Etsijä's Call: gamifying virtual conferences with alternate reality games

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Abstract

Gamification has spread into almost all scientific fields as a way to achieve beneficial outcomes such as productivity, engagement, learning and health. However, gamification has been less applied into enhancing scientific process and science communication themselves. As a case in point, in this paper we demonstrate how an international gamification conference was gamified through *Etsijä's Call*, a mysterious Alternate Reality Conference Game, to enhance conference engagement, create a positive mood for livelier communication and networking as well as to build a communal spirit among participants. The international GamiFIN conference 2020 was held online due to COVID-19. Therefore, the present paper also contributes to the growing literature on remote work and online research and dissemination practices. In this research effort, we employ both design science and mixed-method empirical work (N=47). First, we outline the process and materials involved in the ideation, design and implementation of the game, secondly, we outline the thematic analysis (n=17) of materials gathered throughout the conference from interaction with the game, and thirdly, we report preliminary results of the adapted Gameful Experience Questionnaire (GAMEFULQUEST) based on the participants' experience (n=6) and the game's probable influence on the conference experience (n=13). Our preliminary analyses show that conference participants had a meaningful interaction with the game which further enabled them to engage with several conference facets, situations and participants as indicated by the qualitative analysis of participants' interactions with the game. Moreover, the preliminary quantitative analyses based on the responses on the GAMEFULQUEST indicate that respondents had had a positive gameful experience as a consequence of interacting with *Etsijä's Call*. While the present study was preliminary and a first pilot of the conference game, future research on *Etsijä's Call* and other similar implementations should attempt to increase the volume of the investigation in terms of participants.

Keywords

Gamification, conference game, online conferences, alternate reality games, engagement, conference participation

1. Introduction

Conferences are one of the oldest tools devised to share knowledge and discuss ideas. Ensuring the quality of conferences' contents and the productive engagement of their participants is critical for academia. In the last decade, however, critical voices over the carbon footprint of conferences have gained traction. To this end, virtual and hybrid conferences were shown as a valid low-impact alternative [1]. The outbreak of COVID-19, moreover, entailed the cancellation of many academic conferences while many more moved online. During 2020, hence, online conferences multiplied, often facing new challenges.

Digital conferences present advantages (they are cheaper, do not require travel, are easier to organize) but offer a very different experience from physical ones. From a design perspective, online conferences afford a different set of interactions with the participants and the conference content. Simply translating traditional conferences online risks being problematic in terms of engagement, quality of the transmission of knowledge and effective networking. As in all forms of remediation [2], it is important to go beyond the older medium and exploit the possibilities of the new one. Moreover, the multiplication of easily accessible online conferences during the pandemic created additional competition between them, making attracting and engaging the audience even more difficult. For these reasons, we need to rethink how to organise online conferences by using the many resources offered by digital technologies to fully engage the participants and provide them with the same - if not higher - quality of interaction and scientific communication as traditional conferences. We believe that, to do so, gamification and conference games will be a valuable tool.

To contribute to the understudied area of conference games, in this paper, 1) we describe the design process of *Etsijä's Call*, a conference game, created for the GamiFIN 2020 Conference (GamiFIN) to engage players with the conference content and materials, 2) propose directions for the design of future conference games extracted through a thematic analysis of player chats and 3) present

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preliminary information regarding the possible effects of conference games on the conference experience.

2. Background - conferences games and gamification

Conferences might seem strange places to be playful - they are spaces of rigorous scientific exchange - but many of them feature some gamified elements. The literature on the topic is still scarce: in this section we organise our literature review in a narrative way, accounting for the different dimensions of gamified conferences that we have encountered. Firstly, the merchandising that many conferences offer, ranging from pencils to t-shirts, has often brought a playful tone and conference bags have been involved in informal competitions and ranking [3].

Conference badges in particular have been reinvented and hacked to be more creative. Analogue DIY playful badges such as the Data Badges [4] as well as computationally augmented conference badges (as GroupWear Nametags [5] or Badgelife[1]) have been used to improve conference experiences. Telepresence has also been subjected to playful implementations: by hosting conferences in virtual game environments, especially during 2020's travel restrictions[2]. Hybrid conferences can make use of remotely operated robots such as Beam [6], allowing participants to roam the conference spaces and interact with the other participants. To all these playful conference elements, we can add the more explicit one: that of having moments dedicated to social gaming, ranging from informal games of darts, to "game nights" in which participants play together to multiplayer games.

There are, finally, conference games. These games are meant to be played by the attendees during the academic event. They can be described as *pervasive serious games* whose mechanics and themes are integrated within the conference hosting them [7]. They are games that proceed in parallel with the conference, mixing playful moments with the ordinary reality of the academic event, and aim to increase the quality of the participation by offering a playful experience as an integral part of the conference.

