

We sincerely thank Reviewer for the constructive and detailed feedback provided in this round of review. We are grateful for your recognition of the improvements made and for the additional comments that have helped us further refine the manuscript. Below we provide a point-by-point response to each of your suggestions. All page and line numbers refer to the revised version of the manuscript with tracked changes.

Content:

Reviewer comment:

a) Throughout the manuscript, you keep using different terms for your process with experts (“semi-structured discussions”, “online semi-structured interviews”, “survey”, “expert-led focus groups”, “focus group of experts”), which is confusing. In my understanding, you sent out an online survey with open-ended questions, to which 8 experts then replied. If this is correct, please make this clear in throughout the manuscript. You may also add a comment about the rather small size of the expert group in the limitations part of the conclusion and what it means for the reliability of the study.

Author response:

Thank you for your observation. We have now homogenized the terminology across the manuscript, consistently referring to an online expert focus group survey to expert. A brief reflection on the sample size and its implications for generalizability has been included in the limitations section of the conclusion (page 19, lines 658-660). Additionally, some sentences that referred to focus group theory have been removed in order to avoid conceptual inconsistencies (page 7).

Reviewer comment:

b) Line 117: Why is the reference year 2015? Which hazard has been the most common since then? 2015 was 10 years ago, so saying in the last 20 years floods have been the most common only makes it the most common for half of the timeframe – what about the other half? Add information about what has been the most common hazard since 2015.

Authors response:

Thank you for pointing this out. We have removed the outdated reference to the 1995–2015 period and updated the manuscript with recent data from the Natural Disasters Data Book 2023 (ADRC, 2024), which is based on EM-DAT, (the Emergency Events Database maintained by the Centre for Research on the Epidemiology of Disasters (CRED) at the Catholic University of Louvain, Belgium). The revised sentence now states that floods and storms remain the most frequent natural hazards globally, with floods accounting for 44 % and storms 37 % of all recorded disasters in 2023 (page 4, lines 128-130). This update strengthens our analysis by providing up-to-date and specific information on the most recent hazard distribution, responding directly to your suggestion. In addition, the corresponding reference has been added to the References section.

Reviewer comment:

c) Figura 1: en los apartados “aplicaciones móviles” y “jugabilidad”, indiquen a qué juego se refieren cuando hablan de “sin sistema de recompensas” y “proporciona retroalimentación positiva”. En “narrativa” y “juegos en línea”, cambien la última línea por: “Sin personajes; el juego se centra en la construcción de edificios o defensas”. En “Contenido”, dentro del recuadro azul, utilicen una coma después de “términos”, es decir: “uso de términos alarmistas, no proporciona...”.

Authors response:

Thank you for this suggestion. We confirm that the statements “No reward system” and “Positive feedback” apply to all three mobile apps analysed (Geostorm, Disaster Rescue Service, and Earthquake Relief Rescue). We have corrected the corresponding text within Figure 1 to reflect this information. Additionally, this clarification is supported by the detailed descriptions provided in the supplementary material S3 (Table S5). We have also implemented the other requested changes to Figure 1: under “Narrative” and “Online games”, the final line now reads “No character; game focuses on constructing

buildings or defences”; and in the “Content” section of the blue box, we have added the comma after “terms” so the phrase now reads “use alarmist terms, do not provide...”. All modifications have been applied directly to the Figure 1 to improve accuracy and consistency while preserving visual clarity.

Reviewer comment:

Line 283: The European education curriculum comes quite out of the blue – maybe add a sentence or two on what the curriculum states and its aims and why you found it worthwhile to include it in your analysis.

Authors response:

Thank you for this observation. We agree that the reference to the European education curriculum required additional context. We have now added two explanatory sentences clarifying the aims of the curriculum and its relevance to the pedagogical goals of serious games in disaster education (page 11, lines 372-374). This improves the coherence of the section and justifies its inclusion in the analysis.

Grammatical errors:

- *Reviewer comment: Lines 23 to 25 – this sentence is unclear and needs rewriting.*

Authors response: Thank you for the suggestion. We have rewritten the sentence (page 1, lines 24–26).

- *Reviewer comment: Line 39 – interchange or exchange.*

Authors response: We have replaced the word “interchange” with “exchange” as suggested (page 2, line 47).

- *Reviewer comment: Line 53 – could allow the players (eliminate the to).*

Authors response: We have removed the preposition to, resulting in a more concise and grammatically correct sentence: “could allow players to make decisions” (page 2, line 61).

- *Reviewer comment: Line 106 – grammatically incorrect, change to: "Considering their characteristics, there is a wide variety of genres and formats such as simulations, which replicate aspects of real or fictional realities and adventures, in which users solve challenges by interacting with people or the environment in a non-confrontational manner."*

Authors response: Thank you. We have incorporated your suggested revision (page 4, line 118-120).

