A Child-Centred Design Evaluation of a Learning Game to Improve Children's Legal Capability

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Abstract: Children lack awareness and understanding of their rights and the law. There is a need to address this gap and empower children to become advocates for their rights when they encounter law-related issues. A promising approach to achieving this is through the use of games. In particular, games focused on learning have evolved into novel tools that can raise awareness as well as help children acquire essential skills. In this paper, we present a child-centred design approach to evaluating the initial version of a learning game designed to help children across a wide age range (3-15 years) and with diverse characteristics, improve their legal knowledge, skills, and confidence. This study supports the integral role and value of child participation in testing the usability of a law-based learning game and shaping its design. A mixed methods approach, grounded in user-centred principles, was employed to assess the first prototype (P1) of the game. 45 children from various schools and early years settings in South Yorkshire and the Midlands, UK were involved. This included children from: 1) advisory groups, 2) case study groups, and 3) game development groups, with an age range of 4 to 16 years old. School staff were also invited to give their feedback. Quantitative and qualitative data were gathered through questionnaires, and field note observations, and analyses were conducted through both thematic analysis and non-parametric statistical methods. We found the game was received positively overall, but further development was needed to make it accessible and engaging, especially for the youngest participants. Importantly, participants of diverse ages and characteristics shared valuable insights into enhancements to make the game more intuitive, interactive, and enjoyable, and these findings informed the development of the beta version of the game.

Keywords: Game-learning, Evaluation, Child-Centred Design, Children's Rights

1. Background

This work is part of Project FORTITUDE, a five-year project led by author two, and funded by the European Research Council (ERC), which seeks to develop a game to help children, aged 15 years and under, improve their legal knowledge, skills, and confidence (so-called 'legal capability'). This paper presents the usability evaluation of an initial prototype (P1) by adopting a child-led approach and incorporating constructive feedback from children to shape the development of a digital legal learning game. It outlines the methodology and discusses the findings derived from the evaluation.

In principle, children are both protected and empowered by various laws and human rights treaties, especially the United Nations Convention on the Rights of the Child (UNCRC). However, a UK-based study led by author 2 (Watkins *et al.* 2018) found that children possessed limited awareness and understanding of their rights and the law. Recent reports by the Equality and Human Rights Commission (2022) and UN Committee of the Rights of the Child (2023) highlight critical gaps in protections for children in the UK and emphasised the need for further action to prioritise their rights and best interests. Importantly, limited access to information about children's rights, inadequate human rights education prevent children from understanding and addressing rights violations. Therefore, there is an urgent need to address this gap by proactively empowering children to learn about their rights under domestic law and the UNCRC. To address this, learning-based games have been identified as engaging tools to scaffold learning, making them an effective medium to keep players motivated and interested. Designed for educational purposes, these games aim to achieve defined learning outcomes through play and problem-solving scenarios (Quian and Clark, 2016). This approach provides a sense of achievement while facilitating the acquisition of new skills and knowledge in a pleasant and playful manner (Anastasiadis *et al*. 2018).

Article 12 of the UNCRC asserts the rights of every child to "form his or her own views and to express those views freely in all matters affecting the child. These views should be given due weight in accordance with the age and maturity of the child", recognising them as active participants in their lives. There is a significant body of research and practice concerning the involvement of children and young people (CYP) (Lundy *et al.* 2022) in decision-making, particularly in the technology design process to address their needs (Fails, Guha and Druin, 2013). Redefining the role of young children as active agents capable of meaning-making has played a pivotal role in fostering the movement for child participation (Lundy *et al*. 2024; Druin, 2002). A review of the literature suggests that some studies have involved CYP in discussions on children's rights (Barwick *et al.* 2018; Watkins *et al*. 2018; Law *et al.* 2016), wellbeing (Koch, 2018), technology design (Bevan-Jones *et al*. 2020) and curriculum development (Presser *et al.* 2015). Importantly, approaches in the design of game programmes have emphasised the importance of a user-centred approach and the involvement of key stakeholders such as children during the design process (Magkafa 2022; López-Faican, 2020). While initiatives like 'Right Runner' (UNICEF, 2019) and 'Rightsburgh' (Children's Parliament, 2021) empower children through game children's participation in developing legal and rights-based learning games remains limited and relatively uncommon.

