Author's response to reviews

Title: Acceptability and adoption of handheld computer data collection for public health research in China.

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Version: 2 Date: 31 January 2013

Author's response to reviews: see over
Dear Editor:

Thank you for the opportunity to submit a revised version of our paper, “Acceptability and adoption of handheld computer data collection for public health research in China.” We have responded to each editorial request and reviewer comment below (in italics).

Editorial Requests:

1. We recommend that you copyedit the paper to improve the style of written English.

_We have substantially edited the language to improve the style of written English._

2. Authors’ contributions - Please include an Authors’ contributions section before the Acknowledgements and Reference list.

_We have included an Author’s contribution Section._

3. Competing interests - Please include a 'Competing interests' section between the Conclusions and Authors' contributions. If there are none to declare, please write 'The authors declare that they have no competing interests'.

_We have provided a competing interests section._

Please also ensure that your revised manuscript conforms to the journal style ([http://www.biomedcentral.com/info/ifora/medicine_journals](http://www.biomedcentral.com/info/ifora/medicine_journals)). It is important that your files are correctly formatted.

Reviewer #1

**Reviewer's report**

**Title:** Acceptability and adoption of handheld computer data collection for public health research in China.

**Version:** 1  **Date:** 12 December 2012  
**Reviewer:** Jodi Vanden Eng

**Reviewer's report:**

I would like to thank the authors for the opportunity to review the manuscript titled "Acceptability and Adoption of Handheld Computer Data Collection for Public Health Research in China."

_You are welcome._
This clearly written manuscript describes the application of handheld computers and related software to a tobacco health survey in China. The authors provided a nice description of the methodology used and successfully implemented the technology noting the improvements and modifications necessary to accommodate Kanji character sets on an operating system that is in English. In addition, there was a unique albeit small-scale evaluation of usability/acceptability on a sample of individuals. The authors clearly present a problem encountered with mobile data collection and adequately describe the methods used to resolve this problem, the data used to evaluate the new method, and the resulting discussion and conclusion of the acceptability and usability.

Although this specialized subject matter is possibly unique to the literature, there are some recommendations and modifications that need to be considered for this manuscript. Mainly, the question of whether this article has enough depth/breadth beyond existing literature to warrant additional publication. Some suggestions on how to include information to enhance the content and subject matter are described in more detail in the recommendations below. Moreover, the technology described is mostly outdated and slowly loosing relevance in the scientific community. It would be of utmost importance for the journal’s readers to understand how this methodology and technology is still relevant and can be applied using modern platforms.

We appreciate the reviewer’s comments and concerns. In revision, we have now included, in the discussion, information on how the present software is compatible with newer hardware. We think our research methodology is still relevant and important today, particularly to health professionals in China and other developing countries.

Recommendations:
Major Compulsory Revisions

1. Please consider modernizing the subject matter. This paper emphasizes a methodology that relies on technology that is outdated and off market. Please incorporate a section on how the methodology presented using a Windows Mobile platform and HP Ipaqs could be transferred to newer platforms.

We have added information to both the methods and discussion addressing this issue.

2. Please explain the availability of other questionnaire software that incorporates the use of Kanji or special characters. Is QDS unique or are there other software available that accept special characters? Will it run on newer platforms?

We have added information on the availability of Unicode characters in other software.

3. Similarly, please explain the availability of other Operating Systems that allow for special characters (to avoid the message boxes that appear in English). Why did you use an English language OS when you are implementing the questionnaire in Chinese? Is there a Chinese version of Windows Mobile? If yes, would QDS run on it?
To clarify, we used the Chinese version of Windows Mobile Operating Systems. QDS was compatible with the Chinese version of Windows Mobile OS, but QDS’ underlying structure and programming environment are only available in English, therefore certain response options and message boxes were displayed only in English. In revision, we have added a figure (Figure 1) to help readers understand and visualize the data entry process in Chinese in a Chinese operating system.

Minor Essential Revisions

1. Methods: Please check the spelling of HP iPaqs. Please list the model numbers.

   We have revised and added the model number (Hewlett-Packard iPaqs, 212).

2. Methods: Please list the version of the Windows Mobile OS

   We have listed the version of the Windows Mobile OS, which is 5.

3. Evaluations: It seems one major weakness in this study is the absence of a pre-training questionnaire based evaluation to get a baseline measure of the trainees’ knowledge, attitudes and practices regarding the acceptability and use of HCDC. It is not clear whether or not the training had any impact on the comfort and acceptance of this technology.

   We acknowledge this suggestion from the reviewer. We did not conduct a pre-training survey because all interviewers and supervisors stated that they had no previous experience with HCDC. However, we agree that not including pre-training survey was a limitation as some data such as on attitudes towards using HCDC could have been collected before training to compare with post-training data. Per reviewer’s suggestion, we now have added a new paragraph in Discussion to discuss about the limitations in evaluation. Not including a pre-training survey was one of the main limitations we identified.

