Reviewer’s report

Title: What is it like to use a BCI? – Insights from an interview study with brain-computer interface users

Version: 2 Date: 30 Aug 2019

Reviewer: Reviewer 2

Reviewer's report:

PEER REVIEWER ASSESSMENTS:

OBJECTIVE - Full research articles: is there a clear objective that addresses one or several testable research questions? (Brief or other article types: is there a clear objective?)

Yes - there is a clear objective

DESIGN - Is the current approach (including controls and analysis protocols) appropriate for the objective?

Yes - the approach is appropriate

EXECUTION - Are the experiments and analyses performed with sufficient technical rigor to allow confidence in the results?

N/A - no experiments or analyses

STATISTICS - Is the use of statistics in the manuscript appropriate?

N/A - there are no statistics in this study

INTERPRETATION - Is the current interpretation/discussion of the results reasonable and not overstated?

Yes - the author's interpretation is reasonable

OVERALL MANUSCRIPT POTENTIAL - Has the author addressed your concerns sufficiently for you to now recommend the work as a technically sound contribution? If not, can further revisions be made to make the work technically sound?
Probably - with minor revisions

PEER REVIEWER COMMENTS:

GENERAL COMMENTS: The ms 'What is it like to use a BCI? - Insights from an interview study with brain-computer interface users' is a report on a user-experience study using analyses of 9 interviews. There is a need for systematic investigations of the subjective experience of using a BCI and depending on it for communication. This study is original and the application of structured analysis method to this field new (as to my knowledge). The paper is well written and clear and the style is according to scientific standards.

REQUESTED REVISIONS:

There is an essential limitation as to the presented evidence: the common limitations of self-reports and interviews. It is a given that more objective empirical measures were not used, but a pity they were not included in the discussion or introduction. E.g. for the sense of agency objective methods are evolving in the domains of AR and games, as was briefly mentioned. But even when relying on subjective self-report a measurement with some reliability and validity (e.g. like a SUS scale) would have been helpful (please discuss).

Also in the scoring of the interviews, assessing and reporting inter-rater agreement could have put the results on more firm footing.

The core of the paper is quite long and I think overly detailed. Shortening it will help it being read more.

The argument of the previous round of reviewers have been properly met, suggestions were followed and changes made.

I have a serious objection against using subject's names in the paper. Even if subjects agreed (I hope they did) in specific cases the info may be possible to be traced back to the patients (especially with a surname mentioned). This may have unforeseen consequences when e.g. journalists find out identity. Moreover, there is no need to not be anonymous. The authors can substitute subject numbers for names (S1, ..).

The discussion is a bit meager, only providing some limitations. (P44 L15). I would suggest to express the need and the opportunity for objective methods to measure workload, sense of agency, involvement and focus, frustration and stress, etc. and relate them to the interview analyses.

The section on participation (pages 18-23) is mostly about the perceived benefits of participating in a study. Although it's good that this effect is recognized and described, it is in fact a different subject that is not related to the research questions that formed the basis of the study. Therefore, it seems to me that the majority of this section is not of relevance to this paper.
Similar, on page 35 rule 31-36: Again the effects of participating in a study are mentioned, and it is concluded that these effects also contribute to the user's sense of agency. But his effect should in my opinion clearly be separated from the effects of BCI use itself. The participation effect is not inherent to BCI use (one could, especially in the future, use a BCI without extensive trainings or without participating in a study), nor are they exclusive to studies with BCI's. So I think this effect should be regarded more as a disturbing factor in the study than as an outcome itself and care should be taken not to make conclusions on effects of BCI use that are actually caused by participating in the study itself.

Overall I advice acceptance in a journal that is not restricted to empirical studies.

Minor remarks:

P4 L14. There are many active BCI paradigms next to motor imagery.

Rewrite 'The mental strategy applied here is motor imagery ..' as

'A mental task used often in these BCIs is imagined (or attempted) movement ..'

The announced 9 subjects (P6, L36) are a bit hard to trace back in the text from P7 L15.

The awareness of the technology and its positioning and acceptance is something that comes about in a social context. The social importance and role of events like the Cybathlon (P20), and the possible importance it may have in positioning the technology, and affect self-perception and personal achievements, can be elaborated a bit. Add some references to these kinds of events (including gatherings of patient-organizations).

The role of emotion as having a negative effect on the use of BCI (P29 L19) is interesting. There are users for which it is different (L31). But emotions are very important for patients to express, and for that the channel of a speller with artificial text to speech in one fixed voice may not be appropriate. There is no reason why future BCIs cannot find ways to support emotional communication better. This gives the emotion issue some more context.

I didn't find any mention of the time that has passed since the participants tested or used the BCI at the moment of the interview. It is known that memories become less and less reliable as the events happened longer ago. Was this documented. Has this been taken into account in any way?

As also pointed out in other words by the original reviewer, in general, I think the article could be better if it contained a more extensive analysis on the different outcomes of the interviews between participants in relation to their very different situations: how often they had tested or used the technology; if they were dependent on it; etc.

ADDITIONAL REQUESTS/SUGGESTIONS:
See text above.

**Are the methods appropriate and well described?**
If not, please specify what is required in your comments to the authors.

Yes

**Does the work include the necessary controls?**
If not, please specify which controls are required in your comments to the authors.

Yes

**Are the conclusions drawn adequately supported by the data shown?**
If not, please explain in your comments to the authors.

Yes

**Are you able to assess any statistics in the manuscript or would you recommend an additional statistical review?**
If an additional statistical review is recommended, please specify what aspects require further assessment in your comments to the editors.

Not relevant to this manuscript

**Quality of written English**
Please indicate the quality of language in the manuscript:

Acceptable

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