A Beginner's Game Jam to Articulate Social Issues with Open Data

Davide Di Staso[1,*], Lærke Christiansen[1], Fernando Kleiman[1] and Marijn Janssen[1]

[1]Delft University of Technology, Jaffalaan 5, Delft, 2628 BX, The Netherlands

Abstract

An increasing amount of open datasets is available to the public. Open data hackathons have emerged as a way to engage the public in the reuse of open data. However, hackathons mostly focus on developing technological solutions with open data, and target an expert audience. There is a need to move towards using open data to identify and describe social issues, while including the contribution of non-expert participants and problem owners. Our research addresses this need by proposing a different approach in which non-expert participants were able to engage. We organized a one-day game jam with civil servants from an EU public body. During the game jam, participants brainstormed a social issue and available data, and produced mockups or early prototypes of a video game representing the issue. We observed participants during the game-making process, and found that the game jam approach is relatively accessible, and motivates participants to explore social issues together. However, civil servants unfamiliar with game-playing struggled to find references, and there were barriers to collaborative work. Future research could further explore this approach with larger samples and a more diverse audience.

Keywords

Serious games, Game jam, Social issues, Participatory workshop, Game-making

1. Introduction

Governments, companies and non-profit organizations are releasing an increasing amount of open datasets to the public. Open data is also part of governmental and European policies aimed at increasing transparency and accountability, as well as facilitating the emergence of new businesses. However, releasing open data does not automatically yield benefits [1]. To achieve meaningful reuse, open datasets have to be useful to citizens, and their release must take into account the users' perspective [1]. Moreover, citizens need to be aware of available open data and be motivated to engage with it, and there is a need for approaches tackling the demand side of open data [1, 2].

Open data hackathons are events organised by governments and private entities to engage citizens in the reuse of open data. Hackathons are *hacking marathons* [3], where to *hack* means to assemble a prototype in an improvised way (in this context, the term is not related to cybersecurity). They are marathons because they usually last for one to three days, during which

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*Corresponding author.

D.DiStaso@tudelft.nl (D. Di Staso); L.V.Christiansen@tudelft.nl (L. Christiansen); F.Kleiman@tudelft.nl (F. Kleiman); M.F.W.H.A.Janssen@tudelft.nl (M. Janssen)

0000-0002-4045-1944 (D. Di Staso); 0009-0006-6202-7657 (L. Christiansen); 0000-0003-3336-3484 (F. Kleiman); 0000-0001-6211-8790 (M. Janssen)

participants work very intensively. Usually, a hackathon starts with a challenge, participants divide into teams, and, at the end of the event, they present their envisioned solution or early prototype [3]. In open data hackathons, participants are usually given open datasets as working material at the start of the event, with the expectation that they will produce prototypes based on those datasets. Hackathons have been criticised for being techno-solutionist, in the sense that they imply that complex societal issues can be fixed with the right app or the right technology [4].

Critics of the hackathon approach argue that participants build shiny tech products, and then oversimplify the issue in order to justify their intervention. While we agree with this critique, we also recognise the benefits of hackathons, namely their capacity to create (temporary) communities around issues [5], and to motivate participants in the challenging task of building prototypes based on open data. The hackathon format needs to be adapted to focus on understanding and describing social issues, rather than fixing them with technology. Currently, the *invitation* [6] to participants of most open data hackathons is to make an app or service prototype which uses open data. We propose replacing this invitation with designing *serious games*, which are games whose main purpose is not to entertain but, for example, to educate or raise awareness.

Our decision to make games the new invitation stemmed from three reasons: (1) research suggests that games help people think by doing and transform information into knowledge [7]; (2) participants with a variety of skill sets can work on games, including artists, game designers, sound designers, and coders; (3) we hypothesize that by talking about how to model a social issue into a game, participants will be better able to discuss the boundaries, causes, and consequences of the issue; and (4) we hypothesize that asking participants to describe social issues through games, rather than fix them, will lead to a deeper understanding.