Despite the fact that conference games are likely not rare, we were able to find only few recorded examples. The first is *Kroblerfon*, an Alternate Reality Game (ARG) at the Digital Media and Learning Conference in 2010 [8]. The game was camouflaged as a conference session, but the participants soon found themselves with one of the presenters having a (fictional) narcolepsy attack and another one lost in campus and able to communicate only by tweets. The players, then, had to collaborate to figure out how to guide the latter to the conference. Based on their own evaluation of the experience and on the feedback received by the players, the authors conclude that this approach to *learning by play* provoked a longer-lasting and more meaningful effect than a formal presentation.

The second example is *Parallel Worlds* at Media Mutation 7 in Bologna, 2015 [7] where players searched the Palazzo Marescotti - the 17th century building hosting the conference - for clues using beacons and QR codes. The clues indicated an ongoing invasion by fictional characters from famous games. To send them back to their worlds, the players had to use their phones to create "screenshots" (pictures), "soundtracks" (audio recordings) and "cut-scenes" (short videos) inspired by the original narratives. The aim of the game was to encourage participants to visit the historical locations and to engage them with the conference themes.

The third example is *Toy Twitter*, a toy-based conference game for the Playful Learning Conference, 2017 [9]. In the game, participants would use plush toys as Twitter users, to engage with the conference. The toys were registered as participants and received mission cards with instructions on how to play (e.g. by taking a picture of the toy listening to a plenary and tweeting it). The aim of the designers was to disrupt the conference by bringing in playful elements for community building. The positive feedback received indicated that the playful use of Twitter encouraged participants to be more creative and lively in their interactions.

These examples indicate that conference games offer a variety of tools for engaging participants with spaces, materials, people and social media. All of them, however, focus on physical participation. Despite having similar objectives of other conference games, we had to adapt *Etsijä's Call* to the new, and challenging play affordances of online conferences.

3. Design

The main objective of the game *Etsijä's Call* was to create an alternative and fun way for participants to interact with the conference and to facilitate the engagement with the different parts of the event. At first, the game was meant to be location-based and aimed to encourage conference participants to explore the venue of GamiFIN. However, due to COVID-19, GamiFIN was moved online and the game was redesigned to help the participants to engage with the virtual spaces of the conference (zoom meeting, the conference website, the conference discord channel) and to compensate the lack of socialisation. In this section, we describe thoroughly the design process of Etsijä's Call. This will allow researchers and designers working on conference games to benefit from this experience [10].

[1] See bit.ly/Etsija_Badgelife
[2] See, for example: bit.ly/Etsija_Telepres

3.1. Rationale and game structure

Etsijä's Call is an ARG based on Discord. To play the game, players have to explore the conference chat, the website and engage in presentations for finding clues. They also have to interact with other participants to gather information. The game, therefore, aimed to help familiarise the players with conference spaces and to socialise with others. The structure of the game was linear, and each player would play individually in parallel, until a shared common ending. The structure of the game was as follows: **1)** The beginning of the game was hidden in the Discord conference chat with a tread labelled as "*#you_are_my_only_hope*". If players opened it, they were instructed to contact a participant called Ilmari Etsijä. **2)** In the second phase, Ilmari - a game character operated by one of the game designers (first author) - would explain that he is in distress, and would ask the players for help. **3)** If the players agreed to help, in the third phase they were presented with several quests, where they had to retrieve bits of a code, hidden somewhere in the conference's cybersphere. **4)** In the fourth phase, if the players had collected all three code fragments, they were thanked and complimented for finishing the game. **5)** In the last phase of the game, Ilmari Etsijä himself made an unexpected appearance during the closing ceremony on Zoom through a 3D-modelled avatar to publicly thank all the players that participated in the game.

3.2. Story

We created a narrative aligned with the themes of the conference. The protagonist was a researcher specialised in "Gamified Creatures" named Dr. Ilmari Etsijä ("Ilmari" is a mythological blacksmith from the Finnish epic *Kalevala*, and "Etsijä" translates as "seeker": the combination hints towards research, craftiness and Finnish folklore). Ilmari works at the *Gamification and Gamified Creatures Centre* located in Lapland, and wanted to participate to GamiFIN. However, since GamiFIN was moved online, his over-eagerness to participate through an unfortunate attempt to hack the conference website resulted in a strange digital transformation. Ilmari became a digital entity, trapped in the cyberspace. Too embarrassed to reach the organizers and explain what he did, he decided to ask the participants to help him to turn back into his physical form. To do that, each player had to find three fragments of a code that would guide Ilmari back to his real body.

