Reviewer's report

Title: Enhanced virtual microscopy for collaborative education

Version: 1 Date: 26 November 2010

Reviewer: Jennifer Neel

Reviewer's report:

This manuscript is, overall, very well written and clear. The project is one that should be of great interest to the many individuals and institutions now using virtual microscopes as part of their curriculum. There are only minor critiques to be addressed. The comments section of the review is structured in 2 parts. In the first part, I have answered the specific questions all reviewers are asked to consider. In the second part, I have made specific comment/questions/critiques of the paper. I see no reason why this paper shouldn’t be published once the few critiques have been addressed.

General questions reviewers are asked to consider:

1. Does the software address a novel task? Alternatively, if there is already software available that performs this task, does the software outperform it in terms of speed, reliability, efficiency, or breadth of application?

The software doesn’t perform a completely novel task, but it does solve a significant problem with VM – the need to purchase and use a viewing software program from a company which also makes it difficult to use slides scanned by different vendors. Most software packages must be licensed each year which can end up being a significant cost. By divorcing the scanning process from the viewing process, the authors have solved an important issue with VM use. The software isn’t faster or more efficient, but the tagging system is a unique application of an already widely used and accepted format from a well known web-based mapping system. As a non-student, non-faculty member, I couldn’t try tagging or vote for tags.

2. Is it easy to use?

Yes, very easy to use. Easy to navigate.

3. Does it satisfactorily address the task or application the authors intend?

Yes, absolutely.

4. Is the software freely available for non-commercial use (note that this is a condition of publication)? And is the availability of the software and any restrictions on use clearly stated in the manuscript?

Yes, software and slides are stated to be freely available, links to the site and to the software and scripting are provided. The authors imply that only enrolled
students and faculty can tag and vote, but don’t specifically state that other users (general public) will not be able to logon to the system. There should probably be a statement that the tagging feature and some materials (lab materials) can only be used by students and faculty members.

5. Does the manuscript clearly describe the problem the software is designed to address

Yes

6. Does the manuscript clearly describe how the software is implemented?

Yes, and a link is provided which gives great detail, although it is more technical than I am able to understand.

7. Does the manuscript clearly describe how the software performs and its advantages/limitations over existing applications?

Yes

8. Does the manuscript state the software’s operating requirements

Yes

9. Are the discussion and conclusions of the manuscript well balanced and adequately supported by the data?

For the most part. I have some comments pertaining to this below.

10. Do the title and abstract of the manuscript accurately convey what has been found?

Yes

11. Is the writing acceptable?

Yes, just a few minor grammatical errors. The authors use commas somewhat sparingly, but this is more of a style issue.

Specific reviewer comments:

Minor essential revisions
  1. Throughout the paper, ‘searchable’ is listed as ‘search-able’. Searchable is a standard word and should be the preferred term. Minor issue not for publication
  2. Background. Paragraph 1, third line from the bottom: Change cellar to cellular.
  3. Implementation. Page 9 line 3: change collapse to collapsed. Minor issue not for publication
  4. Discussion, second paragraph, first line: microscope should be microscopes. Minor issue not for publication

Major essential revisions
5. Implementation. Page 9 second full paragraph: Use of ‘folksonomy’ seems non-standard and should probably be avoided – general readers may not be familiar with the term. Consider replacing with a more standard term or definition. In addition, this sentence is poorly structured.

6. Results. Regarding comparison of exam scores, were the exams identical? Same questions and slides used for both? Same format? If the exams were not identical, how does this impact the comparison of scores?

7. Discussion. Paragraph 1. The authors stage that VM was met with ‘enthusiastic’ adoption – what are they basing this on? They didn’t show any data relating to student enthusiasm and did not reference any previously published reports.

8. Discussion. Paragraph 1. The authors state that VM has not had any negative impact on practical exam performance – this statement should be softened a bit since they only did a single comparison of one exam. Same thing for the conclusion statement regarding student performance and for the abstract. At best, the authors can conclude there was no major difference in a single comparison of similar (identical??) tests administered before and after adoption of VM, a finding that is similar to other studies.

9. Discussion. Regarding the discussion on the change in the structure of laboratory sessions – none of this is presented in the implementation or results sections, although it was mentioned as being planned in the background. If this is included in the discussion, some sort of description of the changed to the lab structure should be in the implementation section and observational or descriptive data should be included in the results, or the authors need to state that the data wasn’t shown/captured.

Discretionary revisions

10. Implementation. How is security maintained when administering exams on laptops via a web-based application? Or are exams ‘open-web’ and ‘open-hard drive’? This is not the focus of the paper, but is an issue of general interest. This isn’t critical to include for publication.

11. Results. It would have been nice to include student survey data showing preference for the system or to document ease of use. It would also have been good if the authors could have found a way to include data showing some sort of benefit from the greater collaboration students engaged in either by some sort of outcome assessment or by survey. This isn’t critical to include for publication.

12. Discussion. Paragraph 2, student usage data – do the authors have any previous usage data from when the course was taught using glass slides to compare with? Can they show that students actually spend more time viewing slides because of digital access? When taught using glass slides, were students restricted to certain hours of access to the slides/microscopes? If any of this can be included, it will help build the cases that students study more or spend more time viewing slides because of digital access. This is a minor suggestion and is not critical to include for publication.
13. Discussion. It is too bad that the authors were unable to include student and faculty survey data which could have supported student and faculty preference for the system and also could have supported increased student usage (over glass slides) as well as increased student collaboration both in and out of the lab. This would have enhanced the paper but is not critical for publication of the study.

**Level of interest:** An article whose findings are important to those with closely related research interests

**Quality of written English:** Acceptable

**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