Author’s response to reviews

Title: Comparison of the effectiveness of lectures based on problems and traditional lectures in physiology teaching in Sudan

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Responses to reviewers:

Maria Weurlander (Reviewer 1):

I lack some definitions and contextualization of the topic. For instance, the authors do not offer a definition of "effectiveness" with regards to the different types of lecture investigated. What is effective teaching? And what is effective learning?

• Definition of effectiveness and effective teaching and learning were added in the background as suggested

Neither do they elaborate on the use of lectures as one of several teaching and learning activities in medical education and the fact that students' own learning process or strategies influence their learning significantly.

Added to background

There are several differences between LBP and TL. What is actually contributing to the higher scores and satisfaction among students in the LBP setting? Could the use of quizzes be a kind of test-enhanced learning (see for example Larsen et al, 2008, Test-enhanced learning in medical education. Medical Education, 42: 959-966)? Or is it the problems that students discuss during the lectures that influence their learning and attitude? I would appreciate more discussions on these aspects in the paper.

The quizzes enhanced their learning. However, the satisfaction comes from the problems discussed, sense of being able to apply knowledge of basic science, sharing the answers with the whole class and giving feedback on the answers
I also suggest that the authors clarify what kind of knowledge the quizzes used in both settings focus on. Factual knowledge or comprehension or application? Is there a difference between the groups regarding kinds of knowledge? This could help clarify the results and explain more than just stating that the scores in the LBP setting were significantly higher.

- The kind of knowledge in the quizzes were clarified in the methodology as suggested.
- The quizzes tested some factual knowledge in addition to comprehension and explanation of some physiological concepts.
- No difference between the groups regarding the kinds of knowledge tested.

The authors do not describe any ethical aspects of the study. I think this should always be clarified in educational research. What relation do the authors have to the students? If the authors also were teachers, this should be clearly stated and also how issues of power and informed consent was managed in the study.

- Ethical aspects are clarified in the methodology as suggested.
- Two of the authors taught the students. However, a teacher assistant obtained the informed consent and collected the data using an anonymized questionnaire.

The results are described clearly and thoroughly. I appreciate that the results presented both in text and in tables. It makes it easy for the reader to get an overview of the results. However, I am not sure about the third column in table 1 (In both equally). What does that mean? Mean value? I am not sure what this information adds. Please explain or remove.

In both equally means the percentage of students who find no difference between the 2 types of lectures regarding a certain parameter. However, it is removed and replaced by the sentence {Almost 20% of students found no difference between the two lectures methods regarding parameters reported in table 1.} in page 12.

I also think that the figures (1-3) are not necessary since the same information is in table 1. These can be removed. The same can be said about figure 4 and 5 and table 2. Use the table or the figures. Both are not necessary.

Figure 1-5 were removed as suggested.

I think more can be discussed based on this study. The character of the knowledge assessed in the quizzes, and what could be contributing to the enhanced effect - the problems discussed or the testing. Or both.

Added to discussion.
Angelo Dante, PhD (Reviewer 2): The manuscript deals with the interesting topic of the comparison between lectures based on problems and traditional lectures in the physiology teaching in medical students. The study of the outcomes related to teaching methods alternative to the traditional lecturers is consistent with the international audience interests. However, manuscript shows some weaknesses that threaten the overall quality of the work.

To improve the manuscript, I suggest some revision that I hope you will consider.

Background

In the background section do not emerge if lectures based on problems are utilized in other international context and which outcomes have been reached. Furthermore, I suggest checking the consistency of the study aims with the sentences reported from line 29 to 34, page 8 (methods section). The study aims do not appear complete.

- To our knowledge, lectures based on problems is a novel teaching method that has not been used anywhere before. This is the first time to test the effectiveness of this method. Therefore, the background section did not emerge on it.

- The aim consistency with the method is checked and completed.

Methods

I suggest reporting method section in a structured way, declaring the study design, the inclusion and exclusion criteria, the year of the study, the efforts conducted to avoid measurement bias. Furthermore, it is important reporting the content of the measurement instruments. Finally, it is not clear what the two quizzes measure. Do they measure students' knowledge?

In my point of view the STROBE checklist could be useful to improve the quality of your report.

- Method section rewritten in a structured way making use of STROBE checklist.

- Effort done to avoid bias explained: participation will not affect their exam performance or grade, questionnaire and consent form were anonymous and were delivered by a teacher assistant not by the investigator.

- The measurement method used was the questionnaire and its contents were reported as suggested.

Results

To help the reader to comprehend the external validity of the study, I suggest reporting the participation rate. Furthermore, I suggest adding a column to the table 1 in which reporting the p-
values. Finally, it is useful reporting the average values and their standard deviation of the two compared quizzes (from line 25 to 37, page 11).

- The participation rate reported as suggested at the start of the results.
- P-value column is added in table 1 as suggested
- The average values and their standard deviation of the two compared quizzes are reported in table 3

Discussion

In my point of view discussion should be centred on the comparison between LBP and TL, that is the focus of this research, instead of compare LBP with PBL. Finally, I suggest highlighting the limits of this study that did are not discussed.

- The discussion is rewritten
- Limitation of the study is added