The objective of this research is to assess game-making as an approach to articulate social issues using open data. For this purpose, we organized a one day game jam, which is a hackathon for video game development [3]. The jam involved 14 civil servants from an EU public body. We collected data through non-participant observation and analysed the game prototypes made by participants. Our study is guided by the following research questions:

1. What data insights did participants select to build their games?
2. What game prototypes resulted from the selected data insights?
3. What were the barriers faced by participants attending the game jam?

In the next section, we go over previous studies on the effects of game-playing and game-making. Next, we present the design of our serious game jam, and the methodology used to assess to address our research questions. We then discuss the data insights, themes, and mechanics found in the games made by participants. Finally, we present our conclusions and limitations of the research.

2. Research background

Previous literature indicates that games are well suited to express the problematic nature of social issues. Bogost [8, p. 119] argues that we should “learn to read games as deliberate expressions of

particular perspectives". Unlike other media, games express the designers' perspective through the rules, mechanics, and procedures implemented [8]. According to Morozov [4, p. 333] "games can be remade with adversarial design in mind", so that they can "articulate political concerns or force citizens to see and confront issue they would rather leave unseen and unconfronted"[4, p. 333]. DiSalvo [9, p. 35] sees video games as similar to "agonistic computational information design", which is the use of "computational information design to represent and perform the associations and flow of resources between people, organizations, and practices" to express hegemony [9, p.35]. According to Harteveld [10], domain experts are absolutely needed to develop this model of the world, as they have information needed to accurately describe the "reality" that the game is based on. Additionally, as noted by Harteveld [10], the depiction of reality that the game is expressing is subjective, and affected by information and knowledge available to the designers, as well as by the scope and resources available to make the game.

2.1. Participatory game-making

Schouten et al. [7, p. 28] argues that game-making "requires exploration and reflection, which in turn allows for a better understanding of the problem space" and "that 'thinking through' game mechanics may be particularly useful in making complex scenarios visible, understandable, and tractable"[7, p. 40]. Similarly, Hartevelt [10, p.40] argues that in making a game, designers assemble together "people, organizations, objectives, variables, and relationships" into a model of the real world. Bogost [8, p. 137] supports reframing "video game development as a rhetorical practice" instead of only a technical practice, and calls for teaching children how to develop video games, pointing to existing software such as MIT's Scratch.

While we have research on the effects of *playing* games on social issues, research on the effects of *making* games is more limited. Previous studies used game-making as an approach to learn 21st centurty skills [11, 12], digital competences [13], different types of literacy [14], to facilitate perspective taking [15], to let students learn about climate change [16], and to encourage high school girls' engagement in computing [17]. However, the studies on game-making listed so far have student participants, and research on game-making with civil servants is limited. Eriksen et al. [18] engaged civil servants and game designers in at least 4 game co-design workshops over more than a year, and found that "Game co-designing offers one format for active, conflictual, yet collaborative reflection"[18, p. 42]. Our research fits in Schouten et al.'s [7] call for the exploration of game jams and game-making as a mode of inquiry into social issues. A fundamental difference in the approach taken in this research is that participants bring their own social issues and make a game from scratch. We do not have professional game developers co-designing with non-expert users. Instead, this different approach allows for the engagement of non-expert users in the game-making process. Finally, our research is informed by Lodato and DiSalvo's [5] concept of an *issue-oriented* hackathon, that is a hackathon intended to articulate, rather than resolve, the "conditions and consequences" [5, p. 542] of an issue.

3. Research methodology

The goal of this research is to test game jams as an approach of the articulation of social issues with open data. For this goal, we organized a game jam at the office of an EU public body. We

advertised the game jam using the institution's internal communication systems, and 14 civil servants attended the event. One day before the workshop, we distributed links to existing games that could serve as inspiration. The workshop started at 9AM and ended at 5PM, with a lunch break in between. Participation to the workshop and participation to the study were voluntary. One of the authors was present throughout the workshop to observe participants and note the topic of the games, group dynamics, problems faced by the groups, and perspective taken on the social issue.

