys, while also providing a comprehensive and immediate reflection mechanism for the workshop participants to assess what new techniques they would implement. Finally, the move to include a longitudinal component in the workshop has provided additional insight. An important lesson learned from this experience was to continuously reflect and revise the activities used in class to provide an impactful demonstration activity. The activity was shown to dramatically change students’ self-reflections on the importance of connections and learning, rather than just memorization of random information.

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