SHORT COMMUNICATIONS

Minor tweaks to tutorial presentation improved students' perceptions of our mass tutorial

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Abstract

Introduction: In the first weeks of medical school, students learn fundamental cell biology in a series of lectures taught by five lecturers, followed by a mass tutorial session. In this exploratory study, we examined students' perceptions of the mass tutorial session over two academic years to find out if they viewed the tutorials differently after minor tweaks were introduced.

Methods: Reflective questions were posted to the undergraduate Year 1 Medical students at the end of each mass tutorial session in 2019 and 2020. Content analysis was conducted on students' anonymous responses, using each response as the unit of analysis. The responses were categorised under the learning objectives, with responses coded under multiple categories where appropriate. The distribution of the counts from responses in 2019 and 2020 was compared, and the tutorial slides used over the two years were reviewed in conjunction with students' perceptions to identify changes.

Results: In 2019, we collected 122 responses which coded into 127 unique counts, while in 2020, 119 responses coded into 143 unique counts. Compared to 2019, we noted increases in the percentage of counts under "Link concepts" and "Apply knowledge", with concomitant decreases in percentage of counts in "Recall contents". We also found that the 2020 tutorial contained additional slides, including a summary slide and lecture slides in their explanations of answers to the tutorial questions.

Conclusion: Minor tweaks in the tutorial presentation could improve students' perceptions of our mass tutorials.

Keywords: *Mass Tutorials, Students' Reflections, Apply Knowledge, Link Concepts, Minor Tweaks*

I. INTRODUCTION

In the first few weeks of medical school, students learn about cell biology which is fundamental to what they need to know about tissues, organs, and the whole body in a series of lectures co-taught by five lecturers. In the lectures, efforts are made to highlight basic cellular processes, and illustrate how these are inter-connected in a cell. Where appropriate, how knowledge in the biomedical sciences underpins applications in clinical settings is also illustrated by the lecturers. At the end of the series of lectures, the lecturers will co-facilitate a mass tutorial session aimed at summing up the topics.

The mass tutorial session has several learning objectives. These include basic levels of learning such as recalling concepts, preparing for assessments, and building knowledge on topics, to higher levels of learning such as applying concepts to solve real life problems, and linking concepts between topics. Being the only teaching and learning activity that all lecturers co-teach, the mass tutorial provides the best opportunity to demonstrate links and apply the consolidated knowledge learnt during the different lectures.

Once the teaching and learning activities are completed, the coordinator of the lectures Foong May Yeong (YFM) reviews the curriculum to ensure that the teaching and learning activities delivered the intended learning objectives. Such reviews include students' experiences of the curriculum (Erickson et al., 2008), which the coordinator (YFM) routinely collect through posting reflective questions at the end of the tutorial. In this exploratory study, we analysed students' reflections from 2019 and 2020, and categorised them under different learning objectives of the tutorial. We noted an increase in percentage counts under "Apply knowledge" and "Link concepts" in 2020 compared to 2019. A review of the tutorial slides revealed the addition of

summary and lecture slides in 2020. Our results suggest that minor tweaks to the tutorial presentation are sufficient to help students see the intended usefulness and relevance of tutorials.

II. METHODS

A. Format of Mass Tutorials

The mass tutorial was conducted after completion of the cell lectures. For 2019, this was a face-to-face session. For 2020, due to the COVID-19 pandemic, the tutorial was conducted online via Microsoft Teams. The class size was 281 for 2019, and 280 for 2020. Four out of five lecturers taught the same topics for both years. For both years, during the mass tutorial, each lecturer used Poll Everywhere to pose a mix of five to six recall and application questions linked to their topic. Identical questions were used in 2019 and 2020. Students discussed among themselves before answering these questions. The class responses were then revealed, after which the lecturer explained the solutions to their questions. The cycle was repeated until all the lecturers completed their parts.

