Active recall strategies for exam and test preparation

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ACTION

Context of project

Level 3 Year 2 Business students sit two mandatory three hour exams in January each year, with those grades making up 42% of the overall year 2 grade. The exams are closed book, although one exam does model an approach where students receive Part A (as case study) several weeks before the actual exam.

The volume of content for both exams, requires the students to learn theory of management principles, business techniques and situational analysis, simple legislative requirements and to also draw on, in one of the exams, two years worth of content from previous mandatory units.

The students this year have had disruption to their learning due to Covid, meaning that they have developed limited revision skills and often rely on passive revision.

The project looked at the use of active recall, as opposed to passive recall. The practical application of it, in a classroom setting, was put in place with students then asked, in interviews, to reflect on this technique.

What is active recall? **A method of studying where the student activates and strengthens the ability to recall information later on. Active recall reinforces the neural connections that represent the knowledge in the brain. Spacing repetition gives access to the information for a longer time. The more you recall, and space the repetition, the better you will remember.**

Students were asked to use **RAG** rating (already used and not new to them) to choose areas for focus by unit learning outcome for the two exam-based units. They then considered active recall strategies (with guidance) and applied those they feel most confident with.

After this work, the students then **RAG** rated themselves again, looking for areas which have developed and areas which require further work.

RAG rating was recorded before and after, as well as discussed with a number of students on an individual basis.

Adapted from the NTL Institute of Applied Behavioral Science Learning Pyramid
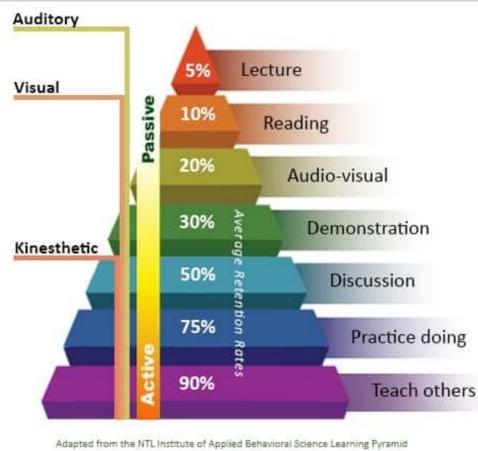
Students involved in the project

Two groups of Level 3 Year 2 Business students participated in the study, approximately 28 students. The three students interviewed had been present for the active recall sessions. Age range, 16 - 20 years old.

Primary Research

RAG ratings - using a pre planned lesson aide and structure with the recall tasks on, each student was provided with a paper copy and also then a **RAG** rating tool on Google Classroom using a Google Form. The students worked collectively as a group, guided through each question in turn.
The first question was answered, then the student would **RAG** rate themselves. They would then move onto the second and third questions, and again **RAG** rate themselves. After each question, the responses were discussed as a whole class. Students could take further notes and make corrections as they went along.
On the next page, question four was then a repeat of question one. Students then **RAG** rated themselves again. This continued for approximately one hour, following a similar format where students were reading, writing, discussing, reflecting, making further notes, and then being tested again.
The data was analysed from the Google Forms.

❑ **RAG** rating had taken place before in other work, so this was not a new concept to the students.

❑ A printed lesson aide with **RAG** rating on was used, along with a Google Form.

❑ Questions were repeated, as per the areas of focus for that revision task.

❑ No multiple choice questions were used.

❑ Class discussions took place, building on collective responses and encouraging collaboration and student directed teaching

❑ No use of online or paper based resources, for the purpose of answers questions.

❑ Mnemonics created as a class, as revision aids

Interviews - these were conducted on a 1:1 basis with three students who had completed the active recall **RAG** rating activities.

These consisted of questions around three areas;

One - school exams and strategies for revision before testing - this was relevant due to the ages of the students and that they had been in Year 11 during 2019/20 and had their exams impacted by Covid.
Two - participation in the active recall activities in class, and reflection of this process.
Three - strategies going forward and, on reflection, what else could have supported them.

