

An overview of learning and revision techniques

This study guide provides a summary of the findings of a meta study which looked at the effectiveness of different learning techniques.

Related study guides you might find useful include *Revision and exam skills* and *Organising your time*.

What works?

We all want our learning and revision to be effective. But how do we ensure that it is? We are now beginning to find out what works well and not so well when it comes to learning. John Dunlosky from Kent State University in the United States and colleagues carried out a meta study evaluating ten popular learning techniques (Dunlosky et al., 2013). Here's what they found.

Practice over time

In order to receive a high utility rating, the technique needed to be useful in a range of conditions, for a range of learner ages and levels of prior knowledge. Two techniques came out as clear winners: **practice testing** and **distributed practice**. **Practice testing** refers to any form of testing for learning which a student is able to do on their own. Examples of this technique include practising recall through flash cards, or completing practice problems or tests. Practice is likely to improve learning via a variety of direct and mediated effects - for a further analysis of these, take a look at the paper. The authors also reviewed the dosage - how many practice tests should be taken, and the timing of these. In a nutshell, they concluded that 'more is better' and that multiple practice tests are most beneficial when they are spaced in time, rather than crowded in, one after another.

The other technique which received a high utility rating from the authors, and links to the previous point about spacing out practice tests, was **distributed practice**. **Distributed practice** refers to distributing the learning over time - in other words, not cramming. The authors cite a number of studies which found that time lags between learning episodes boost learning, despite the fact that people might initially forget more of the material between the individual sessions. So in this case the advice is simple. Start early and ensure that you revisit and review the material you have already revised.

Questioning and explanation

Eight other techniques were reviewed by the authors. Two related study methods which were found to work well were **elaborative interrogation** and **self explanation**. **Elaborative interrogation** is a complex name for a simple concept - asking yourself why something is the way it is or a particular concept or fact is true, and providing the answer. **Self-explanation** refers to a similar process, where the explanation might take the form of answering why but also other questions, as well as relating new information to information which is already known. The authors concluded that more research is needed in relation to both of these techniques, but that they offer promising directions in terms of strategies for effective learning.

Another method which the authors looked at is called **interleaved practice**. This refers to studying different topics or problem types within a single study session. So, is this a good idea, or is blocking the type of study that you do or types of questions you address within a single session more effective? Dunlosky and colleagues concluded that results of studies have been mixed. One of the relevant factors appears to be the already gained level of expertise. If you are just starting out with a

particular type of problem, blocking might provide you with the space to get to grips with a particular topic. Interleaving different topics, questions or problems might subsequently provide you with more integrated practice to boost learning in the later stages.

Other learning methods

The other techniques which the authors looked at included:

- Producing summaries of texts;
- Highlighting and underlining portions of text;
- Using keywords and imagery to build associations within memory;
- And simply rereading the relevant materials.

The authors concluded that these learning methods tended to be less effective than the others, but it's worth digging deeper to examine precisely why. **Producing text summaries** is likely to involve the reading and comprehension of a text, as well as the ability to identify the most important information within it and to encapsulate it briefly in your own words. This requires a complex set of skills and the authors concluded that "it can be an effective learning strategy for learners who are already skilled at summarizing" (Dunlosky et al. 2013, p.18). Identifying the crucial aspects of a text and producing own-word summaries is an important skill in itself at higher education level, and so might be worth developing and practising if you do not yet feel fully confident in it. **Summarising** might also form the first stage of a learning process, with other techniques such as **self-testing** and **self-explanation** used subsequently for review purposes.

Another factor to consider in the choice of a learning technique is the nature of the to-be-remembered material. The advantages for the use of **imagery** for both vocabulary learning (termed '**keywords mnemonics**' by the authors) and text memorisation were found, unsurprisingly, to be constrained to highly visual material which might naturally lend itself to these methods.

Highlighting/underlining portions of texts, as well as **rereading** also received low utility ratings from the authors. The authors found that **highlighting** tended to work better for students who were more adept at identifying the crucial to-be-remembered aspects of a text. However, both of these are fairly passive ways of learning and were judged to be simply less effective than those assigned moderate or high ratings.

So, where does this leave us? What conclusions should we draw and, more importantly, what learning and revision techniques should we actually use? As you can see, the situation isn't entirely clear, but trends and insights are emerging. It's important to consider yourself, including your strengths, weaknesses and preferences, the time that you have available, the nature of the to-be-learned material and any other relevant circumstances before deciding on a learning strategy. The authors of this study examined the techniques in isolation, but there is nothing stopping you combining a number of them within your learning. The benefits of spacing out your studies in time and utilising self-testing do not appear to be in doubt - so ensure that you take note of these. Good luck!

Reference and further sources

The study:

Dunlosky, J., Rawson, K.A., Marsh, E.J., Nathan, M.J., and Willingham, D.T. (2013) Improving Students' Learning With Effective Learning Techniques: Promising Directions From Cognitive and Educational Psychology, *Psychological Science in the Public Interest*, **14**(1), pp.4-58

available from <http://psi.sagepub.com/content/14/1/4.full.pdf+html>

Scientific American Mind article based on the study:

Dunlosky, J., Rawson, K.A., Marsh, E.J., Nathan, M.J., and Willingham, D.T. (2013) Psychologists identify the best ways to study: what works, what doesn't, *Scientific American Mind*, **24**(4), pp.46-53
available from: <http://www.scientificamerican.com/article/psychologists-identify-best-ways-to-study/> (purchase required)

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