Author’s response to reviews

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

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Author’s response to reviews:

Thank you for the opportunity to respond to the constructive reviewer’s comments. We believe the paper now provides clarity and further information in regards to the response to the reviewer's comments. Individual responses are provided as "Author response" below and changes to the manuscript have been highlighted in blue.

Reviewer 1

MEED-D-18-00353 Does video feedback and learning online enhance laboratory skills and engagement in medical laboratory science students?

Rebecca Donkin; Elizabeth Askew; Hollie Stevenson

BMC Medical Education 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.

Author response: Line 160 “Students in the ‘control’ group received the same content delivery in-class”.

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,

Author response: this data was not collected and could not be generalised, for example time taken per student to complete course work consists of too many variables, analytics obtained through online content is more precise and is reported in the results section.

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 (5 min). 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?)

Author response: Further explained in text in methods.

(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).
Author response: term removed

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.

Author response: Paragraph has been revised

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?

Author response: Explained in methods with time frame.

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?

Author response: Reported in results “In total, the module was completed 29 times and was repeated more than once by seven students. The average score was 86% (range 43-100%) and the average time spent on the lesson was 21 minutes (range 4-47 minutes)”. Further information provided for time on task for all activities.

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

Author response: additional data included per group.

I was surprised by the statement that the pre-test scores between 2016 (77% score) and 2017 (69% score) were not statistically significant.

Author response: This was reviewed, typographical error corrected to 74%.

What were the N and p values?

Author response: Included in results.

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.

Author response: Statistically significant data reported only (practical results improved but were not significant). Table 3 has been revised.

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.

Author response: Addressed in limitations.

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 compared to the 2017 cohort" includes data not for the entire 2017 cohort, but the video group scores.

Author response: Revised for clarity.

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).

Author response: Paragraph removed.

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.

Author response: The table now contains n value for responses.

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).

Author response: Highlighting has been removed, Table 4 has been revised.

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.

Author response: This sentence has been deleted to avoid confusion.

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).

Author response: Replaced by “feedback”.
Qualitative survey: open-ended responses

Describe how coding scheme was applied, was there more than one coder? What was the inter-rater reliability?

Author response: Described in paper with Cronbach’s alpha 0.918. Intraclass correlation coefficient of 0.924 suggests excellent agreement between raters.

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.

Author response: Potential benefits section has been removed.

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.

Author response: Discussion revised.

Line 377, I am having trouble finding the data in the results section that supports this statement.

Author response: This line has been removed from Discussion.

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.

Author response: Section removed from Discussion.

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?
Author response: Data provided for time on task for both groups. Reasons for motivation and engagement provided and further references provided for achievement goal theory.

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.

Author response: Conclusion has been revised.

Reviewer 2 (Reviewer 2): PEER REVIEWER COMMENTS: To view the full report from the academic peer reviewer, please see the attached file.

REVIEWER COMMENTS FROM REPORT: The paper is coherent and scientifically sound, and well organized and written as a whole. The figures enhance the value of this work. Also, the data are clearly summarized in tables, and their analysis highlights the consistence of the methodology in relation to the authors' research aim and outcomes. The references are accurate and relevant; they might be more updated, though.

ADDITIONAL REQUESTS/SUGGESTIONS:

The authors should consider including more updated references.

Author response: References have been updated
Reviewer 3

Thank you for this article, overall, this paper seeks to compare outcomes associated with a blended versus non-blended learning experience. In the educational technology world there is limited value in doing this, time and time again, with a large sample we find no significant differences (see no significant difference site linked below). The authors would be well served to review the science education literature to appraise where the field is. After doing so you may find that the nature of your study may or may not provide new learning. I think that emphasizing the administrative challenges that promoted this change may be a path forward, but, as written you focus on student outcomes.

Based upon the paper, as written, I have some questions and comments:

1. results presented beginning on line 246 are somewhat hard to follow.

   Author response: Paragraph has been revised for clarity.

2. line 257, what is 'academic through video'? please make sure you are being consistent in the manner you describe your cohorts.

   Author response: Paragraph has been removed

3. I'm not sure of the value of table 3. it shows that students who engage in content specific practice have improved results as compared to those who don't. perhaps a more important marker is use...not outcomes, what proportion of the students in each group used the resources and how did they use them? Do you have the ability to evaluation time on task (how much time spent reviewing a video, at what speed, how many times a video was reviewed)? Who were those most likely to use the interventions?

   Author response: Time on task has been included in ‘Analysis on in-class and online use of learning material’.

4. In my world likert-style responses are quantitative.

   Author response: Re-worded as “student survey: Likert responses”

5. Sentence 296...this is confusing, not sure what you're trying to say.
6. Sentence 300...strongly enhanced by what?
Author response: Sentence has been revised for clarity.

How many students followed through and revisited the videos post module?
Author response: This data was not collected in this study, it was student perception of future practice.

7. Why is there a likert-style question about use (statement on future use, I used the video to study...)? this is a yes/no question
Author response: Sentence revised

8. Discussion: Improved learning...I'm not sure I agree that an online learning environment has many advantages. You found some advantages, but they were no uniform for all students, a proportion of your students didn't like this format...what does the rest of the literature say?
Author response: Discussion revised to include current literature.

9. Your paper does not detail the time and effort associated with the expert review of student's work.
Please explain how much time this took and the process.
Author response: Now included in study design and discussed further in Discussion.

10. I think your conclusions are too absolute. Again, perhaps reviewing some of the data here will help: http://www.nosignificantdifference.org/, I feel that your study has value but you have not appraised the extraordinary volume of work that precedes this study, please review the science education literature:
Author response: Discussion revised to include current literature.