A central concept of the project is that CYP involvement should be viewed as "participation with purpose" (Lundy *et al*. 2022, p.6), prioritising their voices. This child-led approach encourages CYP to articulate their perspectives and influence decisions on matters that affect them, such as in the current project, the design of a digital legal learning game. Recognizing games' motivational power (Bai *et al.* 2020), we argue that children can learn about law and their rights through gaming.

2. Methodology

2.1 Two-stage Cycle

The design and evaluation of P1 followed an iterative, child-centred approach to inform the game's design. In collaboration with a gaming company, an initial prototype was built, and feedback was sought at different stages. A two-stage process was developed to test the first version of the game; this process enabled the researchers and gaming company to receive valuable feedback from diverse groups of children.

In the first stage, 21 CYP from three groups provided feedback on the initial concept game ideas. A total of 21 CYP from three groups engaged in a session and offered their preferences for the ideal game concept. Once the game concept was selected, the second stage involved the gaming company developing an initial P1, which was then evaluated by multiple groups of children. It is this second stage evaluation which we report on here. A simple prototype was opted for at this stage to ensure a child-led design and to enable children to offer as many insights as possible to inform the design of the next stage (beta version). It is important to highlight that one of the challenges we encounter is our attempt to accommodate the diverse age range for which the game is intended. The design of the game was guided by the Serious Game Design Assessment Framework (SGDA) developed by Mitgutsch and Alvarado (2012). This framework was specifically chosen because it provides a structured approach for designing learning-based games and serves as a guide for their evaluation. It emphasizes on influencing player behaviour during the co-design process and its five fundamental concepts (mechanics, framing, content, narrative and aesthetics) serve as prerequisites for achieving the game's intended purpose. Informed consent was obtained from the parents and the study was approved by the Ethics Committee of the University of Sheffield, UK.

2.1.1 Description of Prototype 1

P1 is a first-person skeuomorphic game which encourages CYP to interact and explore freely. The concept is that CYP will be able to explore a secret office with a hub and select everyday objects on a desk. The hub appears in front of a desk with a pin board behind it; this is the player's personal game space (Figure 1). Due to time constraints, P1 focused on key interactive elements that were designed to enhance user engagement. By creating a simple interface, we hoped not only to make the game more accessible but also to encourage CYP to contribute their own ideas and feedback, thus fostering a sense of ownership and active involvement in the design process. This approach aligns with our goal of creating a child-led game.

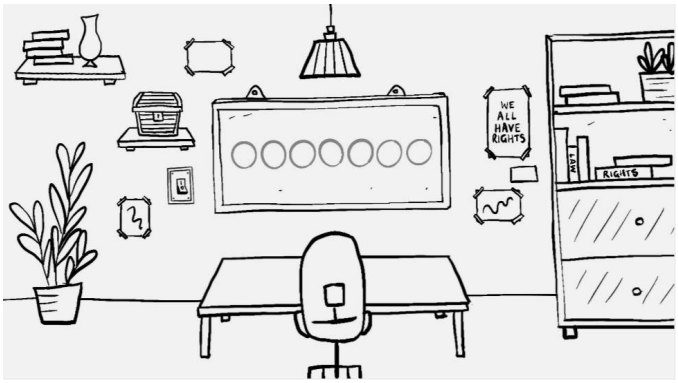

Figure 1: The Hub presented to the player as a personal desk space.

Various everyday objects act as portal keys and represent unique scenarios to which they are thematically linked (Figure 2). Scenarios depict real-world events that present a legal situation or explore a rights violation under the UNCRC, which they may encounter in their daily lives. The selection of the scenarios was informed by a mapping process conducted at the beginning of the project based on the legal educational and pedagogical value. Subsequently, CYP were asked to rank the scenarios. Based on their feedback, the research team refined the scenarios by considering the theoretical framework, learning objectives, and the legal and rights-based issues presented within them. Factors such as overlap of issues and suitability for CYP were also considered during this process.

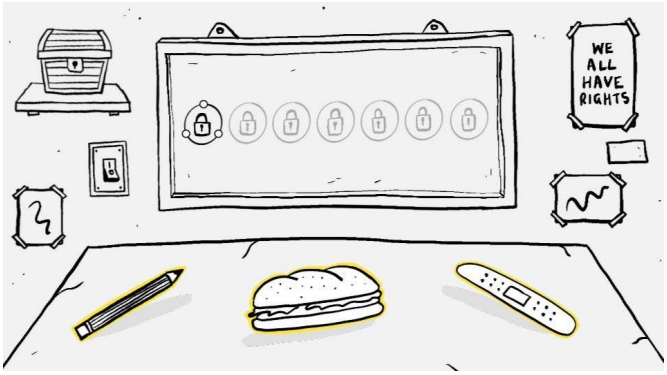

Figure 2: The portal keys which the players need to select.

