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Involving Children in the Design of Gamified Law-Related Tests

Participatory Design and Children's Voice for the Design of Gamified Law-Related Tests

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ABSTRACT

Children's lack of awareness of their rights, which can have considerable consequences on their lives, is a topic of concern in the literature. Digital games have been widely recognised as having a positive influence on children's learning. As a result, the motivational power of games has risen to prominence within the broader concept of gamification which, in the past decade, has become a trend and has been applied in many fields, including education. The value of children's inclusion in the design process of game products through participatory design approaches has been explored in several contexts. This paper describes the participatory design process adopted by engaging children in gamifying law-related tests and presents the main findings.

CCS CONCEPTS

• Human-centred computing • Interaction design • Participatory design

KEYWORDS

Children's Rights, Gamification, Participatory Design, Children's Input

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1 Introduction

Children's rights are protected under various laws and international human rights, such as the United Nations Convention on the Rights of the Child (UNCRC) (1989) which sets out the fundamental rights of all children. These aim to prevent behaviour that can harm children, contribute to children's ability to thrive, and empower their participation in society [23]. However, recent evidence reports that annually, nearly one billion children in the world experience some type of violence or neglect [3] while one in five children and young people in the UK had been exposed to severe maltreatment during their childhood [17]. Thus, the need for more coordinated efforts and child-centred research is becoming increasingly important.

As part of digitalisation, games have become a significant part of children' lives and are often viewed as the main source of children's entertainment [10]. The value of games to motivate players in an engaging and predictable way is well documented in the literature [5]. Given this potential, the concept of gamification has risen to prominence over the past decade as a powerful tool to maximise user engagement, motivation, and improve overall user experience [20].

This study is part of Project FORTITUDE, a 5-year project led by author two, and funded by the European Research Council (ERC), which seeks to develop a range of game-based resources to help children, aged 15 years and under, to improve their legal knowledge, skills and confidence (so-called 'legal capability'). The first part of the study involves creating 'gamified' tests to measure each of these three attributes. Through a Participatory Design approach (PD), the present study engaged with children between the ages of 7 and 15 to influence the design decisions on the gamification of these tests. This paper describes the action research, the approach adopted to working with children, and the key findings from the data collection session.

1.1 Related Work

Previous studies have highlighted that there is a significant lack of knowledge of the most basic rights and legal dimensions of everyday life among the child population of the UK [24]. Lack of recognition of children's rights by adults has also been identified as a type and cause of violence among children [3]. Due to this, a recent project by [2, 16], *Law in Children's Lives* sought to examine children's awareness of law in their everyday lives by gamifying the research activity of gathering data with a digital game. The study adopted a child-centred approach to explore children's legal ability in their decision making. Through participatory design activities, children involved in the design of a tablet-based game, entitled "Adventures with Lex" and children's input contributed to the main game elements such as the game characters, the micro-worlds, and the rewards. The study found that game-based research is likely to increase children's engagement with understanding of the law by providing them with a familiar environment that was appealing to the participants [2]. Broad legal concepts were presented in a playful way and made children feel more engaged. The key game design elements proposed by the children seemed to work as a motivating factor for them to engage with the game and think about the given scenarios. This evidence forms the basis for us to suggest that continued efforts to help children develop a better understanding of their legal rights and be protected from abuse should be implemented. We further propose that children's understanding of the law can be mediated by technology, particularly through game-based learning.

More generally, the use of games for children is a topic that has been studied extensively over the past decade [14] and it has been shown that certain attributes of games such as the use of rewards to demonstrate progress have a significant impact on players' engagement and motivation [15, 25]. Furthermore, it has been highlighted in the literature that children's learning is likely to improve by playing games [11]. [6] defined the term gamification as "the use of game design elements in non-game contexts". In a broader sense, gamification is understood to be a concept that is closely related to games, with the goal of enacting a gameful experience. The central idea of gamification is to increase the user's motivation and lean more on incorporating game design elements to perform goal-orientated activities in which users would not otherwise engage such as user engagement, learning, and user behaviour [6, 15]. Thus, through the principles of gamification, the motivational effects of games can be applied to a wider array of contexts such as education. Gamification has become an emergent trend in many fields and a number of studies have reported the positive influence of gamification in the educational context [8, 2, 16].