4. Evaluations/Results: Although the authors mention a quality control evaluation component as well as a post training interview, very little of these results are presented in this paper. It might strengthen the paper to include more results from the other 2 acceptance/usability evaluations.

   We have added some results as below:

   “Results from 203 completed quality-control evaluations by supervisors showed that all the interviewers used the HCDC effectively. During the preparation process, 201 of 203 interviews were evaluated as “fully” prepared with all necessary materials organized. During eligibility screening, in all but one interview, the interviewer could “fully” orient participant and could successfully enter participants’ occupation, age, and hukou status to determine eligibility. In all observed interviews, the interviewers offered participants a copy of the consent form and effectively provided informed consent for the interviewees.”
During questionnaire administration, all could ‘usually’ or ‘fully’ do well in reading questions exactly as written, definitions verbatim, and all response options exactly as written, as well as recognizing inconsistent responses, clarifying responses, and correcting data entry in HCDC. Based on supervisors’ observation and assessment, the pace for 11% of the interviews was ill-timed (too slow’, ‘too fast’ or ‘very too fast’), and 6% of observed interviews were ‘too long’ or ‘far too long.’ All ‘usually’ or ‘always’ used all of the appropriate flashcards, anchored time periods with examples, and used non-leading probes. During all but two interviews, interviewers ‘usually’ or ‘always’ probed incomplete and inappropriate responses. All but one established good rapport with participants, including making eye contact and maintaining a neutral attitude, conveyed by verbal or non-verbal behavior.”

5. Results Interviewers attitudes: Consider displaying the contents of Paragraph 1 in a table. It is not clear why some of the questions are reported out of 29 trainees and others out of 20. The questions related to confidence seem relevant for both the interviewers and the supervisors. The post evaluation results for efficiency described 19 interviewers found HDHC better and 3 found paper better, but it did not specify the results for the other 7 individuals. Similarly for preferences. Also, in this paragraph, since it is a small sample size, you may want to present the median and IQR vs the mean. It would also be useful to describe the age, gender, and education of the interviewers and the supervisors.

The post-training evaluation was conducted among 29 trainees (20 interviewers and 9 supervisors). The post-data collection evaluation was conducted among 20 interviewers only. In revision, we added Table 2, which provides descriptive statistics of response to each question for both post-training and post-data collection evaluation. We thank the reviewer for the suggestion of adding a table, as we agree that this is a better way of presenting our data in a clear and concise manner.

We have also better described the response from interviewers in text and added information about age, gender, and education of the interviewers. We cannot describe demographic characteristics of supervisors as we did not collect such information. We acknowledge that this is a limitation.

6. Results HCDC vs paper: Were there more questions evaluated? This section seems sparse and redundant to the post training section. Did any interviewers change their responses between the 2 evaluations (what was the concordance)? What are the interviewer characteristics of those who preferred paper? Were they older? more/less educated? More/less experienced? Gender differences? Are any of these differences significant (chi-square test)? It might be good to put this information in a cross tabulation. Figure 1 is a misleading way to display this data because the results are only based on 20 individuals. Therefore, the estimates are rounded to the nearest 5%. It would be better to present this data in a table and present confidence intervals around the estimates. If this figure is included in the manuscript, please make sure it is black/white printer friendly and make the sample size clear in the title. When this figure is not
We appreciate the reviewer’s thoughtful comments. We have presented all questions regarding HCDC vs. paper-and-pencil comparison. We have deleted the redundant information and now have re-organized these results in new paragraphs under the sub-title “HCDC vs. Paper-and-Pencil Survey Methods”. We could not compare responses from post-training evaluation and post-data collection evaluation because the questions were worded differently, and because individuals could not be identified from anonymous surveys. The interviewers who preferred paper-and-pencil surveys were older in age and were female. We now have reported these demographic characteristics in text. However, we did not conduct statistical analyses due to the small sample size and the empty cells.

Lastly, we have deleted Figure 1 in revision and described the results in text instead.

7. Results quality control: This section also seems very sparse. It would be good to add specific numbers and statistics to this section.

We now have added a new paragraph on quality control (see “Quality control” in “Results”)

8. Interviewer Recommendations: recommendations #1 and #3 seem redundant. Recommendation #2 seems like a design flaw.

We agree with the author and have deleted recommendation #3 in revision. Yes, recommendation #2 is a design flaw.

9. Discussion: The second half of the first paragraph in this section requires editing. Also, it would be useful to include in the discussion some of the implications of the results of the evaluations. What steps were taken to alleviate the concerns of interviewers who responded they did not feel confident after training? Were there differences in quality control between individuals who felt confident and those who did not?

We have revised the second half of the first paragraph in Discussion as follows, “A systematic review compared HCDC and paper-and-pencil data collection used in randomized controlled trials and found HCDC to be more time-efficient and better for data management.”

As the reviewer suggested, we have also included some implications from our evaluation in the same paragraph.

