The Psychology of Effective Learning

Teaching and learning are interrelated – a successful examination outcome requires good materials, good teaching techniques and effective learning on the part of the exam candidate; but people learn in a variety of ways and have different learning preferences. This paper and the referenced reports highlight the most effective learning options.

Learning styles

The term learning styles refers to the concept that individuals differ in regard to what mode of instruction or study is most effective for them. Whilst there are many different models of 'learning styles', they all basically include variations on these three modes:

- **Visual learners** have a preference for images, they 'think in pictures' and like visual aids that represent ideas such as graphs, charts, diagrams, symbols, etc.
- **Auditory learners** learn best through listening to lectures, discussions, tapes, etc.
- **Kinesthetic** or tactile learners prefer to learn via experience – moving, touching, and doing things to 'build experience'.

These styles are overlaid with a person's preference for learning in a social or solitary environment and how they absorb and process the information through reflection or other options to create a complex web of possibilities:

There is plenty of evidence that, if asked, people will express preferences about how they prefer information to be presented to them. There is also plentiful evidence arguing that people differ in the degree to which they have some fairly specific aptitudes for different kinds of thinking and for processing

different types of information. Derived from this starting point, the most common hypothesis about the instructional relevance of learning styles is the meshing hypothesis, according to which instruction is best provided in a format that matches the preferences of the learner.

However, there is very little evidence to suggest this 'meshing hypothesis' is valid. Whilst we try to include elements of all three styles in our courses, a person's preferred 'learning style' is not a measure of effective instructional design.

Learning techniques

Techniques are partly instructional design and partly student behaviour. However, unlike 'learning styles', there is a significant body of literature evaluating the effectiveness of learning techniques. From this large resource, the Dunlosky report examines ten of the most popular learning techniques to assess whether the technique's benefits generalise across four dimensions:

- learning conditions (e.g., studying alone vs. studying in a group),

- student qualities (e.g., age or ability),

- materials (e.g., scientific concepts, historical facts, mathematical problems), and

- the criterion tasks on which learning is measured (e.g., essay tests that require the transfer of learning, or multiple-choice tests).

The report's conclusions rate each technique from high to low utility on the basis of the evidence the author's amassed:

Comparison of Study Method Effectiveness
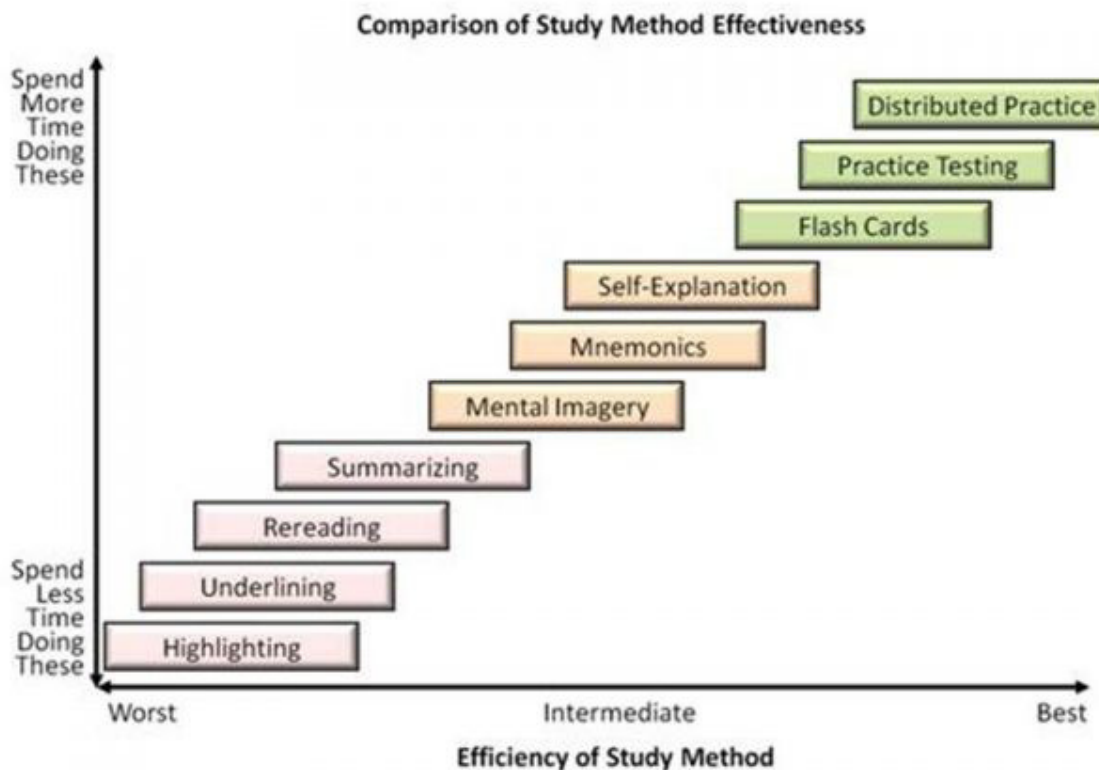
The least effective techniques

Highlighting, underlining, rereading and summarizing were all rated by the authors as being of 'low utility':

- **Highlighting and underlining** led the authors' list of ineffective learning strategies. Although they are common practices, studies show they offer no benefit beyond simply reading the text. Some research even indicates that highlighting can get in the way of learning because it draws attention to individual facts, which may hamper the process of making connections and drawing inferences.

