

Please explain this sentence better: “At the beginning of the game, players are informed of the presence of water wells, food markets and sectors defining hazard impacts but no information is given about their utility on the island” (page: 5214) What is meant by no information is given about their utility?

We mean that we do not explain to the players, when players are requested to install their initial two families on the play board, that water wells and food markets will supply the players families with water and/or food during the game. We updated this sentence with (p.6-line.2):

“In the beginning of the game, players are informed of the presence on the board game of water wells, food markets and sectors dividing the island into different zones that can be potentially affected by hazardous phenomena. No information is given initially about their utility in the game but the players will discover their importance throughout the game“

Section two would benefit of having a clear turn sequence summary. It seems that the sequence is: get income, feed the households, invest/build new.

We updated a sentence in the beginning of the paragraph to make it more clear (p.6-line.8):

“A year corresponds to a round table during which players receive an income which can be invested to (1) support their families’ basic needs and (2) make investments.”

Can you present more details about the mechanics of the income?

More information is given about income in the section 2.3.

“Each game year, the characters receive a specific income related to their livelihood and multiplied by their number of living families. That income is represented by different resource cards: bread, water, and bricks (Fig.1c). Two additional resources, representing the variable part of the income, are obtained each year by rolling dice (Fig.1d).”

Placing new settlements apparently have restrictions (because of the last sentence in 2.2.), but those are not clearly described.

We updated the paragraph to make it more clear (p.6-line.21):

“Huts, houses, and roads can be built to expand only from the two initial settlements of each character (Fig.1f). Development of these new infrastructures is spatially constrained for each player to the zones corresponding to his livelihood profile. These locations are marked on the game board using the color assigned to each (Fig. 1a). No color is assigned to the mayor and the tour guide because no land cover is related to their livelihood. Both characters can live wherever they want on the island.”

Have you considered an alternative to playing a video clip to show the hazard? Was this necessary? It might break the flow of the game.

No alternative has been considered. The video clip, each lasting less than 2 minutes, is already an extra tool to illustrate the phenomenon. If not possible to display, the discussion will start based on what the players already have seen about the hazard. However, we think this moment in the game is important because European players are not always used to the hazard and its impacts. It allows them to visualize what we are talking about. According to our experience, this does not break too much the game, and on the contrary attracts the attention of the players.

How does the game master decide when is time for a hazard?

The game master decides randomly about the time between the hazards. However, it is recommended to find a balance such that players can develop themselves on the island on one hand and experience enough hazards during the game on the other hand to realize their impact and adapt their strategy

We updated the sentence (p.7-line.2) with:

“Each time interval is randomly defined by the game master but is not communicated to the players.”

“It should be noticed that other impacts than the ones defined within the Hazagora guidelines can be proposed by the players and implemented if they correspond to a potential and realistic impact.” (page 5215) How is this managed? Can player suggest changes during gameplay? Is it discussed in the beginning? Is it incorporated in the game rules (e.g. there is a game action that changes the outcomes?)

This sentence has been deleted. Even if it is true that we are providing the players with some flexibility during the game, it is rare that other impacts

are proposed because all potential impacts on the HAZAGORA island have been considered.

You mention huts and people. But, it is not clear in figure 1 that you have huts and families as separate game elements.

Constructions elements such as huts and houses are represented by chips meanwhile families are represented by little wooden figures. On the board game we put the figures above the chips such as represented in figure 1. This allows separating these elements if a family dies or if a hut is destroyed due to a phenomenon. If this happen, it is possible remove one of the two elements which brings an interesting problematic to the game. E.g. where will my families sleep during the next year? Would I make my unoccupied hut/house available to other characters' families if they need a shelter?

We updated the legend with (p.30):

“(f) – hut (one chip with one family), house (two chips with two families)”

Figure 3.b is not clear to me.

This part of the figure shows the different sectors we've drawn on the island and which represent the potential sectors that can be affected by the related phenomena.

We updated the legend with (p.32):

“(b) sectors defining potential zones that can be affected from the right to the left by tsunami, ash fall, lava flow and earthquake on the island”

How and who acquires community cards. Who can decide to use them?

