Reviewer’s report

Title: Learning with case-based worked examples: Comparing the effects of additionally providing self-explanations and making or studying concept maps on physiotherapy intervention knowledge

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Reviewer: Thomas Jaarsma

Reviewer’s report:

Minor Essential Revisions

1. Overlap between intervention and post-test
   This study shows interesting effects of an integrative learning activity on both conceptual knowledge and problem solving skills. However, there seems to be quite an overlap in the tasks in the condition and those in the post-test. The questions asked in the self-explanation condition, for example, resemble those in the post-test on problem solving skills to quite some extent. The same goes for the concept map study condition and the knowledge questions in the post-test. How surprising, then, are the results obtained? Put differently, are there grounds to expect that studying a model concept map could by some means increase problem solving skills at all?

2. Structure of the introduction
   The background section in the abstract illustrates what – in my opinion – could be improved in the article’s introduction: every sentence in that part of the abstract introduces a new instructional/learning method. These concepts are all discussed in the introduction, too. Are all these steps necessary to come to the objective of this study? I think it poses a large stress on the reader to follow this line of reasoning throughout the introduction and to get where the article is going: the effect of integrative learning activities.

3. Introduction of the domain
   An additional comment on the introduction is the lack of introduction and justification of the domain (physiotherapy). For example, the case study of electrophysical agents is now introduced in the ‘Participants and Design’ paragraph; this might better fit in a short paragraph on the domain in the introduction?

4. Justification of problem solving skills and conceptual knowledge
   As it appears to me, clinical reasoning (the main topic of the article) is operationalized by the constructs problem solving skills and conceptual knowledge. However, a clear justification why clinical reasoning boils down to these two constructs seems to be lacking. Their first appearance is in line 119, where it is stated that self-explaining can benefit conceptual knowledge. After
that, there is no such justification given.

5. Inconsistency of terms used
Throughout the article, different terms are used for the same concepts. I believe that the authors mean the same thing by ‘transfer’ and ‘problem solving skills’. In the research question in lines 174-175, transfer is used, while in line 177 ‘problem solving skills’ is used. Am I correct or confused? (this paragraph might need some further attention: two short questions in a row (lines 174-176) and two similar statements in a row (lines 176-178)).
The same goes for ‘model concept map condition’ in line 268; throughout the rest of the article, ‘concept map study condition’ is used.

6. Values in Table 1
To me, it was not clear what the values in Table 1 represent, or what the maximum scores were.

Discretionary Revisions

7. Concept mapping condition
When discussing the hypotheses (lines 173-187), concept mapping is expected to be less effective than self-explanation. A thought that popped up in my mind: why include it? To test this hypothesis (expectation), obviously, but is there any positive reason for including concept mapping? Otherwise, any strategy could be included, just to prove it was less effective… What do the authors expect from that activity?

8. Title
I think the title includes too much detail, making it a bit long and incomprehensible. My suggestion would be to substitute ‘additionally providing self-explanations and making or studying concept maps’ by ‘three different integrative learning activities’, e.g.

9. Participants and design section.
As I said earlier, I think this section deserves some attention. It now includes information on the task, while information on which conditions are present in the study (which I would expect in a description of the design) is lacking. Also, I would move the comments on the ethics (lines 204-206) to the back as they now interrupt a description of the participants’ prior knowledge/training.

10. Data on switches between worked and completion examples?
Just a loose thought: In lines 319-320, it is mentioned that participants can switch as they wish between the worked and completion example. Is there data on the number of these switches? Perhaps that more motivated participants would switch more back and forth to optimize their completion task and hence learn more/better…? Put differently: could it be a covariate?

11. Discussion on far transfer
Self-explanations are mentioned as likely contributors to far transfer. What about concept mapping? This activity has a high cognitive load, but I could imagine that this leads to a better retention on the long term (as compared to simply studying a complete concept map, e.g.).

**Level of interest:** An article of importance in its field

**Quality of written English:** Acceptable

**Statistical review:** No, the manuscript does not need to be seen by a statistician.

**Declaration of competing interests:**

I declare that I have no competing interests.