Once the player selects an object to play, the object acts as a portal key and transports the player out of the hub to show them real world situations (Figure 3). The CYP will then carry out tasks to challenge their perceptions of legal scenarios and encourage exploration and learning. Everyday objects serve as portal keys to facilitate an engaging and intuitive transition between the hub and various scenarios. This design choice allows players to easily understand that choosing an object transports them to a new scenario. The thematic linking of objects to scenarios strengthens the learning objectives.

The player can collect rewards which show up in their hub space. A bar called 'Lawometer' tracks the player's legal capability throughout the challenges (Figure 4). If they select an appropriate answer the bar goes up, indicating an increase in legal capability. However, if they select an inappropriate answer the bar goes down to show their legal capability has decreased. The 'Lawometer' provides real-time feedback on player's legal capability. By visually tracking progress, the Lawometer helps players learn through direct and immediate feedback.

It should be mentioned that due to time constraints P1 was developed without colour. The decision was made to prioritise the development of the prototype's core functionalities and some interactive elements. The monochromatic design was adopted to create a clear interface with visual elements that guide the player through the game.

Figure 3: Transition scene: After the player selects an object to play.

Figure 4: The Lawometer to show the consequences of the player's actions.

2.2 Data Collection and Analysis

Quantitative and qualitative data were collected through questionnaires and field note observations. Field notes identified issues that participants faced navigating the game that might have been overlooked. The questionnaire combined open-ended and closed-ended questions to capture participants' experiences and thoughts with the prototype (Cresswell, 2014). A Likert scale was used with a range 1 to 4 and the typical 'neutral' response was removed to ensure participants would commit to a response indicating a preferred option.

All data recorded, analysed, and reviewed by the first author. Thematic analysis was applied to analyse the field notes and the open-ended responses. For Likert-scale questions, non-parametric statistical methods, specifically Fisher's exact test, was employed to assess patterns of association between enjoyment and understanding of their rights. Authors two and four reviewed and discussed the data for accuracy. To maintain confidentiality, all participants' names were anonymised. The findings from this stage of the study provided the basis for refinement and were considered priorities for improving the game for the next stage of the development process.

2.3 Participants

The P1 evaluation involved 45 participants from various schools in South Yorkshire and East Midlands in the United Kingdom. We worked specifically with three cohorts: 1) advisory groups (ages 8-15) who have been actively working with us and providing valuable advice throughout the project, 2) case study groups (ages 3-16) involving children from early years settings and those with Special Educational Needs and Disabilities (SEND), and 3) game development groups (ages 8-13) who collaborated with us at discrete stages of the game development process. Our decision to include such varied groups in the testing process of the game is driven by our commitment to inclusivity and diversity.

Table 1 presents the participants' profiles by group, age range, school year, number of participants, setting, and location. School staff from the case study groups also provided feedback on P1.

Table 1: Information about the schools participating in testing P1.

Group	Age Range (years)	School Year	Number of Participants	School Setting	Location
Advisory Group	8-9	Y4	9	Primary School	South Yorkshire
Game Development Group	12-13	Y 8-9	7	Secondary School	Leicestershire
Game Development Group	8-10	Y5	5	Primary School	South Yorkshire
Advisory Group	13-15	Y9, 10, 11	8	Secondary School	South Yorkshire
Case Study Group	6	Y1	2	Primary School	South Yorkshire
Case Study Group	5	Reception	1	Primary School	South Yorkshire
Case Study Group	11-16	Y 7, 9, 11	7	Secondary School	South Yorkshire
Case Study Group	3-4	EYFS[1]	6	Nursery	Nottinghamshire

[1] EYFS refers to the Early Years Foundation Stage.

