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(RESEARCH ARTICLE)

The cramming crisis

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Abstract

Despite record-high graduation rates, over 80% of Indian engineers are considered unemployable due to a 'cramming crisis' that prioritizes rote memorization over practical problem-solving.

While good grades are often equated to academic success, modern examinations frequently test only the ability to recall factual data, definitions, dates and formulas crammed the night before. This is done using point-to-point questions that don't let students think critically, out of the box or analytically.

This rote memorization learning method is detrimental for all future purposes; it imposes problems like knowledge encapsulation, a lack of critical thinking, and what value does acquired knowledge hold if students are unable to apply it in real-world situations? What is the purpose of rote memorization when the skill of recalling facts has already been replaced by the skill of critical thinking? What is the use of glueing useless data into your mind that would be forgotten within a day?

Let's answer all these questions and dive into the hidden side of this educational problem.

Keywords: Unemployable; Rote memorization; Crammed; Knowledge encapsulation; Critical thinking

1. Introduction

Exams are like meals for students; they are constant, and an average student spends weeks cramming facts, dates and formulas for exams, and as soon as the student takes a step out of the exam hall, 90% of all the data vanishes from their mind without a trace. Is this the best way to educate the millions of students sitting in classrooms around the world?

The preference for rote memorisation over core understanding is not just a national problem in India, but is actually faced worldwide. The cramming crisis emphasizes a change in modern education from conceptual understanding to simple rote memorisation, which is useful for basic learning like alphabets and multiplication tables, but not effective for long-term knowledge and as a substitute method of learning for conceptual subjects such as science and math. Cramming stores data in the short-term memory part of the brain to pass a test. This file-and-delete system doesn't involve critical thinking, ultimately leading to a lack of real-life applications. This paper examines the long-term effects of this parroting technique of education on students, the associated problems, such as a lack of real-life skills, and proposes some solutions or small steps that can be taken to address this issue.

2. Literature Review

Experts agree that both rote memorization and active learning serve different cognitive purposes. Rote memorisation is useful for fundamental learning, like the alphabet, multiplication tables, formulas and other basics; while active

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learning is best for deep understanding and application for complex topics and real-life problems. However, they also believe that active learning is significantly superior to rote memorization for long-term success, though rote memorization is considered a secondary "support" tool. As a Cambridge learner for 2-3 years, I have developed skills in being reflective, creative, curious, and innovative, which contrasts with the CBSE-based curriculum I tried a few years ago, which emphasized extensive factual data, making cramming a requirement. Evaluators in CBSE schools look for specific "keywords" from the textbooks and similar framed answers to those that have been written in notebooks, discouraging creativity and conceptual clarity. In contrast, examiners in IGCSE schools look for structured answers supported with reasoning, balanced arguments (pros and cons), and links between answers and data.

Let's gather some scientific evidence on why cramming fails. The Ebbinghaus forgetting curve is the exponential decline in memory retention over time. It shows that we forget our learnings more and more over time unless we review/repeat them. "Illustrating Ebbinghaus's forgetting curve, studies have shown that, without reinforcement, people tend to forget up to 90% of what they've learned within a month." (Athena Marousis, 2023)

But does our method of learning (rote memorisation or active Learning) affect this forgetting curve?

Yes, it affects the declining rate and long-term stability of the memory. Studies show that rote memorization leads to a steeper and faster decline in memory retention, as it doesn't link to previous learnings; it lacks meaning, and there it is, separated from all the other data in the brain, unsupported, and fragile connections/bonds between previous learnings, requiring frequent and immediate reviews to strengthen the memory. On the other hand, active learning includes a better understanding, leading to better links/connections between previous lessons and data in the brain, more hooks, ultimately leading to a shallower and slower memory retention rate. Distributed practice, quizzes, tests and regular revisions would help to retain the memory longer.

3. Methodology

I employed both primary and secondary methods for data collection. My primary research reveals that 80% of professionals express regret over cramming during their school years and criticize educational grading systems that emphasize memorization over analytical thinking. Furthermore, these professionals find little use for the facts or data they memorized, as their current roles primarily involve analysis and problem-solving. Additionally, secondary research shows that students in traditional, lecture-based courses (which often encourage rote learning) are 1.5 times more likely to fail than those in "active learning" environments.

I compared an IGCSE and a CBSE exam paper, and my research shows that the CBSE paper emphasized more factual answers and definitions, while the IGCSE exam paper focuses more on different command words like 'describe', 'explain', 'predict', 'evaluate', 'analyze' and many more, testing a student's ability to think critically and answer accordingly.

4. Analysis/Discussion

First of all, let's understand that rote memorization is not the solution to attaining knowledge for life; it only serves as a means to attain full marks on a test. We can refer to it as a short-term fix for exams, for instance, consider a student memorizes the Pythagoras theorem, which states that the sum of the squares of two sides of a right-angled triangle equals the square of the hypotenuse of that triangle, and without linking it to the real world memorizes the formula "a^2(side1) + b^2(side2) = c^2(hypotenuse)". Later on, the same student purchases a TV of 50 inches and wonders whether it would fit in a 40-inch-wide cabinet. This scenario highlights the concept of knowledge encapsulation, where the knowledge acquired in a classroom doesn't get out in the real world.

60% of professionals agree that modern curricula like IGCSE board, university-level courses, and IBL courses are successfully moving away from this traditional cramming crisis; however, as an IGCSE student myself, I find it quite helpful, as it encourages practical-based learning; for instance, a question in any normal Indian board (like CBSE) would be "What is Destructive Interference and how does it occur? "; in contrast, this question in any practical learning board (like IGCSE) exam would be framed similar to an application in reality like, "Describe how noise cancelling device works using destructive interference." In this question, students are required to think more deeply and critically to understand and explain how noise-cancelling headphones work. Cramming is not only bad for long-term knowledge retention and real-world application, but also for physical health; it puts too much pressure on the brain, causing stress and study burnout. The tendency to open the textbook and repeat definitions, dates and formulas until they stick in the brain the minute before an exam overworks the brain, increasing feelings of anxiety, frustration, fatigue and even confusion.

Additionally, have you ever experienced a mental block during an exam, unable to recall all the answers crammed the night before? Relax, it happens to all crammers; the problem is not in you, but in the method; it is simply inefficient, stressing out the brain too much, causing the mental block during the exam. Cramming has a higher chance of backfiring and potentially causing a student to score low marks.

5. Conclusion

We can conclude that rote memorization has its own benefits, such as fundamental learning, but in the long run, active learning outperforms it due to its memory retention, real-world application, and critical thinking and analytical skills. Now, we have understood the working and effects of both learning methods, but discussion, understanding and awareness are not enough; how do we find a solution to this problem? Let's make a call to change. Should schools change their tests, use spaced repetition or encourage self-study under supervision? In my opinion, schools should move away from the copy-pasting method of learning, and teachers ought to encourage self-writing, implementing active learning workshops in which students are forced to think critically and apply themselves in real-life situations, use command words in exams to encourage critical thinking, and minimize the emphasis on factual information that is completely irrelevant and does not contribute to future scope. Spreading awareness and taking small actions will effectively address this problem. Our small actions will help students study more efficiently through effective learning techniques, resulting in better student health and stronger future job prospects. Every student should study smartly and not try to win in a blind race.

Compliance with ethical standards

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The authors have declared that no competing interests exist.

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