Over the years, PD has attracted increasing interest in designing novel systems with a specific focus on children as technology users [9, 13, 19]. It has emerged as a popular approach to achieving a higher quality of technology products that fit well into children's needs, eventually leading to improved user satisfaction [7]. This stems from the idea that, in fostering children's inclusion and giving them an equal and responsible role, we take into account children's priorities during all phases of the design process [13, 21, 22]. Given that children experience the world differently from adults [7] and are surrounded by technology, this stance further acknowledges that children are empowered to bring forth their own ideas and express their own desires for matters that are of concern to them. Based on this perspective, we regard PD in this study as a collaborative activity in which children are encouraged to engage in abstract legal concepts and are supported as decision makers within the ideation of the design process.

Since there are several examples of children taking on roles as social agents in the design of technology programmes which have led to a positive impact on the designs [2, 9], this study has adopted a PD approach and gave the children the agency to co-create gamified law tests. By involving them in the creation process, we sought to create an environment that encourages them to engage more deeply and thoughtfully with law-based issues and their rights. In light of the issues highlighted above, this paper addressed the following research question which formed the basis of this part of the project: *What ideas do children have when co-designing gamified law-related tests?*

2 Methodology

2.1 Participants and Research Context

In the context of the study, our intention was to work with schools from a variety of socio-economic backgrounds. To facilitate access to the schools and their students, the research team initiated a collaboration several months in advance of starting the project. This helped us establish a preliminary relationship and identify a member of the school staff to serve as a liaison about the scheduling of the visits and logistics.

Data were collected in collaboration with two schools in autumn of 2022. A total of 342 children and young people participated, aged 7-15 years; specifically, 325 children were from a primary school (11 primary school classes from Year 3 to Year 6) and 17 from a secondary school (Year 8). The participating primary school had requested that our data generation sessions include all classes, hence the disparity in numbers between primary and secondary school participants. Six sessions were organised in the school context, but the data presented in this study were produced and gathered during the gamification session (5th). All authors contributed to the design of the sessions, and they were led and facilitated by authors one, three, and four. Teachers were present to monitor the activities and support as necessary.

2.2 Data Collection

To ensure that the participants understood the purpose of the study [1] and become more efficient in accomplishing tasks, an informative short session was held with the primary school to provide children with information. Children were introduced to the research team, the purpose of the visit, the aim of the project, and what they would be doing. The study received ethical approval for adopting an opt-out consent method by the Research Ethics Committee of the University of Sheffield, United Kingdom. Information sheets and opt-out forms were sent to all parents and/or carers of the participants, and they were asked to notify the school if they did not wish their children to participate. During the sessions, participants were provided with randomly chosen fruit or vegetable names on illustrated badges. This emphasised their anonymity in a way intended to be fun and interesting.

This session was one of a wider range of activities that focused on informing the design of the law-based tests. [7] identified 4 roles for children to participate. In this project, the role of the participants was to act as design partners to work collaboratively and produce their own prototypes. At the outset of the session, an 'assent mat' was presented to check participants' understanding in terms of their involvement and their freedom to opt out of the study at any time. To ensure that children were willing to take part in the activity, their verbal assent was requested before and during the session. Care was also taken to ensure that the participants understood that they could withdraw from the study at any time without explanation or repercussion.

As an introductory activity, the children were asked to think about their favourite games and the reasons why they like them. Furthermore, they were prompted to list some of their favourite games' features. A discussion about the concept of gamification with relevant examples was used as a means to introduce and contextualise the central design theme of gamifying law-related tests that all groups should focus on. Next, the pupils were given a guidance sheet with prompting questions (i.e., What would the story be?, Would you include rewards and what would they be?).

It is well documented that the method of participatory drawing for evaluation purposes holds a great potential to enable the subjective expression of children's ideas [12] and reflect their experiences of digital games [18]. Small groups of three to four children were created and each group was given art supplies, markers, post-it notes, and A3 paper sheets with which to design paper-based prototypes.

