Anki Usage and Effectiveness in a Medical School Curriculum

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BACKGROUND

- Spaced-repetition and student-initiated retrieval-based practices have a positive correlation with medical licensing examination performance¹.
- In recent years, an increasing number of medical students have begun to use the open-sourced flashcard application Anki (Software built upon and applies the learning principle of spaced-repetition)
- While the literature on spaced-repetition learning is well documented, there is little research on using Anki as a supplement to medical curricula.
- What little research is available shows that Anki usage positively correlates with Step 1 scores and that increasing the number of unique Anki flashcards completed also increases Step 1 scores ⁵.



Figure 1: Ebbinghaus' Forgetful Curve and Retrieval Practices⁷

RESEARCH AIMS

Primary aim: To examine how Anki usage affects performance on standardized exams and gain a better understanding of how to exploit Anki effectively in the medical school setting through statistics embedded into individual user accounts that track quality of Anki usage over time.

Secondary aims: To qualitatively assess the Anki software, including but not limited to, ease of use, likability, usefulness, and effect on student test confidence.

PILOT TRAINING

In Summer and Fall 2021, a pilot program in which 126 volunteers in Wright State University Boonshoft School of Medicine (BSOM) Class of 2025 were recruited to join a cohort that trained users to effectively use Anki. Individuals had the option to attend two initial presentations. The first presentation involved explaining what Anki is, why the app may be useful in medical school, and how it utilizes spaced repetition.



Figure 1: Anki software opening interface

The second meeting taught first year medical school students how to set up the system, general user interface, Anki implementation, how to find relevant flashcards, and Anki user statistics.



Figure 2: Anki software Card Type

The Anki system is not user-friendly, and therefore detailed instructions were given to the students to optimize the system for their specific needs. Furthermore, during the pilot phase, each student was provided a weekly word document with instructions on how to find the necessary Anki flashcards specific for their curriculum.

The Anki app tracks a number of statistics such as flashcards done per day and how many days in a row one has done cards, and the percentage of flashcards "passed" compared to all flashcards completed. Further statistics will be garnered by an add-on called "True Retention" (which tracks reviews completed each week and month, number of reviews with failing scores, and number of new cards mastered). This data will be used to correlate exam and test scores of the cohort and individuals. A wide range of data points were assessed including comparing test scores of Anki users within the cohort, Anki users not specifically a part of the cohort, non-Anki users, and statistics from previous first-year classes.

METHODS

Members of Wright State University BSOM Class of 2025 will be asked to voluntarily submit (1) student generated information from their individual Anki-user statistics, submitted via Qualtrics; (2) end-of-course examination, and the end-of-year nationally standardized examination, securly housed in Office of Medical Education; and (3) Qualtrics surveys on perceived easeof-use at course end points. The submissions will occur after completion of the BSOM course modules and standardized exams:







Figure 4: Anki General Statistics and Forecasting



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FUTURE RESEARCH

- Correlation of other course with Anki usage including:
- Radiology
- Anatomy
- USMLE Step 2
- Correlation with Anki and Myers-Briggs
- Anki Utilization and Hidden Curriculum
- Opportunities
- Structured Anki program compared to other structured learning techniques

Today Studied 3 cards in 19 seconds today (6.3s/card) Again count: 0 (100.0% correct) Learn: 0, Review: 0, Relearn: 3, Filtered: 0 No mature cards were studied today.

Past day: True retention: N/A Supermature rate: N/A Passed reviews: Flunked reviews: Cards relearned: 3

Past week: True retention: 95.3% Supermature rate: N/A Passed reviews: 2828 Flunked reviews: 141 ew cards learned: 1186 Cards relearned: 138

Past month: True retention: 93.6% Supermature rate: N/A Passed reviews: 9581 Flunked reviews: 657 New cards learned: 4150 Cards relearned: 647

Figure 5: Anki True Retention Add-on

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REFERENCES

- 1. Deng F, Gluckstein JA, Larsen DP. Student-directed retrieval practice is a predictor of medical licensing examination performance. Perspect Med Educ. 2015. doi:10.1007/s40037-015-0220-x
- 2. Xue G, Mei L, Chen C, Zhong-Lin L, Poldrack R, Dong Q. Spaced learning enhances subsequent recognition memory by reducing neural repetition suppression. J Cogn Neurosci. 2011. doi:10.1162/jocn.2010.21532
- Landoll, R.R., Bennion, L.D. & Maggio, L.A. Understanding Excellence: a Qualitative Analysis of High-Performing Learner Study Strategies. Med.Sci.Educ. 31, 1101–1108 (2021). https://doi.org/10.1007/s40670-021-01279-x
- 4. Kang SHK. Spaced Repetition Promotes Efficient and Effective Learning: Policy Implications for Instruction. Policy Insights from Behav Brain Sci. 2016. doi:10.1177/2372732215624708 5. Deng F, Gluckstein JA, Larsen DP. Student-directed retrieval practice is a predictor of
- medical licensing examination performance. Perspect Med Educ. 2015. doi:10.1007/s40037-015-0220-x
- 6. McHugh D, Sherban TM, Rahman SH. Digital Spaced-learning Media: a Platform to Reduce Student Anxiety and Promote Proficiency in Medical Pharmacology Education. The Faseb Journal.
- 7. Chun, Bo Ae & hae ja, Heo. (2018). The effect of flipped learning on academic performance as an innovative method for overcoming ebbinghaus' forgetting curve. 56-60. 10.1145/3178158.3178206.