

Peer Review File

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Reviewer A

Incorporation of fine arts in medical school has previously been presented, mostly by anatomical sketches and 3D virtual modelling, yet clay modeling has also been described previously.

The authors proposed a two-week virtual training program consisting of 84 online didactic sessions, simulated telehealth patient encounters, and other virtual activities. The main concern regarding such an extensive program may be limited by the time available during the already filled curriculum.

While clay models have many benefits for medical education, there are also some potential disadvantages to consider and these should be pointed by the authors:

Comment 1:

- Cost: Clay models can be expensive to produce, particularly if they need to be customized for specific patients or procedures. This can make them less accessible to some educational institutions and limit their use in medical education.

Response 1: We acknowledge the Reviewer's concern about costs of clay and modeling tools. Our institution was fortunate enough to be able to supply these items to our student for a cost of about \$15 per person. While this cost may be prohibitive when attempting to scale this academic exercise to a larger number of participants, with only 4-6 participants per year the costs were manageable for our department.

Changes in the Text: None

Comment 2:

-Fragility: Clay models are relatively fragile and can break or deform if handled roughly or exposed to extreme temperatures. This can limit their lifespan and require regular replacement or repair.

Response 2: We agree with the Reviewer's comments about fragility of clay models. However, this was not a concern for our project as this exercise was a short-term activity and models were discarded after they were made, presented and documented with images. The models were not intended as a long-term display.

Changes in the Text: None

Comment 3:

Realism: While clay models can provide a realistic representation of anatomical structures and surgical procedures, they may not be as detailed or accurate as virtual simulators or cadaver dissections. This can limit their usefulness in some areas of medical education, particularly for more complex or advanced procedures.

Response 3: We agree that clay models may not be as detailed or accurate as virtual simulators or cadavers. However, the exercise presented here was for educational purposes only, not as surgical simulators. We aimed to facilitate students' understanding of urological anatomy, not facilitate actual surgical skills.

Changes in the Text: None

Comment 4:

Hygiene: Clay models can be difficult to clean and disinfect between uses, which can pose a risk of infection or contamination. This can be particularly concerning in a medical setting where infection control is critical.

Response 4: We thank the reviewer for their comment and agree that clay models are unable to be sterilized. However, the clay modeling exercise presented here was an educational exercise for students to learn GU anatomy, and the clay models were not designed to be used for actual surgical training or in an operating room setting.

Changes in the Text: None

Reviewer B

I absolutely like the topic of the study and consider it worthwhile being published despite the very low number of participants. The document needs to be revised in order to include more detail (study objectives, data collected) and also needs to discuss (potential) differences between in-person and virtual participants. In the current state the study objectives are not clear - did you want to find out if there is a difference between in-person and virtual learning, or did you want to prove that clay-based teaching is effective, independent of the chosen teaching channel (virtual, in person), or did you want to show that the results shown in the literature are also true in urology. or..... Reviewing the literature is not an objective, it is a strategy to assess an objective. I also miss the link between the literature review and the pilot study. To improve I would reduce the quotes from the literature review to those relevant for the assessment of the pilot study. Last but not least the collected data should be shown and discussed in more detail as the low number of participants only allows for qualitative assessments. It should further be shown if there were differences between in-person and virtual participants. Example: we have 9 in-person participants (= 60%), in line 201-203 it is

reported that 60% agreed that the task was relevant - 46% said it was a valuable learning activity - so it could be that no virtual participant found it valuable- which would completely change the conclusions - we don't know! Therefore, based on the data presented unfortunately no conclusions can be drawn (even if your conclusions may be right!)

Attached please find the pdf file for further comments.

Thank you for reviewing our article and for your insightful comments. We have attempted to incorporate as many of your excellent suggestions as possible. We have attempted to clarify the aims of our project. As you will see, we reformatted the article in order to better organize the narrative review into the discussion. We have also included updates to our data sets and separated out the virtual and in-person data as requested. Please see itemized comments below.

Comment 1: This sentence is not clear to me – Does it mean that they aimed to complement their pilot study with the results of the literature in order to get a higher level or rigor?

Reply 1: Thank you for this question. Our goal has always been to augment the education of medical students with a hands-on activity, similar to what has previously been described in the literature. We believe that the narrative review adds a level of context to for many readers who may not be familiar with this technique, which may help put our results in context of the wider practice of clay modeling

Changes in the text: none

Comment 2: So, what is the knowledge gain in this project

Reply 2: Thank you for this question. Clay modeling has not previously been described as an adjunct to teaching in Urology. We have described a relatively simple project that is easy to implement at minimal cost to augment anatomical teaching to medical students rotating on the Urology service.

Changes in the text: Pages 4-5, lines 69-71

Comment 3: we develop alternative strategies for educational programs

Reply 3: changes to the text made as requested

Comment 4: Content is not reduced in the virtual setting – Interaction is reduced and the way content is conveyed to the learner has changed

Reply 4: We have modified our text as advised

Changes in the text: Page 3, lines 41-45

Comment 5: Please add a reference if you mention “several studies”

Reply 2: References added as requested

Comment 6: Study design, objective

Reply 6: We have changed the format of the text to indicate more clearly the studies objectives and describe the methods we utilized

Changes in the text: See page 5 lines 76-79

Comment 7: I am missing the data here and detail with regards to the shown data. I further would like to see if there was a difference between in person and virtual participants

Reply 7: Thank you for this comment and suggestion. We have both added data with more participants as well as separated the virtual and in-person participants for comparison, which does show some separation between the two groups. We also added more quotes from the students themselves. **We updated Figures 5 to compare differences in responses between the two groups.**

Changes in the text: see pages 6-7 lines 108-131

Comment 8: The figure needs to detail how many students answered, how many were in the virtual groups, how many in-person in order to being able to discuss and draw conclusions

Reply 8: This is an excellent comment. Figure 5 has been to reflect the number and responses of virtual and in-person students, and responses have similarly been noted in several places throughout the study.