B. Collection of Student Reflections

After each tutorial, the coordinator (YFM) posted two reflection questions on Poll Everywhere. The two questions were: 1. "What were the key points you learned in this session?", 2. "Any questions?". Answering these reflection questions were voluntary and anonymous. A waiver of informed consent was approved by Yong Loo Lin School of Medicine Medical Sciences Departmental Ethics Review Committee. The responses to question 1 obtained from students in 2019 and 2020 were analysed in this study.

C. Content Analysis

The responses to question 1 were coded and categorized into the different learning objectives of the mass tutorial, using each response as a unit of analysis. Each response could be coded into multiple categories when appropriate. The counts under each category were represented as a percentage of all counts coded from the responses. The tutorial slides used in 2019 and 2020 were also reviewed to understand students' perceptions.

III. RESULTS

In 2019, we collected 122 responses which were coded into 127 unique counts. In 2020, we collected 119 responses which were coded into 143 unique counts. The number of responses and unique counts coded were largely similar between the two years. The unique counts were categorised into the five learning objectives and their percentage counts were presented in Figure 1. Supplemental data containing an overview of the categories and samples of students' responses, as well as the counts under each category, are openly available in Tables 1 and 2 shared at Figshare at http://doi. org/10. 6084/m9.figshare.20484498 (Lee & Yeong, 2022). The distribution of the counts differed between the two years. In 2019, majority of the counts were categorized to "Recall contents" (37.0%), with low numbers categorized as "Apply knowledge" and "Link concepts" (15.0% and 3.1% respectively). In comparison, in 2020, we observed a decrease in percentage of counts in "Recall contents" (to 21.0%), with an increased percentage in counts in "Apply knowledge" and "Link concepts" (to 22.4% and 15.4% respectively). Overall, there is a shift in distribution of counts, from a skewed distribution in 2019, to an even distribution in 2020.
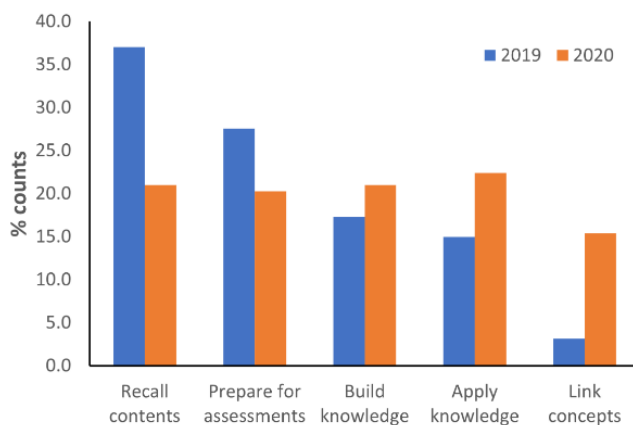

Figure 1. Categorisation of students' responses into the learning objectives

Given that tutorial questions used in the two years were largely identical, we reviewed the tutorial slides used in these two years to look for possible differences. In 2020,

firstly, a summary slide detailing the different aspects of the cell was added to the start of the tutorial slides. Secondly, lecture slides were included in the tutorial

slides to explain the answers to the tutorial questions. The lecture slides could come from the lecturer teaching the topic of interest, or from other lecturers if connections across topics were important. These additions could have altered students' perceptions of the mass tutorial session in 2020.

IV. DISCUSSION

In this study, we examined students' reflections collected across two academic years to understand their perceptions of the mass tutorial sessions that capped the teaching of cell biology. One of the intentions of the lecturers when designing the tutorial questions was to demonstrate links across topics, and illustrate how questions can be solved using connections across topics. The decrease in percentage of counts under "Recall contents" in 2020 suggested an increase in students' awareness of the usefulness and relevance of the tutorial sessions when minor changes were made in the presentation of the overview of the cell biology topic and the answers to the tutorial questions.