3 Analysis - Results

The children's input provided important insights into the game design's content, functionality, storyline, and character profiles. To explore children's ideas, a thematic analysis was undertaken of the collected data [4]. Author one reviewed design outputs from the session including the children's drawings (in total 142) and annotations as well as the researchers' field notes and reflections. The analysis steps involved reviewing each output separately and noting down the key insights found within those outputs. Then, the following step was to develop some codes and examine if certain ideas were repeated. The review step involved comparing themes across the outputs and that the themes captured the content of the data. The field notes were read several times and certain themes were identified centering around children's engagement during the session. The analysis aimed to identify themes relevant to children's ideas about what they would like to see in a law game-based test and the children's approach to understanding specific game design elements. The analysis identified some commonalities across the data, which are discussed in detail below.

3.1 Observation of the Session

At the beginning of the sessions, children were asked to develop a gamified prototype and were free to decide the type of game and its content. Overall, it is evident that children seemed to be engaged throughout the session and showed this by replying to the researcher's questions and brainstorming their own game ideas. We observed that all children seemed eager to openly communicate their likes in the question 'What games do you like to play?. Regarding children's game preferences, it was found that online games like Roblox, Fortnite, FIFA, and Minecraft were the most popular across all years while for early years the most preferred genre were board games (e.g., Snake and Ladders) and card games (e.g., Uno).

Once the session progressed, the children were keener on expressing their ideas on what gamification might mean and what types of features a game possesses. Researchers discussed the meaning of gamification with children in order to facilitate their understanding of the purpose of the activity and stimulate their imagination in creating gamified law-tests. It was observed that some children, especially the older ones (i.e., Years 5, 6 and 8) were better able to grasp the concept of gamification and explain to us the function of each game feature in a game. However, it was noted that some younger children (one class from Year 3 and one class from Year 4) found it difficult to follow the activity despite the attempts to simplify the language and the task they intended to do; this has led to some of the children creating their 'ideal' game which was irrelevant to the study's topic.

Using craft supplies, children created game prototypes with considerable enthusiasm and found it easy to work on the game design with their team members. From the results, it is apparent that children presented various law-related stories relevant to the topic with the older children (Year 5, 6, 8) designing prototypes with a greater detail in the content of the game and realistic representations of the characters compared to the younger children (Year 3, 4). There was also evidence that children were able to

use game features to make their ideas more engaging and appealing. However, in some cases, children produced either irrelevant content or content that was difficult to interpret.

3.2 Ideas of Gamified Law-Related Tests

A general observation is that the majority of the groups worked well as teams and many discussions took place within the breakout groups during the brainstorming stage. The drawings depicted a clear, linear narrative of the game and designed its interface and graphics. A common theme among all years is that some drawings were influenced by existing games and made explicit references to popular games such as mazes, football, treasure hunt, Fortnite, Minecraft, snakes and ladders etc.

3.2.1 Game genres.

In terms of the designs, diverse ideas were proposed within and across the groups. For example, in Year 3 and 4, common themes included fantasy-based games such as aliens invading an island or exploring the Moon and the Earth. However, we noticed that at Year 5, 6, and 8, there was an increasing preference for role-playing games such as crime-based stories in which the players are asked to solve a murder or adventure games such as exploring various environments of the world (e.g., a jungle, a desert, etc). For instance, a group from Year 6 designed a game in which a girl starts a crimewatch to find her cousin's murder by spying on people' phones while another group presented a series of reality-based problems that players would face through multiple choice questions.

3.2.2 Narrative.

It was interesting to see how detailed and well-thought out some of the drawings were. The games all featured a narrative and sense of progression, wherein players would have a clear idea that they were advancing in the games' storyline. For example, one drawing illustrated how players could pass between various levels by jumping and climbing to move to the next challenge. Another group depicted a court story by presenting the criminals' trajectory from robbing a bank to going to court (Figure 1). Others preferred to describe in written format what the game was about, and what the players needed to do to achieve the mission. Regarding this, one group described a game that takes place in the forest and the players need "to try to get out the forest. The players [need] to find things to survive" (Year 5). Another observation is that most of the drawings included written instructions through Post-it notes as a means of guiding us to understand their game.