3.3. 3D Model

Once retrieved all the fragments, Ilmari would thank the player, claim to be finally free from his digital imprisonment and disconnect from the chat. This appeared to be the ending, but we wanted to create one last playful moment to reward players and involve non-player participants. To this end, we created a 3D-model of Ilmari showing him transfigured by his misadventure and transformed into one of the "gamified creatures" he studies. During the closing ceremony, the game invaded the spaces of the conference one last time. Ilmari (a game designer, third author, moving the 3D model (Figure 1) and speaking with a voice changer) joined the Zoom meeting with apparent delight of the players and some confusion from the rest. He thanked all the players that helped him become free, explained his transformation, chatted with the conference chair, and promised to be back in the next edition of the conference.

Figure 1: 3D-Model of Ilmari who joined the Zoom meeting

3.4. Chat

Ilmari and the players interacted via the Discord chat - the main channel of communication for conference participants and organisers. His account was hidden between the others, even if his official role in the chat was "Ghost in the Machine". A specific topic entitled "Etsijä's Call" and its thread "*#you_are_my_only_hope*" were the only other indications to guide the participants into the game. We did not put emphasis on it so to satisfy the exploration skills of players. The lack of clear indications resulted problematic: at first, very few players engaged with the game, and some organisers believed that Ilmari might have been a troll. Therefore we had to publicly announce that there was a game hidden in the Discord chat and that it was safe to approach. When a player engaged with Etsijä, the game designer who operates the chat would respond: with the help of a script, but tailoring the responses to the players' questions or occasionally

engaging in small talk. The main function of the chat, hence, was to attract participants and give them different quests to proceed in the game.

3.5. Quests

Etsijä's Call featured one main quest - helping Ilmari to retrieve the code that would allow him to escape from the digital world - and three sub-quests. In each, the players looked for a fragment of the code. To do so, they had to interact with several facets and spaces of the conference.

3.5.1. Engagement with participants

To adapt *Etsijä's Call* to the online environment, our first concern was to maintain and facilitate the social interaction between participants. For this reason, the first sub-quest was designed to make participants engage with each other and with organisers. In this quest, Ilmari told the player he was able to peek through the webcam of the laptop hosting the first fragment, and that he saw "*a strange creature, with blue skin, one big eye and a gentle smile... A voice called it Tommy*". The reference was to the plush toy that a participant would often use when promoting her research - fairly well known to at least part of the audience. With this hint, players asked around the conference about Tommy and finally, reached Tommy's owner and retrieved from her the first part of the code.

3.5.2. Engagement with presentations

The multiplicity of screens separating presenters from the audience can make online conferences less attractive and effective. For this reason, we wanted the game to promote a stronger engagement with the presentations as well. As one of the game designers (second author) was also a presenter, we hid the second fragment in her slides. The second sub-quest required players to ask a specific question to the presenter regarding her word-cloud. She, then, showed a hidden slide featuring the second fragment, and mentioned that she did not know how it ended up there. The quest, then, required to playfully invade the presentation space, asking a question that, while plausible, the players knew that it was part of the game. If a player missed the presentation, they could still find the fragment by reaching the presenter via chat.

3.5.3. Engagement with conference material

The game also aimed to increase engagement with conference materials. In the third sub-quest of *Etsijä's Call*, the fragment was hidden in one of the posters presented at the conference. We asked one of the presenters to add a small image in her poster: visible but not prominent. While the first two fragments were related to conference organisers, the poster author wasn't. This was meant to create a plot-twist, by challenging the players' expectations. All posters were available at any moment on the conference website. The clue provided by Ilmari was that the fragment was in a poster, but "*the placement was... quite puzzling. Let's say that you need to look for the elephant in the room*". To solve the quest, the players needed to examine the posters carefully and find the icon representing an elephant-shaped jigsaw puzzle piece containing the last fragment (Figure 2).

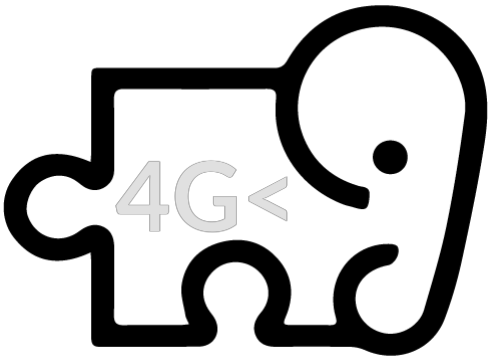

Figure 2: Elephant-shaped puzzle piece in the third sub-quest

3.6. Lore

The looks of Ilmari, especially the profile image from Discord (Figure 3), was inspired by the cheeky profile picture of a prominent researcher in the field. His work as a researcher on gamified creatures was because the first version of the game was meant to be a parody of *Pokémon Go*. Starting from these two features, we built some elements of background around the character to make it more solid and interesting. To support the lore of the game, we created a website for the *Gamification and Gamified Creatures Centre*[3], along with some imaginary colleagues, and fictional publications. None of this information was openly emphasized and we left the players free to explore and engage with the lore at their will.