Both lecture and summary slides likely promoted links in different ways. The lecture slides represent theoretical knowledge for each topic, and also add visuals to the explanations of tutorial questions. Inclusion of lecture slides allow students to use both visual and audio channels to process the explanations, instead of using only the audio channel to listen to explanations when they were delivered verbally without visuals (Mayer, 2014). Using both channels could lower the cognitive load for students to learn and construct meaningful frameworks to solve problems. Summary slides juxtaposed different topics within a slide, allowing students to visualize connections between topics in the proper functioning of a cell (Bae & Watson, 2014). Adding these slides require little effort from the lecturers as the slides are readily available. Such small changes in improving the instructional approach could result in improvements in student learning (Lang, 2016).

There are several limitations to our study. Firstly, we only reviewed the tutorial slides, which covers part of the enacted curriculum. Secondly, the tutorial in 2019 was conducted face-to-face while the one in 2020 was conducted online. Online learning normally is not something students view positively, hence the improvements in student perceptions was surprising. Students prefer the social aspects of learning, which is abundant in face-to-face learning but greatly diminished in online learning (Siah et al., 2022). However, the diminished opportunities for peer-learning in online environment might contribute to increased attention diverted to lecturers for explanations.

V. CONCLUSION

Surveying and analysing students' reflections at the end of mass tutorial proved to be informative in evaluating and improving our tutorials. In our preliminary analysis, a change in students' perceptions of the tutorial from recalling of concepts to application of knowledge and linking concepts corresponded to minor tweaks in our tutorial presentation slides. Such minor tweaks, requiring little time, but yet are effective in helping students see the usefulness and relevance of tutorials, is an approach that even busy academics can do.

Notes on Contributors

Seow Chong Lee contributed to the analysis and interpretation of data, drafting and revising of the manuscript.

Foong May Yeong contributed to the conception and design of the study, interpretation of data, drafting and revising of the manuscript.

Ethical Approval

Ethics approval was obtained from Yong Loo Lin School of Medicine Medical Sciences Departmental Ethics Review Committee (Reference code: MSDERC-2022-006).

Data Availability

An overview of the categorization of responses into categories and samples of students' responses, as well as the counts under each category are openly available in Figshare at

https://doi.org/10.6084/m9.figshare.20484498.

Funding

This paper receives no funding from outside sources.

Declaration of Interest

The authors have no conflict of interest to declare.

References

Bae, J., & Watson, B. (2014). Toward a better understanding and application of the principles of visual communication. In W. Huang (Ed.), *Handbook of Human Centric Visualization* (pp. 179-201). Springer. https://doi.org/10.1007/978-1-4614-7485-2_7

Erickson, F., Bagrodia, R., Gook-Sather, A., Espinoza, M., Jurow, S., Shultz, J. J., & Spencer, J. (2008). Students' experience of school curriculum: the everyday circumstances of granting and withholding assent to learn. In F. M. Connelly, M. F. He, & J. Phillion. (Eds.), *The SAGE Handbook of Curriculum and Instruction* (pp. 198-218). https://doi.org/10.4135/9781412976572.n10

Lang, J. M. (2016). *Small Teaching: Everyday Lessons from the Science of Learning* (1st ed.). Jossey-Bass.

Lee, S. C., & Yeong, F. M. (2022). *Minor tweaks to tutorial presentation improved students' perceptions of our mass tutorial*. https://doi.org/10.6084/m9.figshare.20484498

Mayer, R. E. (2014). Multimedia instruction. In M. Spector, D. Merrill, J. Elen, & M. J. Bishop (Eds.), *Handbook of Research on Educational Communications and Technology* (pp. 385-399). https://doi.org/10.1007/978-1-4614-3185-5_31

Siah, C. R., Huang, C. M., Poon, Y. S. R., & Koh, S. S. (2022). Nursing students' perceptions of online learning and its impact on knowledge level. *Nurse Education Today*, *112*, Article 105327. https://doi.org/10.1016/j.nedt.2022.105327

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