Reviewer’s report

Title: The Collaborative Learning Development Exercise (CLeD-EX): an educational instrument to promote key collaborative learning behaviours in medical students

Version: 0 Date: 01 Jan 2020

Reviewer: Adam Wilson

Reviewer's report:

In the manuscript the authors attempted to evaluate an exercise which fosters the development of collaborative learning competencies in medical students. Overall the manuscript was well written and easy to follow. My recommendations and comments are outlined below.

Introduction

First paragraph - throughout consider using the term "collaboration" skills instead of "collaborative" skills.

First paragraph, third sentence, after the comma - consider saying "elevating the importance of collaborative learning." (i.e., remove "therefore students require the capability to collaboratively learn together.")

Please write out CLeD-EX the first time it is used in the introduction.

The research question needs to be clearly stated.

How do you measure "impact", as this term can take-on a variety of different meanings?

Methods

General comment: The intervention in this study needs to be clearly defined. Was the intervention the assessment process or the session exercise? At times you switch back and forth between calling CLeD-EX an instrument versus calling it a process. The two are very different, as the validity of a process is measured differently than the validity of an instrument. Please clarify.

I applaud the authors for using a Delphi approach to discern the key behaviors to be assessed. However, more information is needed regarding the Delphi process used. For example, how many individuals participated, what were their general qualifications, how may iterations of the Delphi approach were used before the behaviors of interest were solidified, etc.
Given your use of scaled items with anchors being, 'never, rarely, often, and always' I question how many times a student was evaluated with the CleD-Ex. These terms suggest that students were longitudinally evaluated, but I did not see evidence of longitudinal evaluation in the study design. Please clarify.

Regarding tutor evaluation and feedback, more contextual information is needed about the tutors (i.e., what are the tutors qualifications, are they faculty, are they senior medical students? To what extent were there given frame of reference training for how to use the instrument?).

Figure 1 would benefit from adding time durations to the schematic. For example, how much time elapsed between the 'pretest week 1', the 'CleD-Ex', and the 'posttest week 6'?

Under the evaluation section, avoid the use of bullet points and write out the analyses in paragraph format.

I recommend re-running interrater agreement using Cohen's kappa instead of a Pearson correlation. Also consider running a Kendall tau b to help validate the internal consistency of scores generated from the items. Person's correlation is classically used with a continuous scales, your rating scales are ordinal, not continuous.

Thank you for including effect sizes.

Results

Regarding feasibility, please indicate how many sessions the tutors completed before providing feedback. Also indicate the number of students tutors observed at a single time and how times students were observed. (This information can be added to the methods and does not need to appear in the results section). Was there any overlap in who the tutors evaluated? It is a bit atypical for self-evaluations to be compared against external evaluators to run an inter-rater agreement analysis. Typically, interrater agreement means that both raters were expert (external) raters, not a self-rater. How strong was interrater agreement between tutors for the same group of students?

It was not clear to me how the analysis of student reflections helps to meet the aims of the study. It does not appear to contribute to effectiveness, feasibility/practicality, or impact (which is a nebulous term and should be avoided). As such, I recommend discarding this section. If it is kept, a table should be generated with major themes, minor themes, and representative comments to better streamline this section.

The pre-test and posttest evaluation section of the results should be moved up in the results section. Throughout the manuscript, please keep the presentation of findings in the same order as the aims. To me this section speaks to effectiveness of the process as opposed to its 'impact'.

In table 4, also report the effect sizes.
Regarding tables related to the McMaster questionnaire that was used, please clarify who completed this questionnaire. Are these scores self-reports from students or did the tutors also fill these out?

In the tables, use an * to indicate statistically significant findings.

Discussion

In the 3rd paragraph, last sentence, you write, "These findings are consistent with the literature which reports that students have a tendency to underestimate their performance during self-evaluation." I can't help but notice you have only one citation for this statement. This is likely because more of the literature has found just the opposite to be the case (i.e., students overestimate their performance). I encourage you to do a deeper dive into the literature to better support this statement with more references or to further explain why your findings don't align with the majority of the literature.

You note, "only the self-direction scale improved in the control group." You then write, "This finding provides evidence for efficacy of CLeD-EX from the students' perspective." I disagree with this interpretation. To me, this finding suggests that self-directed learning was not a byproduct of the exercise under investigation and was largely unrelated to the construct of interest.

Please clearly outline the practical implications of this research in a separate section of the discussion.

Please include a future directions section.

In the conclusion section, please summary all aims of the study. You mention the CLeD-EX is effective and feasible, but fail to mention anything about its impact, which was also an aim of your study (again I recommend changing the word impact to something which can be measured).

**Are the methods appropriate and well described?**
If not, please specify what is required in your comments to the authors.

Yes

**Does the work include the necessary controls?**
If not, please specify which controls are required in your comments to the authors.

Yes

**Are the conclusions drawn adequately supported by the data shown?**
If not, please explain in your comments to the authors.

No
Are you able to assess any statistics in the manuscript or would you recommend an additional statistical review?
If an additional statistical review is recommended, please specify what aspects require further assessment in your comments to the editors.

I am able to assess the statistics

**Quality of written English**
Please indicate the quality of language in the manuscript:

Acceptable

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None

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