4. Methodology

To analyse the game interactions and to assess the impact of the game on the conference experience, we will proceed with a thematic analysis [11] of the chat logs (the direct interactions between the players and Ilmari) and quantitative analysis of the responses to a small survey we conducted among conference participants. Out of 47 conference participants, 17 played the game and 9 played it until the end during the two days of the conference. Despite most of the narrative from Ilmari's side being

[3] http://gamificationgcc.com/

Figure 3: Profile Picture of Ilmari Etsijä in Discord

scripted, the interactions with the players were quite heterogeneous. Players engaged with the game, with the character and with the conference in various ways, and the designer playing Ilmari had often to adapt to their ideas, jokes and requests. We believe that this richness of interactions is a strength of *Etsijä's Call* and that it is partly due to our design choices and the affordances of the chosen game spaces.

4.1. Thematic analysis

Our analysis is based on a hybrid thematic analysis approach [12]. Accordingly with best practices, our analysis was articulated in 7 steps: **1)** we familiarized ourselves with the chat logs; **2)** We created the preliminary coding scheme based on our observations; **3)** To ensure the reliability of the codes, three authors coded three chat logs with MAXQDA[4]; **4)** we compared the results, resolving the conflicts through discussion, clarifying the definition of inconsistent codes and adding new codes; **5)** We coded three more chat logs and calculated Cohen's Kappa for the Inter Rater Reliability (IRR) scores between coder pairs by using MAXQDA's Inter Coder Analysis function (1st Coder - 2nd Coder, $\kappa = 0.69$, 1-3, $\kappa = 0.75$, 2-3, $\kappa = 0.72$). These scores indicated moderate agreement between coders [13]; **6)** Relying on the moderate score, we coded the rest of the document; **7)** The final IRR scores showed from moderate to high reliability (1st Coder - 2nd Coder, $\kappa = 0.71$, 1-3, $\kappa = 0.80$, 2-3, $\kappa = 0.76$) and final conflicts were resolved through discussion.

The resulting code scheme included the following 8 main categories with 70 sub-codes: **1)** narrative segments, **2)** non-textual forms of expression (e.g. emojis, gifs), **3)** language register (e.g. formal, neutral, informal, polite, rude, calling Ilmari by name), **4)** humour, **5)** real world information (e.g. sharing personal information), **6)** engagement with game challenges (e.g. requesting more hints, attempted solutions), **7)** engagement with the game content (e.g pathemic positioning, in-character conversations), and **8)** periludic interactions (e.g. engaging with the GGCC website, or with Ilmari after the game has ended). We used MAXQDA to visualise the overlapping codes, affinity maps between codes and the frequency of occurrences. This allowed us to organise the findings of the qualitative analysis of the codes around three main themes: Transformation of Engagement through Narrative Structure, Affective Involvement in the Game-World and Characters and Engagement with the Game Spaces (see the supplement[5]) for the coded chat logs and the detailed breakdown of the coding system).

4.2. Quantitative analysis

The quantitative analysis is based on data from a 36-items survey. The survey was structured on three axes regarding attendees' experience: gameful experience, social activities experience and the overall evaluation of the conference. In addition, the survey included 2 more open questions regarding further recommendations and a brief description of the conference, 3 closed-ended questions regarding attendees role in the conference (i.e. on-line attendee, on-line presenter of a poster, on-line presenter of a paper and if they participate in the *Etsijä's Call* game and in the social activities respectively). Having positively answered these last two questions, more items of the survey were presented to participants to evaluate their experience regarding *Etsijä's Call* and the social activities, respectively. The latter is not further analysed since this study focuses on describing and investigating the impact of an ARG on an online conference. Due to the small sample, no strong statistically significant conclusions are drawn, only descriptive statistics for the small sample are presented in section 6 to investigate participants' game experience and its impact on conference content, interactions and overall evaluation.

5. Results of thematic analysis

5.1. Transformation of engagement through narrative structure

If we apply Greimas' narratological schema [14] to the game, we can identify 8 narrative segments: one that starts the game (beginning with the call for help to which players had to respond positively), four in which Ilmari would make several requests (asking if the players are conference organisers, if they will be discreet about his predicament, if they are willing to help and if they will retrieve the code) and three coinciding with the three quests. We did not consider the final appearance of Ilmari as a separate narrative segment, but a sort of reward.