Community cards are acquired during the community discussion we start at the end of each year. To acquire a community cards, all players have to agree together on how each player participates to buy the card and how to use it.

We updated the paragraph (p.9-line.4) with:

“At the end of each *Hazagora* year, the game master invites all the actors of the game to discuss the development of the island and the need to take joint decisions to develop the island or protect the entire community against

hazards. Community protection cards can be acquired during this discussion .”

It could be interesting to compute the Resilience index at the end of each turn to promote awareness of the progression. Or at least to have a track of capacity points and vulnerability points.

For the purpose of the paper, the evolution of the games has been recorded as much as possible. That is why we always tried to be at least two people during game sessions. However, in the future, this could be a drawback of the game because it is not always possible to have a “recorder” person available. Moreover, it has been decided to calculate the vulnerability point only at the end of the game because it also has been realized, in previous game sessions, that calculating this index alone induces a big break in the game flow. That is why we decided to simplify the rules when it is played for none scientific purposes but just information purposes and to calculate the vulnerability point just once at the end of the game.

In my opinion the paper present just a few details regarding gameplay to understand the concept. I got an idea on how the game works, but I’m guessing a lot of details. It would be nice to know a few more details to fully understand the gameplay (to recreate it, for example).

The objective of our paper is to give an overview of the game but mainly to evaluate its potential as an education and awareness raising tool. It is not the purpose to give the full details of how to play the game in this scientific paper. Our idea is to allow potential users to contact us if they want a version of the game, in which details rules and a guideline for the game master are provided. This information has been added to the text (p.4-line.27):

“Hazagora is a none commercial game that available upon request.”

Section 4 present interesting studies. But, the description lacks some details.

“Classification of the players regarding of their age, background and experience cannot be made” (page 5219) Can you explain this a bit better. It is not clear to me why the classification (you mean analysis?) of players by age, background/experience cannot be made do you mean that it was inconclusive? You did not found any effect?

The adopted strategies were mostly adopted based on personal desire. Moreover, if a real correlation had to be made regarding the players' age, background and experience, the players sample in each category should have been more important to allow us concluding a significant correlation.

However, the sentence has been updated with (p.11-line.5):

“No significant correlation between age, background and experience with strategy could be made. However, these factors influence the decisions taken by the players during the game. It also seems that strategies adopted during the game are influenced by personal desire to take risk or not; are mostly intermediary to the extremes strategies described below and; are changing during the game.”

Furthermore, why do you state that “strategies adopted during the game (1) are influenced by personal desire to take risk or no”? (page 5219) How do you sustain this affirmation? This was based on observation? Did you perform a risk-taking assessment to the subjects?

This is based on our observations and on the oral statements of players. With a game, we know that we are not taking any real risk. It is fun to test new and extreme strategies during a game regarding less of our experience and background. We agree the experience and background will allow players to realize that some elements on the game are important such as access to water and markets but the final decision that players takes is mainly based on their feeling of the moment.

A note. It would be interesting to see more details regarding changes in the strategies of players during gameplay or across games (if played more than once). For example, if they start playing a fast-growth fatalist strategy will they move towards a more protectionist strategy (or vice versa). It seems that they change to a fatalist strategy in the last turns of the game. But this is due to a “end of the world effect” where the action no longer have “long-term effects”. You can try to avoid this by having some uncertainty on the end of the game (e.g. avoid a fixed number of turns).

Unfortunately, we have never had the opportunity to play the game several times with a same set of players. Evolution in their strategy regarding different game session is therefore not possible. However, sometimes during a game session, a shift of strategy is observed such as the one explained in section 4.1.4. where one can read about the evolution of the

tour guide in the game. He is starting with a fast-growth fatalist strategy and because of all the hazards affecting him, he is adopting a more protectionist strategy due to his situation.

We agree that we are seeing a “end of the world effect” at the end of the game which explains the strategy shift of most of the players. A solution that can be found and which is already used is to play with an ending hour. This could avoid the “end of the world effect”. However, we recommend people to play a minimum of 5 years to experience a large suite of different hazardous events and explore and refine different mitigation strategies. Within that time, it allows them to also experience the same type of hazardous event several times.

However, to avoid an “end of the world” effect, it will be added to the game rules that the game master doesn’t have to give information about the end of the game.

