Evaluation of a Pre-Made Expanding-Retrieval Flashcard Tool and Medical Student Performance on Step 1

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Repository Citation  
Miller, Alexander; Wilson, Geargin; and Sachs, Howard, "Evaluation of a Pre-Made Expanding-Retrieval Flashcard Tool and Medical Student Performance on Step 1" (2018). University of Massachusetts Medical School. *Senior Scholars Program*. Paper 258.  
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What is Anki...

Anki is an expanding-retrieval electronic flashcard program available for desktop and smartphone, capable of word association, and spaced repetition. It enables content creation, organization, and review in a single application.

After activating cards, students are presented with flashcards daily according to the Supernova spaced learning algorithm. With each card they are given the option of “Hard,” “Good,” “Easy” and “Again.” Each corresponds to a different multiplier of the spaced repetition algorithm, with “Again” restarting the entire algorithm.

...and what is the Maimonidescak...

Drawing from the most common Step 1 preparation materials, two UMass Medical School students created a 3000-card flashcard Anki deck covering the full breadth of Step 1 material, known as “The Maimonidescak.” Designed for daily use over the 9-month course of second-year students, utilizing the deck was instructed to activate cards as those topics were encountered; doing this consistently, they could expect from 50-100 cards of varying ages to review per day. The potential of daily study imposed on the 32 Maimonidescak lent the project its name.

“Gave me the strength, time and opportunity always to correct what I have acquired, always to return in my working knowledge, and the spirit of man can assist indefinitely to enrich itself daily with new requirements.”

Methods

The 125 members of the UMass Class of 2019 were enrolled before the start of their second-year courses. The messages included a description of Anki and the Maimonidescak and a link to request access. Those who requested access received a set of MCAT reference guides, in both digital and physical forms, for downloading the 3000 cards, a usage guide for new users, a study plan and topic organizer, and a link to a shared website for reporting errors.

Baselining

- Administered prior to the start of classes
- Evaluated baseline academic information, such as GPA and TACS scores

NBME survey

- Administered “12 weeks into second year, following score reporting of a customized NBME exam covering pathophysiology, cardiovascular, and renal systems.
- Evaluated Maimonidescak usage and interaction, written comments about interaction with the tool, prior to the exam, and ungraded NBME score.
- “Usage grade” and “Interaction Grade” were given based on table below
- “Primary grade” was based on a 5-point scale asking if user agreed with the statement, “The Maimonidescak is your primary study tool for reviewing previously covered material.” Categories included Primary Tool (Agreed / strongly agreed), Secondary Tool (Neutral), or Reference Tool (Disagreed / Strongly disagreed).

NBME results (n=44)

- There was no significant difference between MCAT scores of users and non-users, or between the Primary, Usage, or interaction tool groups. There was no difference in pre-test question bank completion.
- There was a statistically significant difference in test score when comparing High Use vs Moderate + Low Use (p=0.01, power=0.71), as well as Moderate + High Use

The average of all 125 UMass test-takers was 74.5 (21.7). The 44 Maimonidescak users averaged 79.0 (15.0), remaining them resulting in a non-user average of 73.6.

Discussion

There has been a proliferation of Step 1 resources, but few address a fundamental difficulty of preparing for the exam: study scheduling. The Maimonidescak—an resource created by two medical students—was designed for straightforward, daily use over the entirety of the second-year curriculum, and appears to be effective in that capacity. The 31 users averaged 243.8 (Step 1: 75%) of all test takers, compared to the 220.9 of non-responding UMSMS students (80% percentile of all test takers).

A second iteration of this study is underway for the Class of 2020 and will seek to address the primary weaknesses of the current project, namely:

- **Step 1**: We anticipate equal or even greater interest from the 150 students in the Class of 2020
- **Improved Control Group**: Obtain UWorld and Step 1 data from non-users
- **Selection Bias**: Evaluate both users and controls for specialty preferences and target score as possible markers for self-selection

For better or worse, the stakes of Step 1 are not decreasing. The value of this exam as a measuring tool for residency qualification, and its effect on medical education in general, is very much up for debate. What is not, however, is its importance to current medical students with specific specialty and geographic preferences.

If students are to weather this high-stakes exam, they should possess the resources—both in content and delivery—to do so effectively and efficiently as possible.