Comment 9: In order to draw this conclusion, we would need to see the feedback from the virtual group

Reply: Thank you for this suggestion. We have now included a separate description of the data regarding the virtual group and how this compares to the in-person group

Comment 10: How many students answered the questionnaire or is this the answer of one student

Reply 10: Figure 5 has been updated with requested information

Reviewer C

The authors present an interesting education concept which is novel to urology in utilizing clay models to teach anatomy during a urology sub-internship.

Comment 1:

While the concept is novel and the approach is interesting, there is not a clear goal or hypothesis either in the abstract or the introduction.

Response 1: We thank the reviewer for their comment. To clarify our goals and

hypothesis with this project, we have added a defined hypothesis to the introduction section as below:

Changes in the text: “We hypothesized that clay modeling fosters engagement and interaction, enhances understanding of anatomical structures, and acts as a way to assess creativity, dexterity and early surgical skills” Page 5 lines 69-71

Comment 2:

Introduction:

Great use of literature regarding the observational outcomes of students who participate in artistic projects, as well as objective outcomes such as improved exam scores, long term retention, and fund of knowledge.

The authors report positive response to the clay modeling activity in the introduction, which should instead be reported in the results.

Response 2: After further review of our manuscript, we concur that this information would be better introduced in the results section, and this information has been moved accordingly.

Changes in the text: Results section, page 6

Comment 3:

Methods:

I am not sure why the literature review needed to be a separate focus and reported in the Methods as this is typically a standard part of writing an academic paper. Creating a separate component focused on the literature review causes the article to not flow as smoothly.

If written as a specific component of the study, the literature review process should be reported in “Methods” and the actual number of studies found should be reported under “Results”.

For a literature review, would recommend exploring beyond PubMed, can consider Web of Science or EMBASE as the topic being searched for can easily extend beyond PubMed parameters.

Response 2: We thank the reviewer for their comment. As this manuscript was submitted as a narrative review, it was stipulated in the submission criteria that information on how the literature review was performed be included in the manuscript. We have moved the information regarding the number of articles included in the review to the results section as recommended. On the reviewer’s suggestion, Web of Science was briefly queried but no additional references to support this manuscript were

identified. Unfortunately, our institution does not have access to EMBASE. However, we believe that the majority of relevant articles would be able to be found through PubMed, as our focus is on the use of clay modeling for medical/surgical training.

Changes in the text: Results section, pages 6-7

Comment 4:

Narrative Review:

One issue that arises from making the literature review a focus of the report is that many points are repeated in the introduction, in the narrative review, and in the discussion. Combining this in the introduction and discussion can make the paper flow more smoothly.

Response 4: We thank the reviewer for their comment. To help the manuscript flow more smoothly we have restricted the manuscript to reduce redundancy and make clear the objectives and findings of our work.

Changes in the text: Introduction and Discussion restructured.

Comment 5:

Pilot study results:

Only 46.7% responded agree or strongly agree to “valuable learning experience”

According to Figure 5, only half of respondents reported that this improved knowledge in the subject area.

These are important findings and would argue against the authors assertion that there was positive feedback. Post teaching evaluations tend to be biased towards positive responses, a possible limitation mentioned by the authors. These are significant survey results in this small sample and need to be further discussed.

Response 5: Thank you for your comment. On further revisions, we have separated the responses from the virtual students from the in-person students and performed additional evaluation based on this difference. We have indeed noticed a difference in responses between virtual and in-person students and have changed our findings to reflect this and added language in the discussion to address this.

Changes in the text: Pages 6-7 lines 115-131, pages 7-8 lines 138-139, pages 13-14 lines 272-276

Comment 6:

Discussion:

Agree with haptic feedback decreasing cognitive load while learning procedures like knot typing or laparoscopy. Not sure that the connection to clay modeling and learning anatomy is quite the same as the objective is more knowledge based rather than procedural.

There have been some studies that show that positive response to a learning modality may not necessarily correlate to better knowledge retention. The authors address knowledge retention in the narrative review, but not in the discussion regarding the pilot study.

Response 6: We acknowledge the reviewer's concerns with additional language in the discussion section as noted below.

Changes in the Text: Page 15, lines 307-310

Comment 7:

Conclusion:

While I agree completely with the sentiments of the authors, I may word the conclusions a little differently with regards to the pandemic being the impetus to explore this modality. The use of clay modeling is certainly an interesting way to engage learners, and should be explored as a way to enhance surgical trainee education regardless of the pandemic. I wonder if focusing so much of the conclusion on pandemic related teaching limits the impact of this article.

Response 7: We thank the reviewer for their comment, and have removed the language regarding the pandemic from the conclusion section, to emphasize the authors' view that the need for developing alternative educational tools transcends restrictions placed by the pandemic.

Changes in the text: Page 15, lines 313-315

Comment 8:

Figures:

Figure 1 does not add up mathematically. 26 articles from PubMed search + 1 article from references – 12 articles excluded should equal 15 articles. Please clarify.

Response 8: We thank the reviewer for noting this error. This has been corrected

Changes in the text: Figure 1