First of all, the narrative tags showed that all of the players that stopped playing before reaching the ending

[4]https://www.maxqda.com/

[5]Supplement file: https://bit.ly/3mR2SPF

did so in the first part of the game, before completing any quest. Of the seven players that stopped playing, three stopped at the fourth narrative section (where Ilmari would explain the background of the game and asked them to help), one at the fifth section (after asking more hints on how to retrieve the code), one at the third section (after agreeing to be discreet), one at the very first segment (they wrote a single message in the chat), and one at the sixth section (they learned about the first quest, but did not complete it). Two possible, non-exclusive explanations could justify the disengagement of these players. On the one hand, the first four narrative sections are rather text-heavy and require little interaction from the players. These sections were meant to involve the players in the narrative: while some players explicitly reacted to the backstory with delight (Participant 7, or P7 responded to Ilmari's sad story with *"ahahahahah fantastic!!!"*, going "out game" to show how much they enjoyed the narrative), others might have perceived it as an obstacle. On the other hand, several players (all but two) stopped playing exactly when they received more clear information on what they should have done to help Ilmari. It is also possible, then, that the tasks required to complete the quests discouraged them.

Secondly, it was interesting to notice how the first narrative segment was the one that contained more often humorous remarks (P3 opens with a Star Wars reference: "*I have a bad feeling about this...*", P15 with a South Park one: "*What seems to be the officer, problem?*") and the one in which the players more often mentioned Ilmari's name (six out of nine occurrences). While joking might be a response to Ilmari's call for help being itself a geek reference ("*#you_are_my_onlyhope*"), the use of humour in the first sentences could also reflect the difficulties and unease involved in beginning an ARG. Even in a conference with a playful character such as GamiFIN, the uncertainty about the lusory status of the situation stopped participants from engaging with the game. Both humour and the attempt to establish a friendly and direct connection by using Ilmari's name, then, could be ways to "break the ice" and help win the reticence to play.

Both points emerged from the analysis of the narrative structure highlight a possible issue: the lack of a traditional embarking phase in the game. The players' hesitation to start and their disengagement when moving to active tasks might have been addressed if they had been gradually introduced to the game. On the other hand, a seemingly deeper engagement with the game character (i.e calling him with his name or joking about the situation) might have been due to the fact that the current embarking phase is exploratory rather than explicit. Thus, looking for ways to provide more guidance while still retaining a soft embarking through an exploratory path can be an effective way of engaging conference participants with the game in a deeper way.

5.2. Affective involvement in the game-world and characters

The players engaged with *Etsijä's Call* and with Ilmari in various ways, from treating the character as a simple bot, to making jokes while trying to guess who was the real person behind Ilmari. Several of the tags in our analysis were good indicators about what kind of emotions players displayed, how role-playing was involved and how much they would be willing to engage in small talk.

One of the key sets of tags in this respect is the *pathemic positioning*. This tag indicated the emotions the players explicitly conveyed through their messages. The most commons of such emotions were: "sympathetic" and "helpful" (42 and 36 occurrences in the 17 chat logs), followed by "investigative", "decisive" and "apologetic" (19, 19 and 17). These emotions are quite in line with the game narrative, indicating that the players behaved friendly towards Ilmari, tried to help him, were invested in the quests and felt responsible for their actions. Interestingly, however, the emotional palette emerging from the logs is very rich. While trying to keep the number as low as possible for the sake of consistency in coding, we still come up with 17 different tags to account of the many different emotions expressed by the players. Some players, for example, scolded Ilmari for his actions (About Ilmari's predicament P16 declared: "*You partially deserved it*" and P17 "*It was not really nice of you o spy on people so I guess Karma just played its cards*"), or openly expressed being distrustful of him (P16 hesitated giving Ilmari the fragment, writing: "*I found the next step, but... can I trust you with what I got? you seem to be a really shady character you know.*"). Others expressed surprise, tiredness, frustration and even sadness both in relation to the story and to their personal feelings. We believe that the fact that the game allowed space for such a varied form of self-expression from the players should be considered one of its strengths. In this sense, placing a real human agent controlling Ilmari, using the conference platform and writing a rich narrative were able to stimulate an affective response from the players.

Similarly, in some cases, players exchanged messages that were not related in any way to the progress of the game. For example, P16, after looking at the website of Ilmari's fictional research centre, spent some time chatting about the possible consequences of climate change on Lapland's mythological creatures (*"even the mythological ones would have to adapt [to climate change]"*).