Figure 1: Example of a game design prototype (Year 6).

3.2.3 Characters and Appearance.

In the drawings, characters' profiles seemed to fit well with the game's narrative. Many of the drawings usually presented realistic representations of the characters and other items, such as illustrating a desert, a shop, and cars included in the game. Some of the groups drew the characters, depicting one male and one female figure that competed against a common enemy or collaborated with each other to achieve a common goal. Non-human characters such as life-like animals were also popular among the designs (e.g., pandas, dogs, or penguins) as illustrated in Figure 2. In the group work, other characters acting as companions were also involved, assuming different roles, ranging from a policeman chasing a criminal or a shopkeeper, to a monster who kidnapped a girl. Some groups were keen on using a combination of real and fictional elements like moving from a maze to a theme park or a human fighting an enemy (e.g., alien).

Figure 2: Example of a game design prototype depicting a mix of human and life-like characters (Year 5).

3.2.4 Game mechanics.

The majority of the designs clarified the game's goal and specified how the players tackled challenges. Some of the designs suggested customisation features that centred around customising character profiles, selecting the setting or the characters one could play as (usually male or female). Other mechanics were also suggested; the main elements included a reward system as a game success (e.g., earning points, collecting coins, and receiving trophies) and for game progress (i.e., the player receiving extra abilities) as shown in Figure 3. Some drawings had direct feedback in a written format (i.e., 'Good job', 'Well done') as a result of player's actions or a penalty system in case of wrong actions (i.e., 'Start again', 'Lose life'). Some groups added functionality elements such as interacting with items by pressing the 'next' and 'back' buttons, or buttons to control player's actions (i.e., button A: to jump, button B: to slide under obstacles, button C: to accelerate). All the game designs were competitive; in some cases, two players competed against each other, while in other drawings a single player pitted their wits against the game. It should also be noted that a small number of drawings either have not been clearly related to the suggested focus (i.e., a family is going to the beach to find the prom) or they were incomplete or abstract and this made it difficult to interpret the meaning. For example, Figure 4 does not include any components that can be characterised as a game.

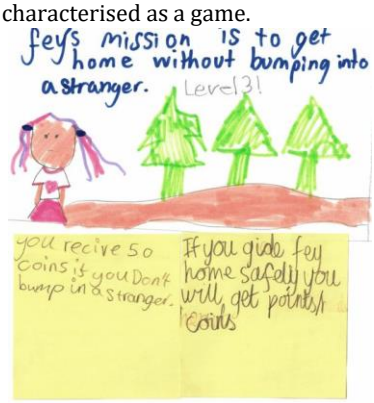

Figure 3: Example description of a reward system (Year 5).

Figure 4: Example of a drawing difficult to convert to a game context (Year 3).

4 Conclusion and Future Work

This paper reported on preliminary work in the process we followed to inform the design of law-related tests for children under 15 years in a school context. By adopting participatory design practices and applying game design principles, we facilitated pupils' creativity, and this allowed us to suggest that the best designs can come directly from them, emphasizing the value of their input in the present study. We found that children were strongly engaged with and productive to create game ideas from scratch by asking them to draw what they would like to see in a law-based test. Children's perceptions provided some interesting ideas to influence the gamification of the tests, including the game content, the design of characters, and other interactive elements. However, because of the children's unfamiliarity with the subject matter (e.g., law) and the concept of gamification, some of these ideas were unsuitable or insufficiently relevant.

This work was limited in eliciting children's perspectives on the early stage of designing technology. Next steps include the development of the gamified tests by a gaming company. Further input from the participating schools will be gained through usability testing to measure the effectiveness and level of satisfaction from children. This will help us eventually to iteratively refine the beta version before we launch the game-based tests to measure children's legal capability. Within the broader scope of this project, children's unfamiliarity with law will be addressed by having some legal and rights knowledge-building sessions, prior to running the game co-design activities.

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