

Strategies for Improving Memory in Students

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Different models of memory have evolved with the concepts of sensory memory, short-term/working memory, and long-term memory. How information is passed from one memory to the other, to be encoded, stored, and retrieved is nature's marvel. We believe that the students can utilize their understanding of memory processes to avoid forgetting and improve memory. In the following text, we have enlisted 13 possible reasons of forgetting, and given some strategies that can help overcome them to improve memory.

1. Lack of effort or intention: Effort refers to ascertaining what one must do to remember and then doing the same, whereas intention means deliberately choosing to remember. Remembering is a direct product of the amount of effort exerted and the intention to remember.¹

Strategies: Teachers should tell their students what they should remember, and students should also tell themselves what they should remember. For meaningful learning to occur, the learner must actively engage in cognitive processing rather than passively receiving or storing information.²

2. Inattention: Memories are formed as the residue of the thought principle, implying that the more you think about something, the more likely you are to remember it. We tend to remember not every fleeting thought, but only those to which we devote some attention. So, you cannot remember things you have not paid sustained attention to in working memory. Inattention or partial attention also causes inaccurate encoding of memory.³

Strategies: Think about what you want to remember, and pay full attention to it. One way to ensure attentiveness is by writing out and elaborating on the main ideas after reading a textbook chapter. Drawing a hierarchy or a flow diagram can also help attention by relating the ideas to one another.

3. Encoding failure: Sometimes, even though we paid attention, we still fail to remember. This is because the information never made it to storage in long-term memory.

Strategies: Associate information to the meaningful purpose (also known as an elaborative rehearsal) as a mere repetition of a verbal-auditory stimulus is inadequate for transition into long-term memory. Connections are made by integrating new data into existing schemas of stored information (consolidation). More the associations, the better the chance of storage in long-term memory.⁴

To relate what one is familiar with to what one wants to learn is by activating prior knowledge that increases recall.⁵ This can be done by various stimulating methods like pre-reading group discussion, reading about familiar topics and experimenting, etc.

The Know-Want-Learned (KWL) strategy based on active learning can be used.⁶ The steps are identifying: Know (what we already know), Want (what we want to learn), and Learned (what we have learned).

Yet another way of better encoding is by using concept maps. They help in identifying how the key components are related to each other. Some forms of concept maps are flow charts, tree diagrams, Venn diagrams, and context diagrams.⁷

Interestingly, recall can also be increased by adding emotional connections to the content, as the amygdala (the brain's emotional processing center) greatly influences memory.

4. Disuse: Any information not used for a long time fades from the memory. Decay theory claims that memory traces are not displaced but gradually disappear unless something is done to keep them intact.⁸

Strategies: Rehearsal keeps the information in the memory (maintenance rehearsal). Thus, decay can be prevented by regular use/practice & recall/revision.

5. Retrieval failure: In this case, the memory does not disappear but becomes hard to reach. The information may be stored away in the mind but the right "cue" for the recall is missing. Cues are small chunks of information that are required to initiate the retrieval of a memory. Memories may be inaccessible due to the poor quality or ambiguity of the cues (not offering enough/right detail).

Strategies: Learning the material using one's own words assigns better cues. Understanding and recall are significantly increased when one puts something completely and accurately in one's own words. Note-taking, summarizing, and explaining to oneself are some efficient strategies.⁹ The right cue can bring back a memory one considered lost. The relationship between the cue and memory should be meaningful, creative, and distinctive. Using mnemonics, acrostics, acronyms, and imagery helps. Studies show that students find mnemonics as an easier, faster, and more enjoyable way of learning than rote rehearsal.⁹

6. Information overload: Too much information can be overwhelming and may be confusing. Moreover, some to-be-remembered material hinders the learning of other to-be-remembered material due to similarity. This may be due to similar cues, and therefore ambiguity.⁸

Strategies: Chunking is the most effective strategy for learning a large amount of

information. To avoid confusion, distinguish using logic, make note of the similarities and differences, and identify patterns. Marking/highlighting can be of use if the information to be marked is actively processed by thinking about the meaning, activating prior knowledge, and then selecting information. All these steps help in strengthening the encoding process so that the information is better stored.⁹

7. Interference: Learned material may interfere with the recall of previously learned material. Interference theory attributes forgetting to a single cue leading to more than one memory. Interference is the most common cause of forgetting in short-term memory, whereas it also affects material in long-term memory, leading to memory distortion.⁸

Strategies: The material should be learned in a structured manner, with proper cues. All material to be remembered must be regularly refreshed in the mind by reviewing and reediting. Before an assessment, one must make time for revision.

8. Under learning: A common reason for forgetting is, the belief that learning is complete whereas it is not. Learning is a time-taking process that requires repetition for information to move from short-term to long-term memory. If the steps necessary for this process are not taken, one has under-learned the material, and forgetting is expected.⁸

Strategies: Overlearning - studying until one knows the material and then continuing to study; "A good rule of thumb is to put in another 20 percent of the time it took to master the material". Frequent testing also helps in remembering the material.³ Practice tests relevant to the information being studied improve overall learning for an actual test.⁴ The act of retrieval of information changes its representation in memory such that it becomes more recallable in the future.¹⁰ One must not rely on feelings to gauge learning, but instead repeatedly quiz and test oneself. Explaining to

another person, ideally, one who can ask follow-up questions is a much better metric for learning.