- *Reviewer comment: Line 126 – exchange “achieve” with “reach”.*

Authors response: The verb “achieve” has been replaced with “reach” (page 4, line 138).

- *Reviewer comment: Line 131 – exchange “destined to” with “intended for”*

Authors response: We agree with your observation. The phrase has been revised and we have replaced “destined to” with “intended for” (page 5, line 154).

- *Reviewer comment: Line 135 – exchange “DRR is the lack” with “DRR being the lack”*

Authors response: We have adjusted the expression to “DRR being the lack” (page 5, line 158).

- *Reviewer comment: Line 158 – change to: “A content analysis of the selected games was then carried out. This is a research method used to quantify and analyze the presence, meaning, and relationships of specific words, themes, or concepts, allowing for inferences to be made about the messages within different units of analysis”*

Authors response: We have adopted your suggested rephrasing (page 6, line 186-188).

- *Reviewer comment: Line 162 – eliminate the “in turn” (i.e. have the sentence go like this: “... tendencies in the games and describes the attitudes ...”)*

Authors response: The words “in turn” has been removed (page 6, line 190).

- *Reviewer comment: Line 164 – change to “These authors adapted the theoretical Social Discourse of Video Games Analysis Model (Pérez-Latorre, 2010) into an analytical instrument for games about climate change using the Delphi method.”*

Authors response: We have rewritten the sentence as suggested (page 6, line 192-194).

- *Reviewer comment: Line 221 – add “could be used in both”*

Authors response: We have added the words “could be used in both” (page 8, line 281).

- *Reviewer comment: Line 225 – change to: “Finally, in Stop Disasters, decisions such as which buildings to construct or improve, where to build hospitals, or which barriers to build against natural hazards can also involve teamwork.”*

Authors response: Thank you. We have revised the sentence as suggested (page 8, lines 285-286).

- *Reviewer comment: Line 230 – eliminate “in the content”*

Authors response: We have removed the words “in the content” (page 8, line 288).

- *Reviewer comment: Line 231 – Change to: “Build a Kit is the only game that can likely be completed within an hour, while Disaster Master may also be finished in that time, depending on the students’ age and comprehension level.”*

Authors response: We have incorporated the reworded sentence (page 8, lines 389-390).

- *Reviewer comment: Line 234 – eliminate the comma after “actions”*

Authors response: The comma after actions has been removed (page 8, line 292).

- *Reviewer comment: Line 253 – change to: “As it is based on a fictional film, Geostorm leans more toward fantasy and is less realistic than other games, such as Disaster Master.”*

Authors response: We have adopted the suggested formulation (page 10, line 340-341).

- *Reviewer comment: Line 278 – exchange “however” with “meanwhile”*

Authors response: The transition word “however” has been replaced by “meanwhile” (page 11, line 368).

- *Reviewer comment: Line 281 – Eliminate the “likewise”*

Authors response: We have removed the word “likewise” (page 11, line 371).

- *Reviewer comment: Line 299 – change to: “... since natural phenomena lend themselves well to interaction with the environment.”*

Authors response: We have changed the sentence accordingly (page 11, line 391-392).

- *Reviewer comment: Line 318 – I am unsure what that sentence means. If this is what you want to say, please change to: “However, the most prominent element in this context is narrative, since serious games with a strong narrative may have less interaction but can still deliver a powerful impact.”*

Authors response: Yes, that is exactly the intended meaning. We have replaced the original sentence with the suggested version (page 12, line 418-419).

- *Reviewer comment: Line 343 – “since livelihoods, housing, and access to training and information are often unequal and more susceptible to natural hazards”*

Authors response: We have modified the sentence as suggested (page 12, line 427-428).

- *Reviewer comment: Line 346 – change to “training in prevention and vulnerability reduction”*

Authors response: The phrase has been updated (page 12, line 430).

- *Reviewer comment: Line 368 – change to “integration of findings” o “synthesis of findings”*

Authors response: We have adopted the expression “integration of findings” (page 14, line 476).

- *Reviewer comment: Line 369 – change to “In this section, the findings of the qualitative content analysis and the expert focus group were compared and further summarized”*

Authors response: We have replaced the sentence with the proposed formulation (page 14, line 477).

- *Reviewer comment: Line 373 – change to “multiculturalism” instead of “multicultural”.*

Authors response: We have corrected the term, replacing “multicultural” with “multiculturalism” (page 14, line 481).

- *Reviewer comment: Line 468 – there is a word missing*

Authors response: Thank you for noticing this. We have identified and corrected the omission to ensure grammatical completeness (page 17, line 580-583).

- *Reviewer comment: Line 480 – “Reward system” – eliminate the s in “Rewards”*

Authors response: The term has been corrected to reward system, removing the plural “s” as recommended (page 17, line 593).