Reviewer's report

Title: Using diffusion of innovation theory to understand the factors impacting patients' acceptance and usage of consumer e-health innovations: a longitudinal case study in a primary care clinic

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Reviewer: Josianne Marsan

Reviewer's report:

The topic of your paper is very interesting and not much yet studied. Your paper has the potential to bring a useful and timely contribution to research and practice.

1. MAJOR COMPULSORY REVISIONS

1.1. I feel that your paper in its current form doesn’t bring much more than your two previous articles (i.e. Zhang, Yu and Yan 2014; Zhang, Yu, Yan, Hu and Goureia 2012). Log data collection and analysis, and results from this analysis are the only significant addition, but it only occupies a relatively small portion of the paper compared to qualitative results. I also acknowledge that your qualitative results are presented in this paper in a more theoretically-based fashion, which is a nice addition. However, I think you should present and discuss your qualitative results more briefly and put much more emphasis on the results from the log data analysis and comparisons of the log data with qualitative data. Most notably, in its current form the paper says nothing about the procedure for log data collection and analysis.

1.2. You should cite your own previous work on the same topic in order to acknowledge work upon which you are building.

1.3. Your research question(s) is not clear. On lines 111 to 112, you talk about factors influencing adoption, as well as understanding of the adoption and usage. You then mention that you use Rogers’ theory to analyze adoption factors, but you say nothing about usage. Please clarify your research question(s)/objective(s).

1.4. According to Rogers (2003), diffusion represents the adoption rate of an innovation. An innovation is adopted by a “unit of adoption” which perceive it as new. The adoption is the decision or commitment to put the innovation into use for the first time. An online appointment, as I understand it from your explanations, is the use of the e-appointment system by a patient to take an appointment. Thus, the e-appointment system is necessarily already adopted by this patient when it is used for his second appointment, since the system is not new anymore for this patient. For example, a TV is not adopted by someone every time he/she switches it on. The TV is first adopted by the person, installed in the house and then used repeatedly to watch many programs. Adoption is a
different concept than use. Adoption is a decision. After being exposed to the existence of an innovation and understanding how it functions, the person forms an attitude towards it and decides to adopt or reject the innovation. Immediately after the decision to adopt has been made, or after some time, the innovation is put into use. Later, use can be discontinued if the innovation does not reveal itself as useful. This is Rogers’ (2003) innovation-decision process. Note that an innovation may be adopted, but never used in the end. Use (one-time or repeated) implies adoption, but adoption does not imply use. Since diffusion represents the rate of adoption of an innovation among units of adoption, and since you really measure use instead of adoption of e-appointment system in your paper, then you do not measure diffusion. If you want to measure diffusion, then you need to consider that the very first online appointment of a patient can be a surrogate for adoption of e-appointment by this patient. Please provide clear definitions of the concepts you measure.

1.5. You claim to have done a longitudinal study. However, you seem not to have surveyed the same patients all along. A longitudinal study would have compared the adoption factors and behaviors at T1, T2, etc. for the same respondents to see how it evolves. You should tell the reader how many patients participated in all four surveys, in 3 of them, 2 of them and 1 of them. If you have less in the last two groups than in the first two, then it is a limitation of your study that should be mentioned. Moreover, since you may have patients that were surveyed more than once, it doesn’t make sense to treat the data as if the 125 interviewees were 125 distinct patients, i.e. without distinguishing the survey period (see tables 1, 2 and 4). I am not an expert in statistical analysis, but it doesn’t seem right to me.

1.6. In your discussion, compare your results with those of other studies that focus on more complicated consumer e-health services, especially since you say that your results bring new insights. What is similar to what is already known? What is new?

1.7. Your claim on lines 104-106 is not wrong. However, you can’t ignore that Or and Karsh (2009) presents a systematic review of patient acceptance of consumer health information technology in general, not excluding the primary care context. The same can be said for the meta-analysis presented in Dohan and Tan (2013). Also, Macpherson et al. (2014) presents a systematic review of older adults’ use of personal health record in the primary care context. You have to at least acknowledge their efforts to synthesize and interpret more general evidences or subsets of evidences. Even if it was not in the same context, you could compare your results with Zhang et al. (2014) who says that despite the benefits of using the e-appointment system, most patients in Shangai’s tertiary hospitals still registered via the usual method of queuing, suggesting that hospitals and health service providers should promote and encourage the use of the system. Cao et al. (2011) also demonstrates that being ignorant of online registration, not trusting the internet, and lacking the ability to use a computer were three main reasons given for not using the web-based appointment system in tertiary hospitals.

1.8. You make an unsupported claim about DOI theory on lines 171-173. Please
provide evidence or reference for this claim.

1.9. Please explain why you chose the period April 2011 to May 2013 for surveys and January 2011 to May 2013 for the log data collection. Moreover, why first survey was done 3 months after the system implementation? Is it long enough for the system to be used in a meaningful manner?

2. MINOR ESSENTIAL REVISIONS

2.1. On lines 226-231, you talk about the channels but you don’t mention when they were put into place. Moreover, you later talk about a voice message via the phone service, but it is not listed as a channel on lines 226-227.

2.2. On line 152, you mention that characteristics of the adopters are determinants of IT innovation success, but you don’t present these characteristics afterward. Please present it as you do with the other determinants. Also, talk a bit more about the structure of the social system on lines 169-170.

2.3. On lines 358-359, you mention the ability to print out the appointment results, but you don’t provide evidence of this afterward, as you do with the other perceived advantages.

2.4. Title on line 395 should be in bold.

3. DISCRETIONARY REVISIONS

3.1. You should give an id number to each interviewee and use it to identify who said what, i.e. put the id number of the interviewee after each interview excerpts.

3.2. I think it could be interesting if you mention that one important problem faced by clinics is that patients sometimes do not show up for their appointments. Missed appointments represent close to 10% of all appointments and this can lead to lower productivity for healthcare professionals and increased overall wait time for patients that can higher the risk for their health (Boyette and Staley-Sirois 2012, Henderson 2008). Recently, Horvat et al. (2011) showed a reduction of 2% in missed appointments for patients using an e-appointment system over 2 years.

3.3. I understand that your study was done in Australia, but you should talk about the rest of the world in your Background section. How does Australia compare to the rest of the world in terms of challenges related to healthcare and of future use of consumer e-health technology?

3.4. You could use a table to present and compare the demographics and census data.

3.5. You present the details of the architecture of the system on page 10 and in figure 1, but I find this information useless to understand the adoption and use that is the focus of your paper. I would delete this.
REFERENCES:


Cao W; Wan Y; Tu H; Shang F; Liu D; Tan Z; Sun C; Ye Q; Xu Y (2011). A web-based appointment system to reduce waiting for outpatients: a retrospective study, BMC Health Services Research, 11, pp. 318.


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Level of interest: An article whose findings are important to those with closely related research interests
Quality of written English: Acceptable

Statistical review: Yes, but I do not feel adequately qualified to assess the statistics.

Declaration of competing interests:

I declare that I have no competing interests