Natural Hazards
and Earth System
Sciences
Discussions

Interactive comment on "Learning in an Interactive Simulation Tool against Landslide Risks: The Role of Amount and Availability of Experiential Feedback" by Pratik Chaturvedi et al.

Pratik Chaturvedi et al.

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The manuscript presents an interesting tool for testing the people's propensity to invest money for protecting goods and life from landslides. The tool has been applied for analyzing the effect of feedbacks availably in influencing the people's decision-making process when asked to invest resources for landslide protection. The topic of the manuscript fit into the scopes of the NHESS Journal since it deals with the design and implementation of mitigation and adaptation strategies to reduce the impact of hazardous natural events on human-made structures, infrastructure, and life.

Authors: Thank you for appreciating our research. We agree with you that the ILS tool

is a promising tool for capturing the decisions of participants against landslide risks and it could be applied with reduced effort to other natural disasters involving human decisions.

We have added these points as part of our discussion section in the manuscript (pgs. 20-22).

General comments: The structure of the paper is fair and, even if I'm not a native English speaker, I found the paper understandable. However, I think that some improvements can be made simplifying the sentences and re-phrasing some frequent constructs as "Although . . ... ; however . . .. .", where the semicolon do not help to understand the sentence.

Authors: Thank you for appreciating our research.

We have now modified the language of the manuscript according to your suggestions and removed the use of semicolons.

I suggest to promote the section "Interactive landslide Simulator (ILS) tool" from the level of a subsection to the level of a section. Currently it is, erroneously, inside the "Computational model of landslide risk" section. More in general I would also suggest to the author to use the common scientific structure which includes "Introduction", "Material and Methods", "Results", "Discussion" (currently discussion and results are in the same section).

Authors: Thank you for the comment.

We have now made ILS tool as a separate section (pg. 8). Also, we have modified the headings in the manuscript as per your kind suggestions.

I think that the ILS tool is very interesting but I see a major problem in the paper: there is not the possibility to test the ILS tool. My opinion is that, according to the open science, open data, open knowledge concepts, researchers should be put in condition of evaluating the ILS tool. From the paper it is not clear if the tool is a web application

or a standalone program and there is not a description of the technology adopted for implementing it, nor of the intention of the authors of releasing the code and, if this is the case, adopting which license.

Authors: Thank you for your kind comments. ILS is a web-based tool that one can access on the following URL: www.pratik.acslab.org.

We have now provided a link to the tool on pg. 8 and can provide the tool's code upon request.

Another issue is about the significance of the results of the experiment. Evidences are that people using the ILS tool with feedbacks, rapidly understand that the best strategy to "win the game" is to invest the entire daily income in landslides mitigation measures. Even if this is interesting, the authors do not comment or discuss the fact that the population of the participants is made of people having high to very high educational levels. This can have a strong effect on their capacity to rapidly find the best strategy. This is particularly true where one considers that, as far as I know, the educational levels of people living in the Himalaya region is mostly low and very low. I think that representativeness of the participants to the experiment should be discussed more in detail.

Authors: Thank you for your kind comments. The sample was representative of the study area's population because, like in our sample, the literacy rate is quite high (81.5%) in the study area. In addition, before the experiment, participants were also asked about their self-rated knowledge level for landslide risks.

We have now mentioned these points in the revised manuscript on pg. 15. Furthermore, we have also observed that the use of the optimal invest-all strategy was maximized when the experiential feedback was highly damaging in the ILS tool. One likely reason for this observation could be the high educational levels of participants residing in the study area, where the literacy rate was more than 80%. Thus, it seems that participants' education levels helped them make the best use of damaging feedback.

We have discussed these points on pg. 20 in the revised manuscript.

Lastly: figures are enough rough and should be improved and better described in the captions.

Authors: Thank you for your kind suggestions.

We have now improved the quality of figures and their captions in the modified manuscript. All other formatting errors and references are corrected in the revised version. Now, the manuscript has also been proofed for English grammar.

Specific comments:

L138: I think you need to add that 0<M<1

Authors: Thank you for this comment.

We have now added $0 \leq M \leq 1$ as per your kind suggestion in the revised manuscript on pg. 6.

L162: It is not clear to me what the Total Estimated Hazard is. Please define it. L162: Landslide Hazard Map: what is this? Not clear how this is related to the LSZ and to the THED. It is even not clear how the spatial probability is included in the tool. It is a single value or there is a map?

Authors: Thank you for your kind comments.