2.4 Procedure

We invited participants to attend a 10–20' minute session held in a quiet environment either within the IT or activity classrooms of the setting. Equipment usage varied, in some schools, participants used the school's equipment (e.g., PCs, Chromebooks), whereas others used iPad tablets provided by the researchers. The procedure involved one-on-one sessions with researchers observing the participants play the game. When all participants needed to be in the classroom together, researchers worked one-on-one with individual students, while the remaining participants drew their ideas for portal keys (the objects on the desk) either before or after gameplay. Field notes were taken for data analysis. After gameplay, participants and their teachers (in case study groups), completed a questionnaire regarding the game's features and functionality to gather feedback for improvements. Examples of questions included: Was it easy to play the game?, Was the game easy to understand? Did you enjoy playing the game? What was the most/least fun part of the game? What would you like to add/change to the game to make it better? We adapted the questionnaire and adjusted the pace of asking questions to accommodate the broad age range and to ensure participants' understanding. The questionnaires were also reviewed by the teachers of the SEND participants to ensure that the questions were suitable for the participant's cognitive abilities and ages.

3. Results

The analysis of the questionnaire responses and the field notes revealed several important insights and identified consistent themes across all participants' responses. The Likert scale questions reflected an overall positive perception of P1 and indicated its potential effectiveness in enhancing children's understanding of their rights. The recurrent themes provided us with important ideas and allowed us to distinguish areas for further improvement. The main themes identified are discussed below.

3.1 Usability

The majority found P1 straightforward to play (68.9% very easy, and 20% easy) with only a small minority of participants reporting it as 'hard' (4%) or 'very hard' (6.7 %). 51% of participants found P1 very easy and 35.6 % considered it easy to start playing. Some participants faced difficulties understanding what to do and its overall goal due to a lack of instructions, leading to confusion in several instances. A 6- year-old girl repeatedly asked

the researcher "What do I do?", "What do I do?" even after being prompted to look at the screen while an 11-year-old boy wondered how it starts ("What do we do first?"). EYFS participants found it challenging to start playing the game as reported by Teacher 4. According to Teacher 4, the beginning of the P1 was not suitable for this age group.

P1 was accessible for older participants, as evidenced by their ability to navigate and quickly complete the tasks. Some of them noted that correct answers were easy to guess, and after the first activity, became increasingly obvious. For example, one participant commented that the correct answer (speaking to someone) is "always the correct answer" (male, age 15) and this makes it easy.

Field notes and comments made by the participants revealed that the lawometer seemed confusing for them in some cases even if it was perceived as an effective reward mechanism ("The law-meter was a good idea" female, age 15). This was evident when the lawometer filled up, with no indication of the answer's correctness or what was expected to happen next. When a male, age 9 found out that he needed to repeat the scenario for the third time, he expressed his frustration asking, "what do I do? I did this one" and repeatedly querying "what do I do?". In another case, in the first scenario the participant clicked on the wrong response ("tell a friend") and she appeared confused about what to do. After staring at the screen for a few seconds, she asked "Ahhh, did I get it wrong? What am I doing now? Going back? (female, age 14). It is also evident that EYFS participants found it hard to understand the lawometer and the researcher's verbal guidance was necessary for them to progress, as can be seen from the dialogue below:

Male, age 3: Why did it do that?

Researcher 3: I think it's because the answer wasn't quite right. It was a good answer but not the right one. Do you want to try again?

Male, age 3: [*nods]

Researcher 3: [reads options to male, age 3]

Male, age 3: Press it?

Researcher 3: Yes. [reads options] Hide away? Okay that is this one.

Male, age 3: Ohhh.

Researcher 3: I think that wasn't right. [reads options]. I think you got it right, well done. Now press the chest.

3.2 Purpose

Findings were mixed in relation to the game's intended purpose. The majority of the participants highlighted the game's central themes of legal awareness ("Law", male, age 13) and rights advocacy ("I think it's about that we all have rights", male, age 9). They emphasised its educational role in teaching children about human rights and providing insights into the legal aspects of different situations ("Basically showing mostly the younger audience what actions you would take in that situation", male, age 12).

Participants, from the case study group, offered a different perspective and stated that the game primarily focused on emotional wellbeing ("about feelings when you are worried", male, age 13). In this context, P1 was perceived as a tool for helping children deal with worries ("being worried about mums, friends, and doctors", female, age 6) and encouraging them to seek support from trusted adults ("It teaches me to always tell a trusted adult", male, age 14). Additionally, some participants emphasised P1's role in building problem-solving skills and helping children in managing their emotions while navigating various scenarios ("Choosing the more sensible option to react in situations", female, age 14). In contrast, EYFS participants provided neutral responses to what the game was about ("I don't know", female, age 4) indicating a lack of clear understanding of the game's objective.