It would be important to check the resilience evolution of other game sessions. It is not clear why only one session (of the 9 sessions) is presented. That particular one is a bit biased due to the fact that the lumberjack was lucky and did not suffer from hazards.

Other resilience evolutions have been recorded, but for the purpose of clarity, it has been decided to select just one evolution which was, according to us, the most characteristic evolution to illustrate the different strategies we develop in the paper.

In session 4.3 you refer to Belgium students, while in most of the paper (and in the images) they are referred to as European players. You should stick to the last. Always refer to European players.

This has been updated throughout the manuscript.

In section 5, you refer to five types of strategies (fatalist, protectionist, spatial, individual or collective strategies) stating that they were observed once or repetitively. You should clearly state the number of occurrences of each strategy.

The five strategies mentioned are not all mutually exclusive. The strategy of one player cannot always be allocated to a given strategy unambiguously and might vary throughout the game session. It is therefore not possible to provide a quantitative analysis of the number of occurrences.

“Real life experience and impacts experienced during the game may influence the players’ strategies. These people usually adopt more protectionist strategies with a good access to resources” (page 5226). You should present some data to sustain these affirmations. The wording “may” makes the affirmation weak as well. What do you mean by those people it not totally clear. It seems you refer to people that have experienced (more) hazards, in the game or in real life.

With “these people/players” we indeed refer to people which have experienced hazard in their real life or during the game session. Although this cannot be quantitatively demonstrated, our experience of game session suggests that these players will adopt more protectionist strategies.

We updated this sentence (p.18-line.14) with:

“Real life experience of hazardous events and impacts experienced during the game influence the players’ strategies. It has been observed that these players usually adopt more protectionist strategies with a good access to resources.”

It would be interesting if you could compare the experience of real and game hazards. For example, how someone that witnessed 2 real-life hazards compares to someone that suffered 2 game hazards.

This is indeed a very interesting topic for research. The game indeed creates a somewhat more simplified version of the reality of an experienced hazard, and this difference could indeed influence the players behavior in the game environment. This would however require the collection of a specific set of players, and a detailed analysis of their personal experiences in combination with their game behavior, which falls beyond the scope of this paper.

Regarding the limitation of the need for a game master I have a suggestion. You can give the game master resources and goals and turn him/her into a player playing against the other players. This would engage the game master in the game as well and not just as a facilitator. If so, you could have students peers to take this role. You could still have an expert/teacher to mediate the discussions, but the gameplay would be more autonomous. You can see the Descent boardgame series <http://boardgamegeek.com/boardgame/17226/descent-journeys-dark>) for inspiration.



More engagement of the game master could be indeed given. However, we think that it is important to have an expert/teacher to give the needed information about hazards and to mediate the discussions. More responsibility is already given during the game to the mayor who is responsible to take the leadership during discussions (section 5.1.). Adding to its responsibility the management of the cards collect and the time management could be a drawback because of the diversity of the tasks he will be responsible for. We therefor prefer to give the game master all the management responsibility during the game even if it means that he will be less involved in the game.

In a future development stage of the game, we will have to test if a simple and short training of a teacher or student could be sufficient to let him act as a game master, with support of a detailed game master guidelines. This has not yet been tested.

Finally check the references. Some appear incomplete. In particular this one Pereira, G., Prada, R., and Paiva, A.: Disaster prevention social awareness – the Stop Dis- asters! case study, available at: <http://gaips.inesc-id.pt/gaips/component/gaips/publications/showPublicationPdf?pid=367&format=raw> (last access 1 January 2015), 2014. Replace it by:

Pereira, G., Prada, R., and Paiva, A.: “Disaster Prevention Social Awareness The Stop Disasters! Case Study” in Proceedings of VS-GAMES’2014 - 6th International Conference on Games and Virtual Worlds for Serious Applications, pg. 115-122, IEEE, Msida, Malta, September 2014.

We updated the reference as recommended:

Pereira, G., Prada, R. and Paiva, A.: Disaster prevention social awareness - the Stop Disasters! case study in Proceedings of VS-GAMES - 6th International Conference on Games and Virtual Worlds for Serious Applications, Msida, Malta., 2014.