Finally, a few tags inform us of how players expressed their individuality and subjectivity. ARG player interactions in a conference game can be considered as role-play in which players are playing "themselves" translated in the game world ([8]: 224). Thus, we created a tag, "in character", to indicate when players were explicitly positioning themselves in the game world. In most cases,

in-character players have created a specific relation with Ilmari, either by being particularly empathetic towards him (e.g. P11: *"Absolutely. Just imagining how horrifying such experience must be... I'll definitely help you"*), or openly distrustful and moralistic. On several occasions, they expressed wishes for the future, both for Ilmari not to incur in new problems, and in the hope to meet him again (P8: *"Let's hope we dont get caught in the internet again"*). P16 went so far as proposing to send his CV to be hired by Ilmari's research group. It was interesting to see how two players that were also conference organisers reacted differently when asked about their involvement in the conference: P5 fully embodied their role as an organiser and hoped that the conference organization was clear to Ilmari ("*I hope you are doing well in these exceptional circumstance. I hope the conference organization has been clear to you*"), while P13 pretended not to know anything about it and claimed that they "*Don't even know who those people are!*". Players, therefore, while role-playing themselves, were able to exercise some freedom over their own identities. Additionally, several participants were eager to share personal information with Ilmari (12 out of 17), from stating the fact that they were presenting a paper at the conference, to mentioning their background studies to ensure Ilmari they would be able to help (P8: "*I'll try to help - after all I got a background in information systems*").

Etsijä's Call, according to our analysis, was able to obtain a rich emotional response from the players, to encourage them to immerse themselves in the story, and to play with their own identity while doing it.

5.3. Engagement with the game spaces

Etsijä's Call willfully engaged conference spaces to transform them in game areas and allow new interactions. Our analysis of the chat logs helped us to reconstruct some common interaction dynamics.

The website of the fictional research group was mentioned by three participants. P10 simply stated that they were looking at it (P10: *"Yes, I'm looking at the site now"*), but P16 explicitly enjoyed it and even proposed to join in ("*your lab seems a rather interesting one, I may send a CV once my PHD is concluded*"). P8 wrongfully believed he found one of the fragments on that website. The aim of this website was allowing players to learn more about the game lore. However, most players did not seem interested, and one was eventually misled. We believe that the website should have been tied to the narrative economy of the game. Making the website meaningful for playing the game could have enriched the interaction with the players, without becoming confusing.

Discord, the main game space, was important in setting the interactive affordances. Not all conference participants were familiar with it, and most of them used it in a direct way. For the in-chat communication with Ilmari, most players simply used plain text and emojis. Only three players sent pictures (two featuring one of the fragments) and only one used GIFs for humorous purposes.

The conference itself, additionally, was transformed into a game space. Many participants mentioned conference activities and events while chatting with Ilmari, sometimes to explain that they had to "pause" the game to attend one of them (P11: *"I'll look into it! Although the paper session may delay me a bit..."*), some other to qualify themselves as presenters and, sometimes, to praise the quality of the conference altogether (P7: *"Top organizers for organizing everything online, don't you think?"*). This was reinforced by many references to time (acknowledging the passing of time between quests, telling Ilmari that they would do something *later*, e.g. P17: "*I will update you after the presentation*") and to several conference participants - often, but not only, when involved in the quests (P10: "*But I think I might know who to contact with regard to that first password*"). These many references to the conference are probably due to the fact that the narrative was strictly tied to it. If the game would have been set in a fictional world, probably players would have not written about presentations and posters. Building a narrative that followed closely and overlapped with the conference events was an important factor to allow a seamless movement between game and conference.

Finally, as GamiFIN is part of a conference series, the series itself becomes part of the lore of the game. This might explain why six different participants made use of meta-knowledge to solve the last quest, and when instructed to find a fragment in one of the posters they mistakenly tried to find it in a poster by an author that gave a particularly playful presentation the previous year. This fact, however, can have also other explanations, as it was also the most visibly playful poster at the conference and the only one by a conference organiser.

6. Quantitative results

6.1. Participants

The thematic analysis offered us insights on how players interacted with the game and with the conference itself. To offer a simple assessment of the game's effects on players' perceptions we report here the preliminary results of an adapted Gameful Experience Questionnaire based on the participants' answers (n=6) and the impact of *Etsijä's Call* (N=13). This study refers only to a preliminary evaluation of the game and we acknowledge that our sample is considered relatively small, as the conference included 47 participants. The survey was anonymised, and no further demographic variables were recorded. Although the