3.1. Design of the game jam

The morning section of the jam was dedicated to brainstorming a game concept. To facilitate the formation of teams with diverse skills, we asked participants to make a custom event badge, picking one or more roles from *issue expert, coder, artist,* and *game designer*. We then asked participants to fill an *issue pitch sheet*, present their social issue to other participants, and write the title of the issue on a whiteboard so that it would be visible to everyone. Once everyone had presented their issue, participants were left to freely form groups around an issue. The newly formed groups were then asked to fill a *game design doc*, which included brainstorming the game's title, art style, environment, story, and sounds. The game design doc also included a section dedicated to brainstorming data insights and game mechanics that would reflect those insights. After filling the game design doc, participants were finally asked to draw mockup screenshots of their game. Throughout the paper, we will use the term *prototype*, referring interchangeably to mockup screenshots (drawings of how the game should look like), as well as digital game prototypes. In the afternoon section of the workshop, we gave a brief tutorial for Construct 3, a popular web-based game engine which relies on visual coding (similar to Scratch), and let participants develop the game. The facilitator was available throughout to provide technical support. Game development lasted for about two hours, after which participants presented their results, and voted on a winner.

We collected all brainstorming sheets (issue pitch, game design doc, mockup screenshots) left by participants for analysis. We were able to collect the brainstorming sheets for two of the three game prototypes made by participants.

4. Findings

In this section, we present the results of our workshop; we start by listing the social issues pitched by participants, and the games they produced. We then answer our three research questions about the data insights selected by participants, resulting game prototypes, and the barriers faced by participants during the game-making process.

Participants brainstormed and pitched 7 ideas to each other, with potential games about: information archival, work-life balance, democratizing open source intelligence, mindfulness about water consumption, project management, how to increase IT skills in older generations, and the projected decline in global population. One team had already discussed their idea before the workshop, while other participants brainstormed ideas on the spot. After pitching the ideas and writing them on a whiteboard, participants were asked to select a team to join. Teams formed around the work-life balance, population decline, and information archival issues; other

Title	Topic	Data	Genre
Work-life balance	Burnout, and the difficulty of balancing personal and professional commitments.	Statistics on life events contributing to burnout, statistics on the rise of burnouts in society	Text adventure
Children of men	The projected rapid decline in global population	N/A	Resource management
The archives	Work of institutional archivists, who store information that can later be used in judicial proceedings	Condition of the archives, places and building which host the archives, and access rights	Top down RPG

Table 1
Title, topic, data used and genre of the games produced by workshop participants.

ideas were discarded. Table 1 summarizes the title, topic, data, and genre of each of the game prototypes produced by participants.

4.1. Data insights

To assess which data insights were selected by participants, we rely on the artefacts they produced, such as their game prototypes, issue pitch sheet, game design doc sheet, and mockup screenshots. The game design doc sheet prompted teams to identify available data insights on the issue, and use them as a basis for the ideation of game mechanics to implement in the game. The team working on the issue of work life balance identified that burnouts are on the rise, and that lack of appreciation leads to dissatisfaction, which in turn leads to burnout. They also identified a number of external stressors affecting employees. The team identified datasets which could help articulate the issue, such as statistics on life events which contribute to burnout. Moreover, they intended to collect new data about the issue through the game prototype itself, by recording player choices. We are unable to report the data insights of the team working on global population decline, as their brainstorming sheets were not found at the end of the workshop (it was optional for participants to share their brainstorming sheets for analysis). Finally, the team dedicated to information archival intended to use data about the condition of the archives, places and buildings which host the archives, and the different access rights to the archives.

