Reviewer's report

Title: Video feedback and e-Learning enhances laboratory skills and engagement in medical laboratory science students

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Reviewer: Lynn Kosowicz

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MEED-D-18-00353
Does video feedback and learning online enhance laboratory skills and engagement in medical laboratory science students?
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Reviewer: Lynn Kosowicz, MD
Date: 8/15/2018

The authors are to be commended for designing the implementation of this new curriculum in such a way as to allow measurement of educational outcomes that can be used to inform future curricular interventions. The topic of approaches to effectively reducing face-to-face time with faculty with "flipped classroom" type experiences is one of wide interest. The authors describe training of medical laboratory science students, but the challenges and findings are generalizable to medical science education more broadly.

Below are a series of comments that are offered with the intention of helping to enhance the manuscript and not to detract from the remarkable work of the authors.

The abstract is clear and accurately summarizes what is presented in the body of the manuscript. The background adequately presents support for designing a curriculum that included video feedback and online resources, and state the purpose of the study is to determine if students enrolled in medical laboratory science course would display greater engagement and achieve higher grade results using these by incorporating those approaches.

The authors included a detailed comparison of the prior curriculum and the restructured curriculum. It would be helpful if they included explicit statements regarding whether any of the information covered was different, or only the delivery. In addition, a comparison of face-to-face time is provided, however, an estimation of total time spent per student on assigned coursework would be appreciated. The e-learning materials produced are impressive and use many adult learning theory approaches.

The figures and tables provided were well described and helped in understanding the text descriptions.

The study design states that students were "equally allocated" to "video" or "control" groups. A description of how this allocation was achieved should be added- was this a random assignment? Also, the authors should consider including how much time was spent in the video feedback sessions. It is stated that control group received oral feedback at the time of the technique only, did the video students also receive oral feedback at the time of the technique (in addition to video feedback?)
(as an aside, I found the use of the term "video feedback" confusing at times, because there is also discussion of online feedback in "embedded videos" in the e learning module- it would help readers if different terms could be used for the different parts of this curriculum to keep it all straight)

The last paragraph of the Study Design section is somewhat confusing as to what happened. There are 2 attempts in the lab with formative feedback, then there is mention of the final formative attempt of peer assessment /feedback. Is this a 3rd feedback session? Who is providing the feedback in the prior sessions? There is a description of random allocation of students to peer assess another student in either the control or video group- am I correct in interpreting this to mean students were assigned without regard to what group they were in (could be control-control, video-control ,video-video , or were students not participating in the study also in this mix)? The final sentence indicates that the academic then views the video recordings and marks the same student using same rubric. Is this just for the video group? Rewriting of this paragraph with more clarity on how this part occurred is needed.

Another point that needs to be explicit in the manuscript- at what point were the students informed that they were assigned to the video group? Did all students and faculty (particularly the graders) know who was in what group?

Method of analysis
Appreciate that authors collected data to assess comparability of study groups. The use of the pre-test to compare 2016 and 2017 cohorts was helpful. How often students participated in online activities was recorded, was the amount of time spent also collected? Statistical analysis and power/sample size calculations were appropriate and well described.

Results
28/31 students agreed to participate which is a good number. As stated above, should explicitly state if students were randomly allocated to video vs control groups. The authors provided information that the gender and age demographics were similar in 2013-2016 and 2017 cohorts, but should also provide that information comparing video and control groups.
I was surprised by the statement that the pre-test scores between 2016 (77% score) and 2017 (69% score) were not statistically significant. What were the N and p values? The authors also included a statement about pre-test comparison for video and control groups in 2017 but providing the data would be useful (particularly if the groups were not randomly assigned).

Analysis of in-class and online use of learning material
The text states that students who viewed the expert video demos and completed e learning module performed better on practical and final grade, but Table 3 does not provide the results of the practical.

Students who participated in these activities may have done better on final grade because they are conscientious students in general, rather than directly from what they learned from those activities. I will repeat this later in the review, but the authors should clearly state limitations of their study.

Quantitative analysis of the practical examination and the final grade
The second paragraph should be reworded to improve clarity. Consider changing the first sentence to e.g. "In comparison to the 2016 cohort, means of the 2017 video group were significantly improved" followed by data. The next sentence "The final grade for the 2016 cohort was lower compare to the 2017 cohort" includes data not for the entire 2017 cohort, but the video group scores.
The final paragraph in this section could be removed—my understanding is that it is based on peer assessment of observed performance not video performance. This is not directly related to the stated purpose of the study (though is interesting and might be the subject of a future study).

Qualitative survey: Likert responses
The authors report a decent response rate 68% however 2/3 were from video group. Is table 4 the responses from the video group only? That should be more explicit, as the first sentence includes all students in the study and there is no segue to analysis of subset. The highlighting of highest percentage in table 4 may mislead the reader and suggest this be removed—(e.g. in the second entry, more students were unsure or disagree, yet the strongly agree category is highlighted). There is a statement that half of the students strongly believed video provided authentic picture of skills yet the last sentence states that value of facilitated feedback by tutor was variable—yet 50% strongly agreed that it was helpful, therefore not clear on why the authors interpreted the two findings so differently. Line 298 2/3 stated written feedback through form of a marking rubric was necessary does not match what is written in table 4 (verbal/written) Qualitative survey: open-ended responses Describe how coding scheme was applied, was there more than one coder? What was the inter-rater reliability? Discussion The three potential benefits sound more like a general discussion about on line materials and video review, not really about what the study shows. Discussion of study results seems to start at line 365. If the first part of the discussion were removed, the authors would have more space for a discussion of their study results- including limitations which should be addressed. Line 377, I am having trouble finding the data in the results section that supports this statement. Line 380- The data provided showed that peer ratings of directly observed performance was higher than tutor rating of video-observed performance. There are many potential explanations. A comment by the authors on potential areas of future work might include further study on this topic. The stated aim of the study was to determine if students displayed greater engagement- is there data to support this regarding online resources? Why did the video group attend more tutorials and participate more in online modules? I feel the authors missed opportunity to more deeply examine their results, and to discuss limitations and future opportunities. Conclusions The conclusion address online learning, but not the video/feedback aspect of the curriculum which is arguably the more unique aspect.
Are the methods appropriate and well described?
If not, please specify what is required in your comments to the authors.

No

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

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