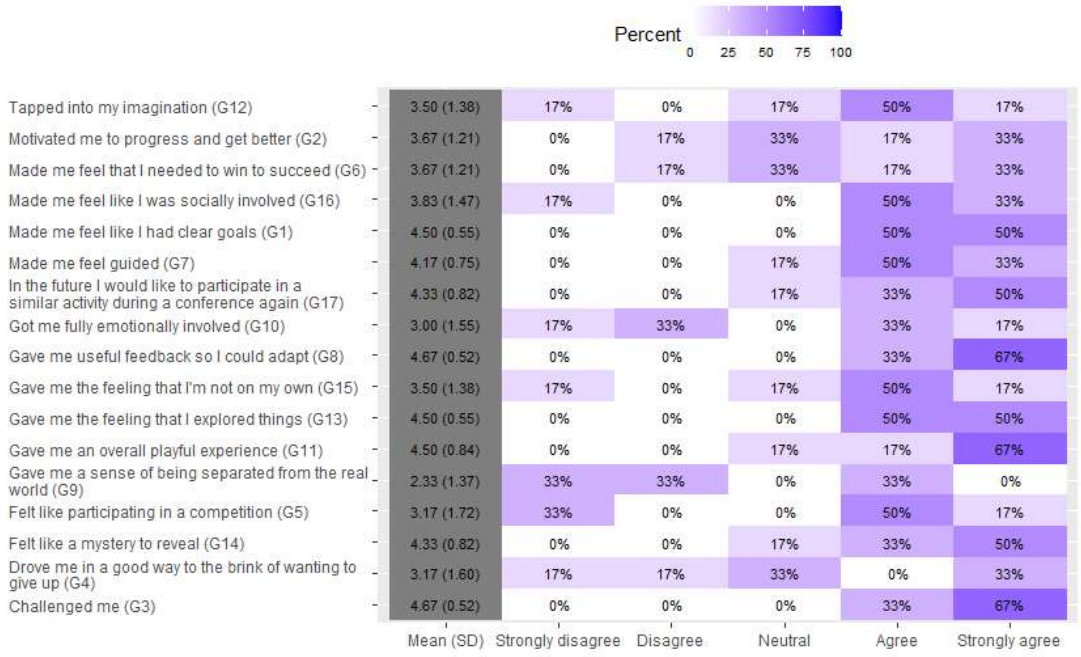

Figure 4: Answers of the survey questions about *Etsijä's Call* evaluation.

sample of the survey is relatively small (about 20% of the attendees), the findings of this preliminary evaluation compose an index for further research and improvement in gamifying a conference.

6.2. Materials

We used Microsoft Forms to deploy a 36-items survey, including a five-point Likert-scale ranging from "Strongly disagree" to "Strongly agree". The survey was composed of three main parts: i) preliminary assessment of *Etsijä's Call* game experience, via an adapted version of Gameful Experience Questionnaire [15], using 17 closed-ended questions (see section 6.3.1), ii) the overall evaluation of the conference, using 14 closed-ended and 2 open text questions (see section 6.3.2 and supplement), iii) evaluation of social activities experience, using 5 closed-ended questions (see supplement). The survey was sent via email and Discord.

6.3. Results

6.3.1. *Etsijä's Call* game experience

The first axis of our analysis is the attendees' gameful experience. Only a subset of our sample (n=6) answered this part of the survey since these items were available only to the attendees who participated in the game. The items of this survey were based on GAMEFULQUEST [15], which is an instrument dedicated to measure an individual user's gameful experience in systems and services. Aiming to keep the survey time-limited while touching all gamification's dimensions, we chose some of the items per dimension, focusing on the playfulness aspect. Acknowledging that subtracting only some items of the survey may harm the internal validity of this GAMEFULQUEST instrument, we do not present statistical tests nor statistical ground for game evaluation, but we present only a preliminary assessment of our game initiative.

The modified GAMEFULQUEST instrument (Figure 4) included all the dimensions (i.e. Accomplishment (G1, G2), Challenge (G3, G4), Competition (G5, G6), Guided (G7, G8), Immersion (G9, G10), Playfulness (G11, G12, G13, G14), Social Experience (G15, G16, G17)). Based on the percentages of answers per question, the dimensions Guided, Playfulness, and Accomplishment noted the higher mean values. Most of the users reported useful feedback from the game (G8), a strong playful experience (G11), and feeling challenged (G3). Considering the medians of participants' answers for each of the dimensions of GAMEFULQUEST instrument, the dimensions of Challenge (Md=4.5, SD=1.38) and Guidance (Md=4.5, SD=0.67) received the highest values. However, no further comparison of medians was made, because of the small sample.

6.3.2. Evaluation of the conference with or without *Etsijä's Call* game

The second axis of our analysis is structured by attendees' evaluation of conference. The main part of our survey, common for all participants is composed of 14-items (see

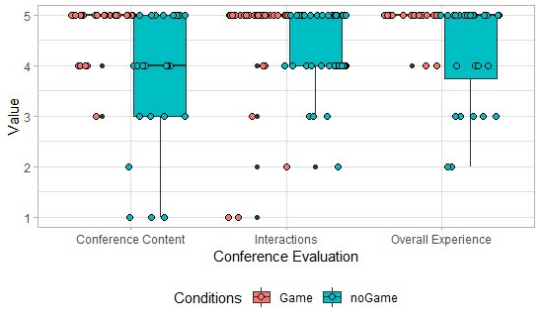

Figure 5: Conference Evaluation participants (Game) and non-participants (noGame) in *Etsijä's Call* game.

supplement), which are divided into three major categories: Conference Content (Q1, Q2, Q3, Q4), Interactions (Q5, Q6, Q7, Q8, Q9) and Overall Experience (Q10, Q11, Q12, Q13, Q14). The items of the survey were selected by a combination of sources [16, 17] and they were modified to cover this study's needs, without using a formal, modified, or a validated instrument. Figure 5 illustrates the distribution of attendees' answers for each of the three categories, using boxplots and dividing them into two groups: Game (answers of the *Etsijä's Call* participants, $n_{game} = 6$ and noGame (answers of those who did not participate in the *Etsijä's Call* game, $n_{nogame} = 7$).

