Reviewer's report

Title: On the Usage of Health Records for the Design of Virtual Patients: a Systematic Review

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Reviewer: Inga Hege

Reviewer's report:

This paper addresses an interesting aspect of Virtual Patients (VP) - the production from electronic health records.

The aims of the study are clearly described in the Background section. However these aims need to be clearer addressed in the methods and results section and consistently discussed.

Language: The overall language is very well understandable, however there are some minor typos (e.g. "Germn" on page 7) and my feeling (non-native speaker) is that it could benefit from a native speaker check.

Background:
Major Compulsory Revisions:
In my opinion it would be helpful especially for less experienced readers to give a definition of the different forms of health care records (unformatted? annotated?) you are describing in your article.

It would also be helpful to state the definition of Virtual Patient you used as a basis of your work. Depending on that it seems that some hits would need to be excluded. For example not all definitions would regard mannequins or movies as Virtual Patients.

Minor Essential Revisions:
Line 5: "Reducing the costs of producing Virtual Patient systems, while....": Why are you talking about "systems" here? The terms of "Virtual Patient" and "Virtual patient systems" are used sometimes in a confusing way.

Discretionary Revisions:
Line 8: "To attempt to reduce the costs of...." This sentence seems to be hard to understand. Also it would be helpful to briefly explain unformatted and annotated (see also comment for Background)

Minor Essential Revisions:
In your aims you are including also the search for standards such as SCORM. Maybe you could skip that part, it would in my eyes make your aims more focused. (See also my comments on that in results and discussion section.)
Methods:
Major Compulsory Revisions:
For the research questions you are addressing (as stated in the Background section), it remains unclear to me why all the categorizations and distributions have been made and described in detail, especially since you are excluding most of the articles in phase 4 anyway.
It remains also unclear whether you are looking at the virtual patients or the systems they are created in.
Figure 2 seems to contain no relevant information.
Also, the distributions seems to be more suitable to be described in the results section.
The purpose of Phase 3 remains unclear.
Discretionary Revisions:
Figure 1 is helpful, however you could include the exclusion criteria
Figure 3: "System type" is hard to understand, since a "report" is not a system.

Results:
Major Compulsory Revisions:
The results are hard to read and to learn the main aspects - which should be the aims as stated in the background section and mentioned in the discussion. I would suggest to put the main aspects (according to your aims) into a table.
It would be helpful to explain the categories you are using (VP based on Medical Image Data and VPs based on Patient data) (and why) in the methods section. It remains unclear why the subcategories have been made / why this is relevant.
You are not referring at all to your aim to look for standards (such as SCORM) used by VP systems.
There seems to be a mismatch of your literature references, no. 20 does not deal with CaseTrain ;-) 

Discussion:
Major Compulsory Revisions:
This section needs in my opinion some major refinement. I would suggest to discuss the results more explicitly (e.g. what could be the reason why not many virtual patients are directly based on electronic health records,...)
It could be an interesting aspect to discuss whether using electronic health records for the VP creation might reduce production costs and time and how. What are advantages/disadvantages of such an approach.
"This reformatting constitutes production costs..." This is not evident to me from the results (literature?) and should be discussed here. Is reformatting faster/cheaper than other approaches such as your approach or
exchanging/adapting existing VPs?

Also limitations of the study should be discussed.

You mention that there was no evidence for the use of standards: There is the MedBiquitious Virtual Patient group that has developed the MedBiquitous Virtual Patient Standard (www.medbiquitous.org) together with the Electronic Virtual Patient Project (eViP - www.virtualpatients.eu). Systems like OpenLabyrinth, WebSP or Casus implemented this standard to be able to exchange Virtual Patients.

I wonder whether your literature research approach was suitable to answers this question, since you excluded many articles that may contain information about such initiatives (e.g. Abstract 152 of 362 - 1. Stud Health Technol Inform. 2009;150:826-30. Enabling interoperability, accessibility and reusability of virtual patients across Europe - design and implementation. Zary N, Hege I, Heid J, Woodham L, Donkers J, Kononowicz AA.)

Minor Essential Revisions:

"Majority of systems used patient data that were reformatted to suit the system being used...." Shouldn’t it be "virtual patients" instead of "systems"? It should be made a clear distinction between systems (e.g. OpenLabyrinth or WebSP) and the content (the Virtual Patients).

Conclusions:

Minor Essential Revisions: Last sentence: "Our group have..." -> "Our group has..."

Level of interest: An article of importance in its field

Quality of written English: Needs some language corrections before being published

Statistical review: No, the manuscript does not need to be seen by a statistician.

Declaration of competing interests:

I declare that I have no competing interests