Author's response to reviews

Title: A web-based simulation of a longitudinal clinic used in a 4-week ambulatory rotation: a cohort study

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Author's response to reviews: see over
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BMC Medical Education
Attention: Editors

To Whom It May Concern:

Re: MS: 1640056089221574
A web-based simulation of a longitudinal clinic used in a 4-week ambulatory rotation: a cohort study
Authors: Rene Wong and Heather Lochnan

Thank you for the review of this manuscript and for the comments provided by the two reviewers. Please consider the revised manuscript that has incorporated the responses to the comments from the reviewers. It indicates that we obtained informed written consent from our study participants. In addition, as requested a point-by-point response to the concerns are attached to this cover letter.

If there are any questions about this report, please do not hesitate to contact me.

Sincerely yours,

Rene Wong, MD, FRCPC
Response to reviewer 1

1. The 7 revisions suggested under “Discretionary Revisions” have been made within the revised manuscript under the appropriate headings.

2. All of the “Minor essential” revisions have been made within the revised manuscript. In particular, in response to point #4, a new table (Table 4) has been added.

3. Major compulsory revisions:

   - Methods: The reviewer asked for clarification about how and why the five conditions were chosen.

     When selecting the conditions for which to write COCOS cases, it was our intent to select both commonly and uncommonly seen conditions to examine this would have an impact on the effects of computer simulations. Prior to the study, we had obtained resident reports of their exposure to various endocrine conditions as part of their evaluation of the clinical rotation. This was the basis for selecting the conditions in our study. As part of the study protocol, we asked resident participants to report the number of patients seen during their rotation with the conditions used in the study; the results matched previous resident reports conducted prior to the study. We did not review clinic records to measure the exact numbers of patients seen by each resident. This has been incorporated within the Methods section.

   - Protocol: The reviewer asked for clarification about the “specific reading material and printed guidelines” provided to the control group, and how this compared to the COCOS material.

     One of the key reasons for conducting this study relates to how there is a lack of reading material that adequately covers many of the “continuity of care” learning objectives. The reading material and printed guidelines provided to the control group were primarily review articles that only briefly address the COCOS learning objectives. We did not provide the control group with a paper-based version of the COCOS content. Our goal was to evaluate COCOS as a supplement to all the teaching and learning resources used by all residents. When interpreting the results, it is not known whether the improvements in test scores seen in the intervention group can be attributed to a computer-dependent feature in COCOS. Future studies comparing paper-based to a web-based presentation of COCOS content, or comparing two different versions of COCOS (to measure the impact of change in a single feature while holding others constant) would be useful.

     One other limitation of our results is that it remains unknown as to the net worth of COCOS on the learning gain, relative to the resource costs to develop and maintain it. Due to a lack of resources, we were not able to measure the amount of time doing the online modules or survey residents whether they felt the use of COCOS resulted in a more efficient use of time to learn about its specific topics, thereby allowing them
to allocate the saved time for learning in other curriculum areas. Thus it is theoretically possible that the time allocated to the use of COCOS could have taken away from other learning opportunities. We also did not measure whether the implementation of COCOS resulted in staff physicians being able to save time and/or notice a benefit in their other academic responsibilities. While resident opinions may not be the best measure of worth, the overwhelming response of residents who used COCOS was very positive and did allow them to better learn about topics that they would not have otherwise been able to do.

These points have been addressed in the discussion of the revised manuscript.

**Response to reviewer 2**

1. **Methods** - the reviewer suggested a diagram of the algorithm of the control and intervention group. This has been added to the revised manuscript as Figure 1.

2. **Methods – re: power analysis and impact of sample sizes on the outcomes.**

   Power is the apriority ability to detect a difference when one actually exists. We found a clear, statistically significant difference between groups in pre-post test scores (control + 5.9% vs. intervention + 21.6%, p < .001), and thus demonstrate power. If we had not noticed a difference, the threats to power based on smaller expected sample sizes would be relevant. In addition, the actual standard deviations in our two study groups were 12.6 and 8.7 points respectively, whereas we had used an estimate of 20 points, resulting in a larger sample size calculation.

   Forty-four percent of our total participants did not complete the post-test, and their pre-test scores were not included in analysis. We did not systematically measure reasons for non-completion. It was explicit that participation in the study was voluntary and we suspect that these residents gave less priority to completing the post-test in favor of other aspects of the rotation. This could have biased the results, in two ways. First, if these residents had a lower baseline level of knowledge, our actual results would have ultimately underestimated the changes in pre-post test scores. In contrast, if these residents had higher pre-test scores, our results would have overestimated the changes. However, when analyzing the pre-test scores of who did not complete the study, there was no difference between groups and we feel the dropout rate did not influence our interpretation of the data. Second, not completing the post-test could be an indicator of relatively weaker skills or level of interest in self-directed learning and thus, our final results would not be applicable to them. It is unclear as to why one resident assigned to the intervention group did not end up using the COCOS program, but there were no reports however of technical difficulties with accessing the website.

3. **Results – the reviewer requested our opinion as to the reason for the drop in scores post-rotation related to “Thyroid nodules”.** After reviewing the specific test questions pertaining to the management of thyroid nodules, we noticed that the most common
questions that were answered incorrectly were relevant to clinical decisions once shown results of thyroid biopsies (i.e. pertaining to follow-up care). The content of our test was based on guidelines, but unlike for diabetes, the follow-up care of thyroid disorders may be more subject to clinician-to-clinician variability in practice. This variability could have manifested in control residents finishing the rotation with different approaches to follow-up care of thyroid nodules. Even though there was no COCOS case for thyroid nodules, the completion of the other COCOS cases may have resulted in the intervention group paying more attention to guidelines in general preventing a drop in their test score. 

4. Results – The p-value for the drop in scores for “Managing Treatment” in the control group was .166. This has been incorporated in a revised version of table 3.

5. Results – changes to table 3 have been made, including the addition of the “B” components shown in Figure 2.

6. Results – the reviewed inquired about the questions answered by the intervention group, related to COCOS. The question shown in Table 5 (formerly Table 4) are all of the questions asked, not just the ones with high Likert scores. Text in the results section has been modified slightly to make this clearer.

7. Discussion – The reviewer asked for reasons for non-participation or completion of the post-rotation test and questionnaire. As this was a voluntary study, completion of all aspects of the study was not considered to be a mandatory part of the rotation and completing the written test may have given lower priority by the residents. The potential effect of the lower sample size was discussed earlier in point number 2. It is unclear as to why one resident assigned to the intervention group did not end up using the program, but there were no reports however of technical difficulties with accessing the website. This has been incorporated into the discussion at the request of reviewer 2.