

Scaling the Doer Effect: A Replication Analysis Using AI-Generated Questions

As technology continues to transform education, one question remains central: how effective are these tools in actually helping students learn? A recent study explored this by testing whether AI-generated practice questions could produce the same benefits as traditional human-authored ones. The research focused on the **Doer Effect**, a learning science principle that proves practice has six times the effect on learning than reading.

THE STUDY

The research involved two semesters of a Cognitive Psychology course at a major university. Using an AI system, practice questions were generated from the course textbook and integrated into the digital learning experience. Over 200 students participated, with different policies for completing the practice questions applied in each semester.

Key changes between semesters included:

- ✓ Fall 2022: Students had until the end of the semester to complete all assigned practice questions.
- ✓ Spring 2023: Students were required to complete questions chapter-by-chapter before each exam.

MAJOR FINDINGS

The results highlighted several important outcomes:

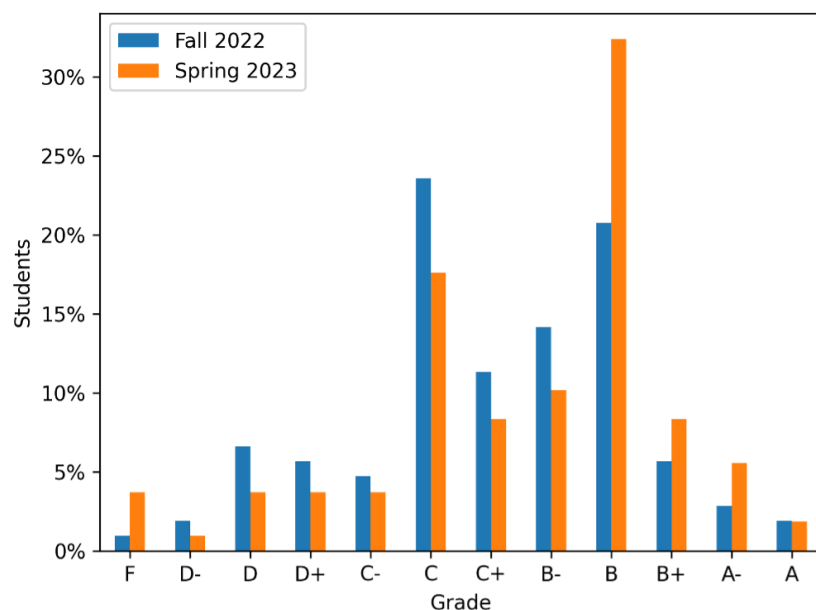
- 1. Engagement Matters:** When students were required to complete questions before exams (Spring 2023), they engaged with the material more effectively. They focused on relevant content, reducing the proportion of irrelevant practice attempts (from 40.3% to just 6.8%).*

- 2. Improved Exam Scores:** Exam performance improved with the new policy. Average scores increased by nearly 2 percentage points, with significant gains seen among lower-performing students.
- 3. The Doer Effect Confirmed:** In Spring 2023, researchers observed the doer effect with AI-generated questions—showing a clear link between completing these practice questions and higher exam scores.

*Irrelevant practice attempts refer to answering practice questions at times when they could not benefit exam performance, such as after the exam has already passed, likely just to earn credit for completion rather than for active learning.

WHY THIS MATTERS

This study is the first to demonstrate the Doer Effect using AI-generated questions, highlighting their potential to scale effective learning strategies to more students. By automating the creation of high-quality practice questions, educators can provide valuable study tools without the significant time and cost of manual question development. Additionally, the study showed that simple changes in how learning tools are implemented—like adjusting deadlines—can make a big difference in how students engage and benefit from them.



FINAL THOUGHTS

This research offers an optimistic view of how AI can enhance education, particularly for students who need extra support. The findings underscore the importance of thoughtful implementation and the role of instructors in maximizing the impact of these tools. By combining cutting-edge technology with proven learning science principles, the future of education looks brighter for students everywhere.