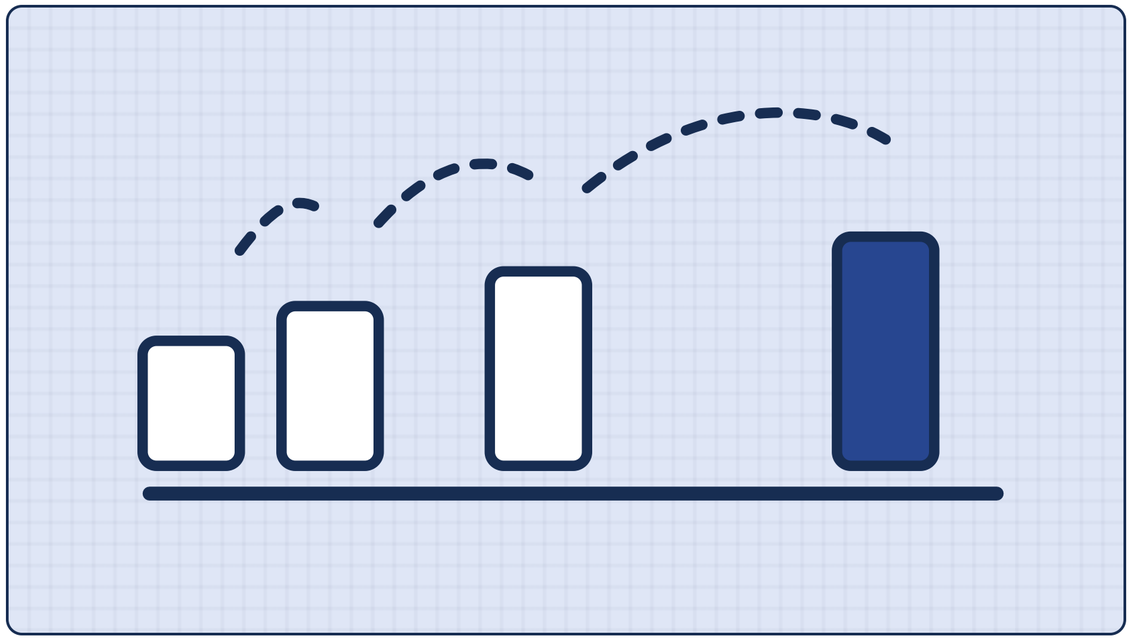
Active recall and spaced repetition: what the research says and how to use it

How to Study Effectively



Goals

By the end of this session you can

- Explain why rereading feels useful but fades
- Use active recall in every study session
- Space your reviews to match your exam date
- Write flashcards and self-tests that work
- Choose techniques by the strength of evidence

The illusion of knowing

- Rereading makes text feel familiar
- Familiar is not the same as able to recall
- Restudying raised confidence more than long-term recall
- Exams ask you to produce answers, not recognise them

What a major review found (2013)

High utility

- Practice testing
- Distributed (spaced) practice

Low utility

- Rereading
- Highlighting and underlining
- Summarisation
- Keyword mnemonic

What is active recall?

- Pulling information out of memory without looking
- Also called retrieval practice or practice testing
- Self-quizzes, flashcards, past papers, blank-page recall
- Low stakes: the aim is learning, not a grade
- Always check your answers afterwards

The testing effect in one study

61%

recall after one week for students who tested themselves (40% if they re-read)

- Roediger and Karpicke, Psychological Science, 2006
- Tested after five minutes, re-reading looked better

Forgetting, and why spacing helps

- Memory fades fastest soon after learning
- Each spaced review brings the memory back
- Cramming helps tomorrow's test, not next month's
- Spacing benefits are often larger on delayed tests

How far apart should reviews be?

- The best gap grows with how long you must remember
- Remember for 1 week: gap ≈ 20–40% (1–3 days)
- Remember for 1 year: gap ≈ 5–10% (3–5 weeks)
- Exam in about a month: review roughly weekly
- Too long a gap costs less than too short a gap

A century of research

- 1906: Thorndike advises active recall over rereading
- 1909: Abbott's early study of practice testing
- 2006: Roediger and Karpicke show the testing effect
- 2008: Cepeda and colleagues map ideal spacing gaps
- 2013: Dunlosky review rates testing and spacing highest

Worked example

Ananya's 30-day plan for one chapter

- Day 1: learn it, then close the book and recall
- Day 3: answer ten questions from memory, then check
- Day 10: redo the missed questions; redraw diagrams
- Days 17 and 24: timed past-paper sections

Passive or active study?

Passive

- Rereading the chapter
- Highlighting key lines
- Watching the lecture again

Active

- Blank-page recall of the chapter
- Answering past-paper questions
- Self-testing with flashcards
- Explaining a step aloud

Flashcards that actually work

- One question per card, with a short answer
- Say or write the answer before flipping
- Keep practising missed cards until you get them right
- Apps such as Anki can schedule spaced reviews
- Paper cards and a calendar work too

Useful extras: explain, ask why, mix it up

- Self-explanation: explain each step in your own words
- Elaborative interrogation: ask why a fact is true
- Interleaving: mix different problem types in one session
- Rated moderate utility: helpful, with less evidence so far

Common obstacles and fixes

- Recall feels hard: that effort is part of learning
- Wrong answers happen: check and correct right away
- Reviews get skipped: put them in a calendar
- Short, regular sessions suit spacing better than marathons

Quick check

Which study method is an example of active recall?

A. Highlighting key terms in the chapter

B. Rereading your notes three times

C. Writing all you remember, book closed

D. Listening to a recorded lecture again

Summary

Key takeaways

1. Familiar is not the same as remembered
2. Test yourself: practice testing is rated high utility
3. Space reviews to match how long you must remember
4. Swap rereading and highlighting for retrieval
5. Check answers and revisit what you got wrong