Despite the overall positive evaluation of the conference in all three categories, based on Figure 5, we can note that the range of participants' answers is smaller, indicating a more positive and homogeneous evaluation of the conference experience. On top of that, conference content received a higher median evaluation by the game participants rather than the attendees who did not participate in the game. Descriptive statistics of participants' answers are provided in the supplement. Acknowledging the small sample of our survey (n=6), we cannot support any statistically significant differences in attendees' answers, but we can claim the positive evaluation of a smooth conference experience and the homogeneity of participants' answers regarding conference content. In this direction, regarding the 2 open text questions, it is worth mentioning that 50% of the people who played mentioned *Etsijä's Call* as one of the most enjoyable parts or suggesting an improvement.

7. Limitations and further work

Both our quantitative and qualitative analyses have several limitations. The qualitative analysis, based on an ad hoc tagging system, faced several challenges, such as the unlikelihood of properly mapping human emotions and the inevitable subjectivity of the interpretation of the chats (partially overcome by the involvement of multiple coders). The fact that some of the players were conference organisers and sometimes interacted in a different way from regular participants was not a negative aspect of the game per se - organising an online conference can be demanding and we believe that conference games could and should make it easier - but it did create some risks in the analysis. We decided to analyse all the chat logs together, instead of making a separate group for organiser players. Nevertheless, during our analysis we had to use particular caution to make claims that encompass the experience of different kinds of players.

The scope of this paper is to understand the main means by which players interacted with the virtual conference ARG and extract design challenges and opportunities accordingly. We acknowledge that empirical studies regarding the statistically significant impact of the game on engagement with the different aspects of conferences should be done. Moreover, some survey participants may be in the organisation committee (we cannot tell for sure since we did not collect names), which might create bias in conference evaluation. Thus, considering the small small size as well, the quantitative results are only a preliminary assessment of the game' s effect without representing a universal impact on conference experience.

8. Conclusions

Our paper, outlining the main steps of the design, implementation and players interaction of *Etsijä' s Call*, offers an in depth perspective on the challenges and opportunities rising from the creation of online conference ARG.

Four main challenges emerged from *Etsijä' s Call*: **1)** The necessity to construct a phase of embarking capable of attracting players in the alternate reality and guide them effectively in the game world; **2)** Finding effective ways for engaging players that are currently involved in another activity - the conference itself; **3)** Making good use of the media involved in the game; **4)** Encompassing coherently all the elements of the game, including those purely cosmetic (such as the Website of Ilmari's research group), into the narrative economy of the game.

Etsijä' s Call, nevertheless, offered us some insight into the potential benefits that such games can offer. The flexibility of human-driven play given by how Ilmari was embodied by one of the designers was able to elicit a variegated emotional response from players, while the fact that the game was an ARG allowed them to express and play with their identities. By successfully allowing conference organisers to become players, *Etsijä' s Call* suggests that conference games can be used not only to attract and entertain participants, but also to ease the burden of organising and managing the conference. Finally, we have seen that a conference game is able to gamify an entire conference - when not a conference series! -

offering to the participants new modes of interaction with its many spaces, and constructing a narrative that seamlessly bends in with the conference itself.

Furthermore, based on the conducted statistical analysis, and due to the small sample of our study, we do support only the overall positive evaluation of the game and the conference. In this regard, considering both the higher median values and the lower standard deviation of attendees' answers, who participated in the game rather than those who did not, it seems that our statistical analysis is a preliminary but positive index in favor of the use of an ARG in the GamiFIN.

Finally, we note that additional risk factors related to the game might have not been detected by our analysis and survey. For example, the game might have been distracting the participants from the conference. For this reason future conference games should devise ways of engaging the players more deeply with the conference contents - probably the greatest challenge in conference games - and that final surveys should also ask players about the possible distracting effects of the game.

In conclusion, we believe that conference games can be a powerful tool to increase engagement and create memorable experiences for online conferences. However, we also believe that it is capital to improve the quality of conference games: something that can happen only through more experimentation and research. While it is difficult to know the number of conference games implemented, very few of those are currently reported. More extensive research and experimentation, finally, will allow us to go beyond conference games and to lay down the foundations of a "gamification of academic dissemination".

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