Reverse Flipped classroom and Pharmacology theater – mix of innovative pedagogies for Autonomic pharmacology lecture series

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Introduction

An in-depth understanding of pharmacological concepts form the basis of strong pharmacotherapy skills. Undergraduate students find it one of the most difficult subjects (1). Autonomic nervous system (ANS) pharmacology is a topic taught in the introductory module of the undergraduate MBBS program at The Aga Khan University, Pakistan.

These concepts are usually taught didactically (2) with limited opportunity to conceptual correlation. Different pedagogical strategies such as team-based learning (3), use of open-access, web-based interactive software (2) and flipped classroom (FCR) (4) methods (5) have shown better learning outcomes in pharmacology teaching.

Since ANS is a topic which initially requires factual learning along with integration of concepts with therapeutics. We aimed to design a mix of innovative teaching strategies to achieve better learning outcomes including two new pedagogical innovations, which we named as "**reverse-flipped classroom"** and **"learning pharmacology through theatrics"**.

Objective

To determine the effectiveness of teaching ANS pharmacology using reverse FCR and theatrics in pharmacology.

To evaluate the perception of learners of learning, retention, application and correlation of autonomic pharmacology using reverse FCR followed by case-based presentations (CBP) and theatrics.

Methods

Reverse FCR was used for "Cholinergic agonist and antagonist" (fig. 1A). It was a reverse flip because rather than teaching content online it was taught in class (Cholinergic agonist) and then recorded presentation was used to teach new concept (Cholinergic antagonist) as flip, followed by Case-based presentations (CBP) (fig 1B).

After LCF on "Adrenergic agonists and antagonist" a theater activity was designed to consolidate the concepts. Learners were encouraged to be creative and reflect the concepts into characters as life situations associate and generalize the concepts.

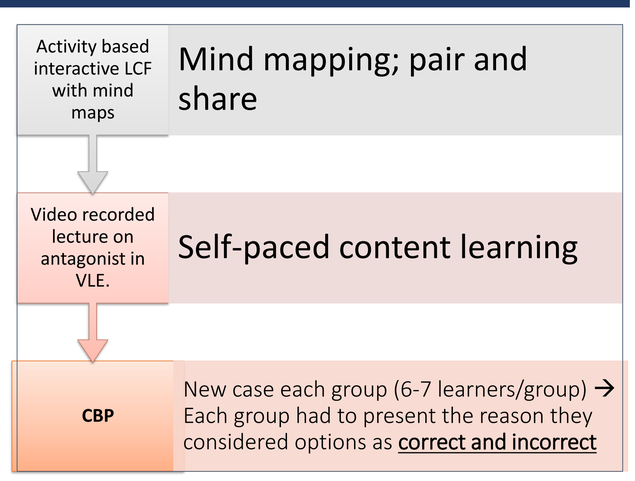

Figure 1 (A-B): Reverse FCR strategy (A). Difference of Traditional classroom (TC) and FCR versus Reverse FCR.

Results

- Active and happy learning https://tinyurl.com/reverseFCR
- Effective Consolidation of concepts
- Ability to rationalize the case as evident by students confidently presenting their cases (fig.3)
- Students' perception of their learning enhancement (fig. 4).

Figure 3: Case-based presentation

Results

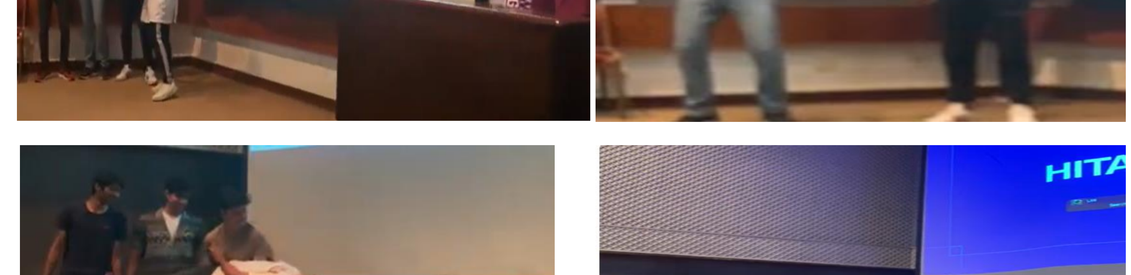

Figure 4: Feedback on CBP in Reverse FCR session

For session using theatrics, learners were asked to generalize the concepts into their daily lives. The innovative and creative ideas reflected in their performances. Highlighted concepts included norepinephrine versus epinephrine and their effect. A sample video could be viewed at the following link: https://youtu.be/KA7d4I2m4r8.

Fig 5 and 6 show learners' creative application of adrenergic agonists. They perform as epinephrine in anaphylactic shock, and response in lungs, heart and blood vessels (fig 5) and in heart failure (that started with a break-up)

Fig. 5: Using theatrics to generalize and correlate role epinephrine in **anaphylactic shock:** The response to epinephrine in anaphylactic shock to all the organs was beautifully correlated with receptors and responses.
Video link: https://tinyurl.com/mtw4e8na.

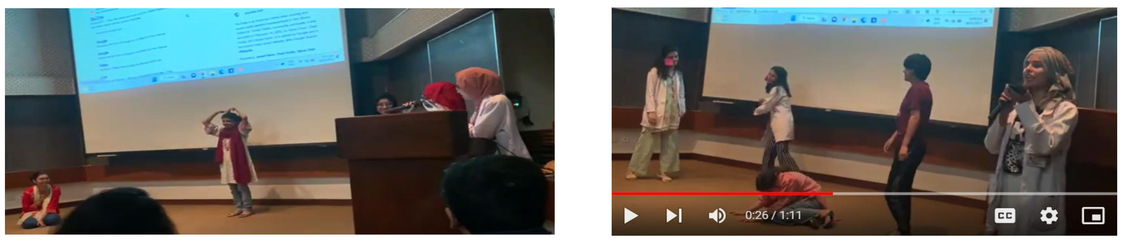

Figure 6: Theatrics by a group reflecting epinephrine's effect to pump heart due to beta 1 receptors

Conclusion

- ❑ These pedagogies are helpful in effective learning and in correlation, generalization and application of the concepts.
- ❑ Reverse FCR is suitable for topics in which prior knowledge is important for learners to engage.
- ❑ In our future study, measurement of learning outcomes will be included.

References

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