Author's response to reviews

Title: E-learning in Medical Education in Resource Constrained LMIC Countries

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Author's response to reviews: see over
Cover Letter: Point by Point Response

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Thank you so much for the review of the paper. Below, you will find a detailed point-by-point response to the comments of the 3 referees and the editorial team.

I. Formatting of the paper

We have revised the manuscript and it conforms to the journal style. We have

1. Changed footnotes to endnotes
2. Formatted references according to the HRH journal guidelines
3. Included author information on the title page
4. Added Key Words, Author Contributions, Title Page, List of Abbreviations, and Competing Interests sections
5. Removed the abbreviations from the title on the first page
6. Formatted and placed all tables and figures according to the HRH journal guidelines

II. Referee # 1

Comment from Referee #1: [Overall Comment Section]: This is certainly a very important piece of work which from a health policy point of view requires serious attention by political leadership and policy makers. Whilst appreciating that the study’s focus was on medical education, it would be interesting to know how many of the articles reviewed had a focus beyond medicine i.e. same issues but relating to other health professions.

Response: We have shown the percentages of articles that had a focus beyond medicine in figure 3

Comment from Referee #1: [Minor Essential Revisions Section]: In Table 1 it would be beneficial for a differentiation to be made clearly in terminology between ‘Internet-based learning / Web-based learning / Online learning / Virtual education’ (appearing on page 4) and ‘Pure e-learning / Fully-online’ (appearing on page 3).

Response: Clarifying language has been added under the definition cell within the table.

Comment from Referee #1: [Minor Essential Revisions Section]: The same goes for ‘Mediated learning’ (appearing in Table 1 on page 4) versus ‘Computer aided instruction’ on page 3.
The definitions of these terms seem to mean the same thing. Maybe inserting an explanatory note about the subtle **definition similarities** in these terms may suffice for a reader.

**Response:** Clarifying language has been added under the definition cell within the table.

**Comment from Referee #1:** [Minor Essential Revisions Section]: On page 6 in the section dealing with method, the sentence on line 7 reading ‘A complete list of these countries can be found in Table 2’ should read ‘A complete list of these countries can be found in Figure 2’. The next sentence should commence with Table 2 instead of Table 3.

**Response:** This has been corrected and readjusted.

**Comment from Referee #1:** [Minor Essential Revisions Section]: On page 7 in line 5 it should read Figure 2 instead of Table 2. In figure 4, mention is made of telemedicine but it was not mentioned in the list of forms of learning.

**Response:** Even though telemedicine is mentioned in the figure, we did not specify telemedicine in the e-learning table definitions as it specifically refers to clinical practice (examinations of patients). The infrastructure set up for telemedicine could be used for e-learning purposes; however, telemedicine is not directly tied to e-learning in medical education.

**Comment from Referee #1:** [Minor Essential Revisions Section]: On page 15, cost effectiveness is dealt with. Is there any possibility that a country comparison can be done between Brazil, Egypt, India and South Africa on cost-effectiveness of e-learning. That will be, if the articles reviewed did that kind of assessment. If they did not, mention could be made that such assessment was not dealt with in-depth in the reviewed articles.

**Response:** Even though this would have been great, none of the reviewed articles did such cost-effectiveness assessment. We have inserted in the manuscript stating that cost-effectiveness assessment was not dealt with in-depth in the reviewed articles.

**Comment from Referee #1:** [Discretionary Revisions Section]: I would also encourage the authors to consider including in the abstract (if possible) the first sentence which appears under the heading “Health Workforce” on page 9. My reasoning is that the article is overall about health workforce shortages and the e-learning movement is a contribution to addressing that challenge.

**Response:** The abstract has been revised to include a good portion of the first sentence under the “health workforce’s” heading.
Comment from Referee #1: [Discretionary Revisions Section]: In the discussion section on page 17, what is your view about the need to have in place some form of monitoring system for benefits of e-learning? The major question I wish to pose (for authors to ponder over in the discussion section) is what the likely impact is on the service delivery platform (clinics and hospitals) bearing in mind that actual health training in LMIC’s takes place largely in government hospitals. By extension, this question relates to views of policy-makers (negative, positive or indifferent) towards e-learning. There is certainly a cost to the infrastructure aspect of e-learning as alluded to by the authors. In resource constrained environments, governments would therefore be expected to lend a hand.

Response: We have added the following paragraph to the discussion section to address the points raised by the referee’s comments, in line with our analysis of the findings. “Given the constraints faced in medical education within the context of LMICs and the cost associated with any e-learning implementation, it is prudent to account for a monitoring system as part of an e-learning strategy to capture, analyze, and report the return on investment. Even though e-learning can be conducted independent of time and place, the associated costs of implementation cannot. Technology-enhanced learning solutions change at a much faster pace than established policy and institutional processes. This being the case, it is prudent for schools to consider carefully whether e-learning is going to be implemented for both the basic science as well as the clinical curriculum. In many LMICs, the clinical training takes place within state-run hospitals which raises serious considerations in terms of who bears the cost for supporting e-learning within clinical settings. In such a scenario, the implications of implementing an e-learning program for an entire medical education curriculum cut across sectors. Due to these cross-cutting implications, it is critical for those involved to establish mechanisms that engage decision-makers across institutional and possible ministerial boundaries.”

Comment from Referee #1: [Discretionary Revisions Section]: Lastly, it would be interesting to know whether the same views on e-learning’s ability to bridge the gap would equally apply to other health professions beyond medical students e.g. nursing, pharmacy, speech therapy, dentistry to mention a few.

Response: We did not address this specifically in the literature review; e-learning may be a viable solution for other health professions beyond medical students, however, it is difficult to say without further research whether the same views apply. Nursing and Dentistry have been farther ahead with e-learning implementation in their curricular than medical education in some high Income countries. We have yet to determine whether it is the same in LMICs.

III. Referee #2

Comment from Referee #2: [Discretionary Revisions Section]: Background, paragraph 3. The paper says it looks at medical education but it is actually broader than medical so would consider broadening to health education.
Response: Even though we have found papers about other health professionals (figure 3), the research and analysis that we have done was on the articles on medical education, thus the reason for the concentration on medical education.

IV. Referee #3

Comment from Referee #3: [Reviewer's Report Section]: This paper describes strategies to implement e-learning in LMIC countries. The authors have reviewed literature in this field and derived certain conclusions. Resource constrained countries are rich in certain resources. Maybe patients and human resources are sufficient there. It may be feasible to define what kind of constraints the authors are referring to.

Response: The list of LMIC we have used comes as per the classification of the World Bank and is based on finance of the country and we have now clearly stated that in the methods section. Yes, resource constrained countries may be sufficient regarding patients, but at the same time, struggle with faculty and health workforce shortages as stated by the World Health Organization and we have stated this in the paper.

Comment from Referee #3: [Reviewer's Report Section]: Under the methods section on page 6, Table 2 is wrongly referred to twice. Table 3 in the text is actually Table 2. These need to be corrected.

Response: Correction has been made

Comment from Referee #3: [Reviewer's Report Section]: The discussion part is useful to the reader, however the paper is a little too long. It is suggested that the methods section be condensed slightly.

Response: We have condensed the methods section

Comment from Referee #3: [Quality of Written English Section]: Needs some language corrections before being published

Response: The whole paper has been reviewed again and has been copy edited