We agree that it would be helpful compare results from quality control between those who felt confident and those who did not. Unfortunately, such comparison was not possible because the quality control evaluation was anonymous and could not be linked to a specific interviewer.
10. Discussion: Please add a section about the limitations of this study and the evaluations? For example, was there potential bias (interviewer or observer bias) introduced by having the supervisors who took part in the training also perform the quality control evaluation? Was there a Hawthorne effect? Was there a bias due to repeated testing?

We now have included a new paragraph addressing the limitations of the evaluations. We have discussed about observer bias, Hawthorne effect, and social disability bias as follows:

“There were also limitations with the evaluations we conducted. For example, we did not include a pre-training assessment because no interviewer reported having experience with HCDC. Some data such as on attitudes towards using HCDC could have been collected before training to compare with post-training data. During the post-training assessment, we did not collect demographic information on the interviewers and supervisors as these surveys were to be anonymous. In addition, the quality control evaluation might have introduced bias because the interviewers might have modified their behavior while being directly observed. Nevertheless, this study shows acceptability and utility of HCDC in the Chinese public health research environment. With advances in software development and even more user-friendly mobile devices, such data collection methodologies should supplant most paper and pencil data collection methods.”

11. Discussion: The comment on education attainment and proficiency as selection criteria cannot be concluded here and needs to be removed or revised. This study did not scientifically compare the association between interviewers’ knowledge and education and their general ‘successes’ with HDHC. This would require a randomized controlled trial. It is possible that any differences seen between this survey and other surveys are related to differences in training or other factors that are unrelated to educational status.

We appreciate the reviewer’s concern. However, the intention of this discussion point was not to draw scientific conclusions for the associations between education and access with HDHC. We just wanted to share our experience with future HDHC users and suggested them to select interviewers with great computer proficiency, as computer skills-related technical difficulties were reported from the previous GATS survey.

We have revised the sentence as follows:
“Third, we encountered fewer technical difficulties during the current data collection compared to the GATS project. Qualitative evaluation of the previous GATS project discovered that some reviewers found it difficult to master handheld devices due to low computer proficiency. In the current study, almost all interviewers had a tertiary degree and thus greater computer proficiency which enabled them to acquire skills in HCDC
easily. This implies that computer proficiency might be an important selection criterion for interviewers in studies using HCDC.”

12. Discussion: the section about QDS and Unicode might be better placed in the methods section.

We have moved this statement to Methods as suggested.

13. Table 2: Please adjust the layout to separate the sections more clearly. Please check case.

We have revised table 2 as suggested.

14. General: Consider consulting a technical writer to proof for grammatical/spelling errors. Make sure headings are consistent in capitalization. Some sentences are incomplete.

We have substantially edited the English writing in revision.

Discretionary Revisions
None
Level of interest: An article of limited interest
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'
An article I published is listed in the references.

Reviewer #2

Reviewer's report
Title: Acceptability and adoption of handheld computer data collection for public health research in China.
Version: 1 Date: 25 November 2012
Reviewer: Peter Byass
Reviewer's report:
This is an interesting case-report on using handheld data capture, with the added interest of the challenges of using Chinese script.

Minor revisions:

In the Abstract, you refer to "QDS Warehouse" without explanation - I understand that this is some kind of proprietary server system rather than an industrial facility, but it
would benefit from a brief explanation here, and a corresponding longer explanation on page 9.

We have revised the abstract and expanded on the Warehouse on page 9.

Table 1: it is not clear to me why start and end times of the interview would not be automatically captured from the handheld's system time, rather than being a data entry item. Is there a technical reason for this? You say on page 7 that interviews could be automatically time and identity stamped - so was this not in fact done? Needs further explanation. Similarly GPS-derived place of interview could presumably be automatically captured. We showed in Burkina Faso that these parameters were very useful for quality control (TMIH 2008, 13 suppl1:25-30).

Yes, start and end times could be automatically captured from the handheld's system time. However, the problem we identified during the pilot study was that some interviewers pre-entered some information (eg: the interview place) while waiting for a potential interviewee. This way, the duration calculated based on system time was not the “true” interview time (it was the interview time plus the waiting time). Therefore, after the pilot study, we decided to add a time variable to avoid such problems from happening during the study data collection, so that we could accurately capture the “true” interview duration.

Similarly the age of the interviewer seems to be redundant on a per-interview basis: presumably the ages of the interviewers are known without having to record them each time.

We are sorry for the confusion but we did not ask for the interviewer’s age during the interview.

The important point here is that the entire date/time type of data entry can be eliminated completely, which simplifies the data capture.

Figure 1: the title needs to include something like "... according to a survey among 20 interviewers". The actual figure is great in colour but impossible in monochrome - please put some patterns as well as colours in the bar fills. Also I didn’t understand the meaning of "handheld is more proficient" - can you clarify please.

In revision, we have deleted Figure 1. Instead, we described these statistics in text. Wording has been changed regarding use of handheld.

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.

We thank the reviewers for their helpful comments which have improved this paper.

Sincerely,

The Authors.