

Do analogies simplify physiology? A student perception

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Abstract

Purpose: Analogy are visually similar images that can help medical students integrate novel information with prior facts to enhance comprehension and strengthen inferences. The current study explores the student feedback regarding using analogies in teaching physiology.

Methodology: During didactic lectures in Physiology a series of analogies were presented in 2 systems that is cardiovascular system including autonomic nervous system and gastro intestinal physiology. Anonymous feedback was collected form the first year MBBS students regarding the significance of the analogies utilized as educational aid during the didactic lectures.

Results: 95.9% of the medical students reported that analogies played a crucial role in explaining the concepts. 90.7% of the respondents believed that using analogies in understanding the physiological concepts. 92.3% of the respondents felt that analogies enhanced the student-teacher interaction in the didactic lectures.

Conclusion: In conclusion, the use of analogies incites student's interest in learning physiology and deepens their understanding of the concepts.

Keywords: Analogy, Didactic lectures, Physiology

Introduction

Analogies are critical tools which enhance reasoning, resolve problems and arguments which are extensively used in medical education. With reference to mapping hypothesis, an analogy is "Mapping of information from one area (the source) over the similar superficial structural resemblance of another area" (Narayanan et al., 2018).

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There is a quote which says, "One good analogy is worth three hours discussions". Analogies focus on structural alignment and mapping amongst domains. The mentioned cognitive process can be tapped to craft inferences and acquire novel abstractions. Through analogies, we try to explain a knowledge to be achieved (the target), with pieces of information already familiar to the learner (the source), keeping in mind the constraints of similarity, structure and purpose. Analogies and metaphors are meant for understanding concepts easily. Basically, analogies strengthen the process of understanding novel concepts by comparing it to an acquainted construct. They aid a student in learning an abstract material by relating to common day to day experiences and facts. Analogies has been used previously for a long time as a teaching strategy. The characteristic similarities between the analogy and



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structure/concept are significant in identifying, categorisation and classification which contributes to learning along with memorisation. Good Analogies can be made a part of medical nomenclature. Great care is required in developing an analogy to ensure that it is understood as intended and that misconceptions are minimized. When use of a simple analogy is not enough to explain and understand a complex concept, multiple analogies can be used so that misconceptions are avoided in the process of acquiring advanced knowledge. The selection of analogies varies depending on cultural environment. Thus, literature on learning by analogies requires research on various cultural backgrounds and different set-up to authenticate adequate validation and figure out the role of analogies in medical education. Research on learning by analogies in India and literature on novel analogies in teaching physiology is scarce.

Hence the authors decided to explore how the 1st year MBBS students perceive the usage of analogies during Physiology didactic lecture.

Methodology

The study participants belong to the batch of 1st year MBBS students of year 2020-2021. The use of given analogies (table 1) was used during didactic lectures was implemented and feedback was taken from the batch of 1st year medical students (Year 2020-21) in. The duration of didactic lecture was 1 hour. Various analogies were used during didactic lecture in GIT module, cardiovascular system including autonomic nervous system and shock to explain the concepts to the students. Students' feedback to usage of analogies and understanding of concepts by using match the following was collected via Google forms.

Table1: Analogies Used and Concept Taught

Analogies used	Concept taught
Balloon (inflated and deflated)	Hypovolemic shock
Car accelerator and brake	Autonomic nervous system (Sympathetic Nervous System and Parasympathetic Nervous System)
Tooth paste	Peristalsis
Pearl necklace	Segmentation
Preparing dinner for guests	Phases of gastric acid secretion
Blocked tube	Obstructive shock

Results

A total number of 193 students participated in the student feedback collection via forms with informed consent incorporated in it about analogies used during didactic lecture in G.I.T module. 185 (95.9%) students are of the opinion that analogies were necessary to explain the concepts. 175 (90.7%) think that analogies helped them to understand the concept better. 178 (92.3%) responded that analogies used promoted instructor student interaction during the didactic lecture. 158 (82 %) were able to match

the analogies with concept correctly after 15-21 days of the class.

Discussion

A first professional MBBS student will be exposed to the complex medical nomenclature for the first time. Another issue faced by the new students is that they are exposed to many new complex concepts within a short span of time and hence it is hard to remember them. The present study focuses on the feedback of students in understanding analogies in physiology among first-year MBBS undergraduates in didactic

lecture classroom, set-up. According to our study analogies made complex concepts simpler for students to understand. Majority of students believed that analogies are required to understand the concepts better. In medical education analogies are used to simplify microscopic pictures, physiological concepts especially using catchphrases (Pena *et al.*, 2010). 92.3% of the students felt that analogies used promoted instructor student interaction during the didactic lecture. Using analogies in teaching fosters deeper understanding and said to lower anxiety in both students and teachers (Brown *et al.*, 2010). In the post test which followed the didactic lectures students were able to retain information. The previous literature reports use of analogies can increase the retention of the subject knowledge by students (Sundrud *et al.*, 2009). Our study reports that learning with analogies aids the students to build their knowledge in vital and clinically relevant domains. This also could be demonstrated in improved performance in the tests provided later. Largely the usage of analogies in physiology didactic lectures was well received by the medical students.

Conclusion

These findings highlight the importance of incorporating analogies into medical education, not only to improve conceptual clarity but also to enhance long-term retention and student engagement. Overall, the positive response to analogies suggests that they are a valuable pedagogical tool in medical teaching.

Limitations

We did not explore the students' perceptions through any of the qualitative method like focus group discussion or in-depth interview.

Compliance with ethical standards

Funding: This study is a self – funded project.

Conflict of interest: The authors declare no conflict of interest.

Informed Consent: The volunteering students gave informed consent for participating in the study.

The study was approved by Institutional ethics committee

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