Active recall methods to consider

❑ **Using flash cards**
❑ **Writing essays**
❑ **Group discussion**

❑ **Direct verbal questioning**
❑ **Self questions**
❑ **Writing notes from memory**

Primary research outcomes

Primary Research findings - 1:1 interviews

Student one - GCSE TAG's in 2020
Took some mini assessments at school, actively used flashcards as a recall and revision method previously.
POSITIVES of the active recall methods in class
+ More than one chance to practice and test yourself
+ Immediate improvement seen
+ Repetition process helped
NEGATIVES of the active recall methods in class
- Could have been fewer topics, so smaller active recall tests more often. Revise one topic, test, move on, come back and test again.
FUTURE USE
➔ Adopt this method from the start of the topic, rather than towards the end
Student two - GCSE TAG's in 2020
Small tests done pre Covid, no full mocks. No further exams or tests once lockdown started. Reading used as a revision tool.
POSITIVES of the active recall methods in class
+ Hints given in some multiple choice style questions
+ Classwide discussion and reflection between **RAG** rating
NEGATIVES of the active recall methods in class
- Prompt questions, with clues would have been useful for harder questions
FUTURE USE
➔ Adopt the method of discussing points between testing, as a whole group or small group.
Student three - GCSE TAG's in 2020
Full mock exams done pre Covid. Reading and some note taking. Some self testing, without discussing with peers.
POSITIVES of the active recall methods in class
+ Classwide discussion and reflection between **RAG** rating
+ Learnt ways to memorise points.
NEGATIVES of the active recall methods in class
- Starting earlier.
FUTURE USE
➔ Adopt these methods using a structure, so the specification rather than just passively reading.
➔ Discussions with others to help with recall.

Primary Research findings - RAG rating (two sets of two questions as a sample)
❑ 21% of responses moved from **RED** to **AMBER** in four questions
❑ 32% of responses moved from **AMBER** to **GREEN** in four questions
❑ 5% of responses moved from **RED** to **GREEN** in four questions
❑ 3% of responses didn't move from **RED** in four questions
❑ 19% of responses didn't move from **AMBER** in four questions

Primary Research findings - RAG rating (one set of two questions as a sample)
❑ 64% of responses moved from **AMBER** to **GREEN** in two questions
❑ 7% of responses didn't move from **GREEN** in two questions
❑ 29% of responses didn't move from **AMBER** in two questions

Secondary Research

"Studying followed by a test in which students wrote down everything they could remember led to better recall in a final assessment than being given an additional study opportunity".
Roediger HL and Karpicke JD (2006) Test-enhanced learning taking memory tests improves long-term retention. Psychological Science

"Use slides on a presentation, insert slides with short questions, either at the end or throughout".
Weinstein Y, Nunes LD and Karpicke JD (2016) On the placement of practice questions during study. Journal of Experimental Psychology

"Research investigated whether test-enhanced learning can be used to promote transfer. Subjects studied passages and then either repeatedly restudied or took tests on the material. One week later, they took a final test that had either the same questions, new questions within the same knowledge or new questions from different knowledge. Repeated testing produced superior retention and transfer on the final test relative to repeated studying".
Butler, A. C. (2010). Repeated testing produces superior transfer of learning relative to repeated studying. Journal of Experimental Psychology: Learning, Memory, and Cognition

"The deep-processing students, who commonly used multiple study methods, not only succeeded in the class but also had better recall. Students who relied on a memorization-heavy surface approach to learning had limited recall and tended to perform poorly in the class. These results strongly suggest that by encouraging students to integrate their studying by using multiple methods, educators can improve both student grades and recall of complex topics".
The influence of study methods and knowledge processing on academic success and long-term recall. Peter J. Ward, James J Walker.

Future actions as a result of project

❑ Sharing of strategies for active recall, which can be facilitated through Google Classroom
❑ Explore the creation of a knowledge planners, for whole units / exams, to support student the basis for active recall and formative testing throughout the learning, and up to the test.
❑ Include a variety of testing methods, to move beyond limited recall.
❑ Repeated testing
❑ Discourage passive recall, unless it can be demonstrated that the learner is progressing and is a visual learner.
❑ Embed questions for immediate recall in teaching slides, to ensure that testing is done throughout the teaching as well as at the end of topics / learning outcomes.
❑ Encompass class or group discussions around active recall testing, avoiding just solitary testing and supporting kinesthetic learning.
❑ Continue to encourage **RAG** rating