4.2. Game prototypes

The three prototypes made by participants had three different genres. The game on work-life balance was a text adventure, and the team managed to set up a functional digital prototype. The player is presented with a command-line interface. The player needs to balance three basic variables on career, personal health, and social contact. For example, the player might have to decide whether to attend an urgent business meeting outside working hours, and earn career points at the expense of personal health and social contact. The information archival game was a top down RPG, with no digital prototype produced, only paper sketches. In the envisioned game, the player can move a character around the screen, visit different rooms, and talk to

non-playing characters (NPCs). Two game mechanics were shown in the paper mockup: (1) talking to NPCs to get access to the archives to retrieve requested files, and (2) deciding whether to store damaged files when new shipments arrive, with the risk of damage (e.g. mold) spreading to other files and causing financial damage. Finally, the game on population decline was a resource management game, where the player uses a set of sliders to regulate global investment on education, infrastructure and housing, or the social safety net. The player then sees the results of these policies on charts showing population growth, as well as other parameters such as unemployment and living standards.

4.3. Barriers

Participants encountered some barriers in scoping down their ideas during the brainstorming phase. However, they managed to pitch 7 ideas, resulting in 3 working teams, with the remaining 4 ideas getting discarded. Most barriers were observed after the brainstorming section of the workshop, while participants were trying to code the digital prototypes. The switch to the development of the technical prototype made the work more individual and reduced collective discussions. We also noted that within a single group, participants had different prototyping approaches. For example, the team working on the issue of population decline was split between members coding the game on their computer and others visualizing the design by sketching it on a piece of paper. Moreover, participants struggled with turning their broad ideas and concepts into an implementable game prototype. One of the teams reported being unfamiliar with other games that they could use as reference. They also reported difficulties in using the recommended game engine. Only one group was able to produce a working digital prototype - in the form of an AI chatbot - with the technical effort mostly driven by a single coder within the team. The recommended game engine was not used for this prototype.

5. Discussion

The game jam motivated participants to reflect on issues that they experience, and discuss them with their peers. While attendees did not analyse raw datasets, they brought to the discussion their lived experience of the issues, and identified what kind of data they would need to describe a social issue through their games. We acknowledge that data insights identified by participants were often vague and insufficient to quantify the issue. We attribute this to the limited time available, as well as participants' different interpretations of what constitutes a data insight. We hypothesize that there could be a correlation between participants' understanding of the issue, and the typology of game they produced, however a larger sample is needed to perform this analysis.

The outcomes of the event were affected by the limited time available, as well as the social issues picked by participants, and the specific characteristics of this sample, which was exclusively composed of public employees from a single institution. While this was a pilot study to test our approach, experiments with larger and more diverse samples are needed. We also found that mockups (drawings) and other low-tech prototypes facilitate collective discussion, while high-tech prototypes push participants to work individually, which is convergent with previous literature [19].

Most discussions about the social issue between participants happened during the initial brainstorming, which only involved paper prototypes. Later in the day, when participants were asked to make digital prototypes on their computers, the work became more individual. The motivational aspect of producing a game prototype needs to be balanced with the need for group discussions and peer learning. Producing video games in one day is a challenging activity, especially for participants who are not used to coding, and the format of the game jam needs to be adapted to the expected participants. While most participants were motivated by the opportunity to produce a digital prototype and learn new skills, the learning curve was too steep and there was not enough time available. We also hypothesize that with a larger sample, it is more likely that each team will contain at least one member who can drive the technical effort and facilitate peer learning.

6. Conclusion

With this research we aimed to address the need for a new approach focused on identifying and understanding the complexity of social issues with open data. Our game jam was designed around the involvement of non-expert users, as opposed to expert-oriented hackathons. In our game jam, civil servants produced three game prototypes on different social issues. This research is an exploratory study aimed at testing this new approach, and is limited by the small, non-random sample. Our findings show that participants were motivated by the challenge of producing a game prototype, but also faced barriers to collaborative work, especially in coding the games. More research is needed to better understand how this approach can help to articulate societal issues using open data. Future research could explore the game-making approach with larger samples and different audiences, and experiment with different designs for the game jam.

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