We have now defined the Total Estimated Hazard (THED) as a rating of different locations on a Landslide Hazard Map and their surface area of coverage on pg. 7 of the revised manuscript. Also, as part of our revision, we have now provided the THED scale in Table 1 (see pg. 7). From this table, the critical THED values (e.g., 3.5, 5.0, 6.5, and 8.0) were converted into a probability value by dividing with the highest THED value (= 11.0). Next, we used the LSZ map of the study area to find the surface area that was under a specific THED value and used this area to determine the cumulative probability density function for P(S). For example, if a THED of 3.5 has a 20% coverage

area on LSZ, then the spatial probability is less than equal to 0.32 (=3.5/11.0) with a 20% chance. Similarly, if a THED of 5.0 has a 30% coverage area on LSZ, then the then the spatial probability is less than equal to 0.45 (=5.0/11.0) with a 50% chance (30% + 20%). Such calculations enabled us to develop a cumulative density function for P(S). In the ILS tool, a participant was assumed to belong to a location in the study area and this study area determined the P(S) value. This P(S) value stayed the same for this participant across her performance in the ILS tool (see pg. 7).

L172: Is "become less than" correct? I suppose should be "become greater than". If not please try to explain why must be "less".

Authors: Thank you for your kind comments.

Yes, becomes less than is correct and we have clarified this reasoning as a footnote on pg. 5 in the manuscript.

L182: please change "their total wealth" with "the total wealth of the participants"

Authors: Thank you for the comment.

To keep the grammar consistent, we have changed the sentence to the following, "The goal in ILS tool is to maximize one's total wealth, where this wealth is influenced by one's income, property wealth, and losses experienced due to landslides." (pg. 8)

L207: "decision-maker". Are you meaning "participant"? If yes please change the text accordingly.

Authors: Thank you.

We have replaced the term decision-maker with participant everywhere in the revised manuscript as per your suggestion.

L241-243: the sentence is not clear. Please rephrase.

Authors: Thank you for the comment.

We have rephrased the sentence to make it clearer in its meaning.

L243: "see Figure 2": please explain how the figure helps in understanding the text.

Authors: Thank you for the comment. Figure 2 (now Figure 3) in the revised manuscript shows the investment screen that were shown to participants in the feedback-present conditions.

We have now mentioned this explanation on pg. 12 in the manuscript.

L262: "(W)": it is not immediate to understand that "W" is the parameter of the equation at page 4. Please number the equations and use those numbers in the text.

Authors: Thank you for the comment.

We have addressed this comment in the revised manuscript (pg. 13) by stating the line with the equation number. Now, we state that, "the weight (W) parameter in the equation 1 of the ILS model was fixed at 0.7 across all conditions."

L263: "was fixed to 0.8": in figure 2, W is 0.7.

Authors: Thank you. We made a typo in the manuscript.

We have now fixed this typo and made W equal 0.7 in the manuscript (pg. 13).

L302: the first sentence was already stated at the start of the 3.2 subsection.

Authors: Thank you.

We have now removed this sentence to avoid repeated use.

L313: please describe the meaning of the statistical parameters (derived from statistic tests) inside the brackets.

Authors: Thank you for your kind comment. We performed analysis of variance statistical tests for evaluating our expectations. The F-statistics is the ratio of between-group variance and the within-group variance. The numbers in brackets after the F-statistics

are the degrees of freedom (K-1, N - K), where K are the total number of groups compared and N is the overall sample size. The p-value indicates the evidence in favour of the null-hypothesis when it is true. We reject the null-hypothesis when p-value is less than the alpha-level (0.05). The $\eta 2$ is the proportion of variance associated with one or more main effects. It is a number between 0 and 1 and a value of 0.02, 0.13, and 0.26 measures a small, medium, or large correlation between the dependent and independent variables given a population size.

We have now mentioned these details as a footnote on pg. 15 in the manuscript.

L330: what "CI" means?

Authors: Thank you for the comment. CI stands for confidence interval value.

We have now added this full form on pg. 16 in the manuscript.

L385-386: unclear. Please rephrase.

Authors: Thank you for the comment.

We have rephrased these sentences to make their meaning clearer in the manuscript (pg. 21). The revised draft with the changes made is enclosed as a supplement.

Please also note the supplement to this comment:
https://www.nat-hazards-earth-syst-sci-discuss.net/nhess-2017-297/nhess-2017-297-AC2-supplement.pdf