9. Trying to cram in a short time: The distribution of study sessions over time (memory rehearsal) affects the consolidation of information in long-term memory.³ Memory formation is better when learning occurs in multiple sessions that are spaced over time (distributed practice) as compared to when learning occurs in sessions crammed together in a short period (massed practice).

Strategies: To maximize long-term recall, use distributed practice with learning sessions spaced out ideally distributed over months, rather than days or weeks (the spacing effect). One reason may be that encoding context varies at each learning session. Moreover, using alternative cues can enrich and elaborate our information schemas, allowing for consolidation into more permanent memory systems.

Memory also depends on the depth of processing. If the learning focus is on the meaning of the new information (deep processing), it will be well-remembered, whereas if the focus is only on the superficial aspects (shallow processing), the information will be less well-remembered.¹¹

10. Mental overcrowding: Too much sensory input at the same time inhibits learning. It is not uncommon to experience poor learning and recall when one tries to study with music or television, talking in the background, or simultaneously worrying about personal issues, etc.⁸

Strategies: Study where it is quiet and is going to stay quiet until one is finished studying. Steer clear of distractions like mobile phones. It also helps in better memory formation if, when studying, one tries to put information in through multiple senses (heard/seen/spelled/acted out). When information enters memory through many paths, there are more ways to get the information out when it is needed.¹²

11. Low self-efficacy: Students who think

negatively or believe that they cannot remember are the ones most likely to forget.⁸

Strategies: One must believe one can remember before one can. It is important to reprogram one's mind with positive self-talk such as, "I will remember this," "I can learn this", and "I have a good memory." Furthermore, encouragement and motivation from teachers and peers also have a positive impact on learning.

12. Lack of a good night's sleep: Sleep deprivation can affect memory processes.

Strategies: REM-stage sleep after exposure to learning situations improves learning. It has been suggested that memory processes in the hippocampus are influenced by the production and integration of new cells into the neuronal network. Prolonged sleep deprivation seems to negatively affect such cell development. Thus, a good night's sleep, which includes plenty of REM-stage sleep, aids in memory consolidation.^{13,14}

13. Suggestion, misattribution and bias: Learning is affected by the influence of the environment, others' comments, the stressed, and the understated. One may be falsely prejudiced, and if things make sense based on previous experience, one may also make assumptions about what belongs in an event, group, or context. Both positive and negative biases can influence memory.¹

Strategies: Emphasize what you want to learn and stay focused. Give deliberate attention & time. Form associations and connections. Always question and explain the how and why of things. Hypothesize using "what if".

Conflict of interest:

All authors declared no conflict of interest.

References:

1. Schacter DL. The seven sins of memory - how the mind forgets and remembers. 1sted. London: Souvenir Press; 2007.
2. Wittrock MC. Generative processes of

- comprehension, educational psychologist. 1989; 24(4): 345-376. doi:10.1207/s15326985ep2404_2
3. Sharif S, Guirguis A, Fergus S, Schifano F. The use and impact of cognitive enhancers among university Students: A Systematic Review. *Brain Sci.* 2021; 11(3): 355. doi:10.3390/brainsci11030355
 4. Bruning RH, Schraw GJ, Norby MM. *Cognitive psychology and instruction* 5th ed. Boston, MA: Pearson; 2011.
 5. Van Blankenstein F, Dolmans D, Van der Vleuten C, Schmidt H. Relevant prior knowledge moderates the effect of elaboration during small group discussion on academic achievement. *Instructional Science.* 2012; 41(4): 729-744. doi: 10.1007/s11251-012-9252-3
 6. Ogle DM. KWL: A teaching model that develops active reading of expository text. *The reading teacher.* 1986; 39(6): 564-570. doi:10.1598/RT.39.6.11
 7. Blunt J, Karpicke J. Learning with retrieval-based concept mapping. *J. Educ. Psychol.* 2014; 106(3): 849-858. doi: 10.1037/a0035934
 8. Mwesigye N. TEACHERS PLATFORM: Why do students forget what we teach them? *The New Times.* 2015. Available from: <https://www.newtimes.co.rw/section/read/187219>. Accessed on Sep, 2022
 9. Dunlosky J, Rawson K, Marsh E, Nathan M, Willingham D. Improving students' learning with effective learning techniques. *Psychological Science in the Public Interest.* 2013; 14(1): 4-58. doi:10.1177/1529100612453266.
 10. Jongeward RH, Woodward AE, Bjork RA. The relative roles of input and output mechanisms in directed forgetting. *Mem Cognit.* 1975; 3(1): 51-57. doi:10.3758/BF03198210.
 11. Bruning RH, Schraw GJ, Norby MM, Ronning R. *Cognitive psychology and instruction.* 4th ed. Upper Saddle River, New Jersey: Pearson Education; 2004.
 12. Clark J, Paivio A. Dual coding theory and education. *Educational Psychology Review.* 1991; 3(3): 149-210.
 13. Ellenbogen JM, Payne JD, Stickgold R. The role of sleep in declarative memory consolidation: passive, permissive, active or none? *Curr Opin Neurobiol.* 2006; 16(6): 716-722. doi:10.1016/j.conb.2006.10.006.
 14. Smith C. Sleep states, memory processes and synaptic plasticity. *Behav Brain Res.* 1996; 78(1):49-56. doi:10.1016/0166-4328(95)00218-9.

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