- **The practice of rereading** is common (and to a degree essential) but it is much less effective than some of the better techniques you can use.

- **Summarising**, or writing down the main points contained in a text, can be helpful for those who are skilled in the practice, but again, there are far better ways to spend your study time.

More effective techniques

Techniques in the middle ground are better, but not especially effective and were rated of "moderate" to "low" utility by Dunlosky et al because either there isn't enough evidence to be able to recommend them or in other cases, the strategy has been shown to work in some situations but not in others. These include:

- **Mental imagery**, or coming up with pictures that help you remember text. This practice is time-consuming and only works with text that lends itself to images (eg, for McGregor's Theory X, Theory Y imagine a lazy person laying on the X axis of a chart)

- **Mnemonic**, using words, phrases or images to link more complex ideas. A mnemonic aims to translate information into a form that the brain can retain better than its original form; for example:
  - Learning the French word for key, la clef, by imagining a key on top of a cliff
  - Using the letters of a word to spell out the first letters of a process; SMART = Specific, Measurable, Achievable, Relevant, Time-framed (applied to objectives or delegations)
  - Using a phrase to remember a sequence. For example, to memorise the colours of the rainbow, use the phrase Richard Of York Gave Battle In Vain. Each of the initial letters matches the colours of the rainbow in order: Red, Orange, Yellow, Green, Blue, Indigo, Violet

- **Self-explanation** and elaborative interrogation were shown to be reasonably effective in experimental studies. Elaborative interrogation involves students ask themselves why the information they are reading is true, and self-explanation is where students explain some procedure or process to themselves. But, the effectiveness of the techniques depends on how complete and accurate your explanations are.

The Best

Learning strategies with the most evidence to support them, rated as having "high utility" by the authors, include distributed practice, and practice tests.

- **Distributed practice and interleaved practice**. This tactic involves spreading out your study sessions. Learning can occur quickly under massed-practice conditions and is an efficient way to teach, but hundreds of studies have shown that distributed practice leads to more durable learning. Certainly, cramming information at the last minute may allow you to get through a test, but the

material will quickly disappear from memory. It's much more effective to dip into the material at intervals over time and mix up different types of problems and learning. This is core to our course design – topics are taught in blocks (unavoidable for intensive courses) but each test and revision element always covers a range of subjects covered to 'this point'. Interleaved practice (in which bouts of study for one topic are interleaved among study for other topics), seems promising in some situations but lacked the general utility of distributed practice and retrieval practice via testing.

- **Testing** – but not for a grade. Research shows that the act of recalling information strengthens that knowledge and aids in future retrieval. Again, practice testing is central to our course design and there is robust evidence supporting its value![1]
- **Flash cards** are a good option for implementing distributed learning and testing.

So, in summary, the authors recommend you spread out your learning, ditch your highlighter and get busy with your tests and flash cards. And you do need to practice!

We all know we have to practice a skill to get better at it, but the improvement we're aware of making is only part of what's going on. Well past the point when we think we've 'got it', continued practice allows our brain and our muscles to become more accurate and efficient in carrying out the task, using less energy to do so. As decathlete Daley Thompson said, "An amateur practices until they get it right, a professional practices until they cannot get it wrong!" And lastly, the easiest way of all to improve implicit learning is sleep. Research has shown that during sleep, the brain identifies meaningful patterns in our memories from the preceding day and makes them stronger and more permanent.

A final thought: studies from 1901 onwards have shown that learning is context specific. Practicing memorizing one type of material (eg, lists of words) may improve performance on memorizing similar lists (the phenomenon of learning to learn), but the benefits of such practice will not generalise to learning other materials. If you want to study for a multi-choice project management exam, your training and study need to be focused on that challenge. For more thoughts and ideas on learning visit our page focused on the art of learning.

Referenced reports

Improving Students' Learning With Effective Learning Techniques: Promising Directions From Cognitive and Educational Psychology. A report published on the 9th January 2014 by the Association for Psychological Science, written by Professors John Dunlosky, Katherine Rawson, Elizabeth Marsh, Mitchell J. Nathan and Daniel Willingham, suggest most of what we do in our courses aids effective learning: https://www.psychologicalscience.org/publications/journals/pspi/learning-techniques.html

Learning Styles Concepts and Evidence. By Harold Pashler, Mark McDaniel, Doug Rohrer and Robert Bjork. See: https://journals.sagepub.com/doi/full/10.1111/j.1539-6053.2009.01038.x

Improving Students' Learning With Effective Learning Techniques: Promising Directions From Cognitive and Educational Psychology. John Dunlosky, Katherine A. Rawson, Elizabeth J. Marsh, Mitchell J. Nathan and Daniel T. Willingham: https://journals.sagepub.com/doi/abs/10.1177/1529100612453266

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[1]   See more on ***the value of questions in the learning process***:
https://mosaicprojects.com.au/Mag_Articles/P029_PMP_Questions.pdf