3.3 Enjoyment

The analysis of responses regarding P1's efficacy in educating children about their rights and their enjoyment of playing the game indicated a strong association between these two variables, (Fisher's exact test = 25.191, $p<.001$). The findings suggest that the game's helpfulness in learning about their rights is closely linked to their enjoyment of the gaming experience. Furthermore, a majority of participants reported enjoying playing the game. In particular, 35.6 % of the participants expressed that they liked it and an additional 44 % liked it very

much. Only 2.2 % felt that the game did not meet their expectations in terms of enjoyment. This evidence is further supported by field notes, which documented the participants' interactions playing the game.

Additionally, there was a clear consensus among the participants regarding the possibility of playing the final version of the game with 62% of them expressing a desire to play the game again and an additional of 24% indicating an interest in a replay. This high percentage of enthusiasm among participants suggests the positive impact that P1 had during the evaluation. There was a significant relationship between participants' perceptions of the game's educational value and their willingness to engage with it once it is fully developed (Fisher's exact = 18.859, p= .004). This indicates that participants who found the game helpful in learning about their rights were also inclined to express an interest in playing the completed version, highlighting the potential of P1 in effectively engaging the target audience.

3.4 Fun

Regarding participants' perception of the game's enjoyment, the overall results remained positive with 37.8 % 'liked it very much' and 33 % 'I liked it'. However, 20 % reported 'it was okay' and 8.9 % expressed 'didn't like it at all'. There was a statistically significant association between participants' perceptions of P1's between learning about their rights and their perception of its fun factor (Fisher's exact test= 18.300, p= .006). This suggests that participants who found the game helpful were also more likely to perceive it as fun to play.

On a positive note, the graphics seemed to capture participants' attention with the transition scenes creating excitement, particularly among young children.

Became excited when he saw the transition scene and made comments like 'wow', 'look', 'wow'

(fieldnotes for male, age 5)

Conversely, one possible reason the participants did not find the prototype enjoyable could be attributed to its limited interactivity. Some participants expressed a preference for more interactive elements in P1. For instance, in the HUB, only three items could be interacted with. This could also be attributed to some functionality issues, which affected the smooth navigation of the game for EYFS children.

Whilst playing he was moving the mouse a lot on the screen and trying to click on different bits that were not interactive (e.g., posters, different parts of the scenario backgrounds etc.) (researcher's 4 fieldnotes for male, age 9)

Several times the children pressed away from the screen which resulted in a new window being opened or the game window being accidently closed. Other apps were also accidently open due to enthusiastic pressing. (researcher 3's fieldnotes).

Participants found various enjoyable elements within the game which contributed to a positive gaming experience, and these include the following:

3.5 Interactive Agency

Participants valued having the agency to make decisions within P1 and highlighted it as a key element of enjoyment. The ease of navigating through choices, such as clicking dots and connecting them, was identified as adding some enjoyment to the game. P1's interactive and realistic experiences effectively engaged the participants. Additionally, the use of badges and the 'lawometer' measuring their understanding of the law after completing a level were also enjoyable features.

"clicking dots, it was the easiest" (male, age 13)

"How the game interacts with the player through interactive and realistic experiences" (male, age 15)

"The badges after finishing [a] level. The thermometer measuring the law strength" (female, age 15)

3.6 Exploration

Unlocking chests and discovering hidden treasures emerged as an exciting aspect for participants; adding an element of unpredictability. Furthermore, participants expressed an interest in the use of scenarios that unfolded after clicking on various objects; this introduced an element of anticipation and curiosity.

"When I had to join the dots, unlock the chest to get into the next level" (male, age 16)

"Waiting for the scenario to happen after clicking on the object-picking the answer" (female, age 13)

3.7 Narrative Learning Component

The narrative component of the game, presented through short stories, played an important role in the overall enjoyment of participants. The use of diverse stories linked to different items contributed to the overall narrative experience.

"The stories. My favourite story is the pencil one" (female, age 9)

Participants also appreciated the educational value of the game. The simplicity of the stories and cards facilitated understanding and acted as a bridge for learning.

"Learning about the rights. Easy to read" (male, age 8)

"The cards easy and read/understand" (male, age 8)

3.8 Rewards Mechanism

The lawometer and the badges played an important role as a reward mechanism.

"The badges after finishing [a] level. The thermometer measuring the law strength" (female, age 15)

Various recommendations and changes were obtained from the testing, which are considered important to 'shape' the game in the next evaluation round. These include:

1. Enhanced Interactivity & Agency

   Increase the number of interactive areas within levels: "More interactive areas within the parts of the levels." (male, age 15)
   Allow the participants to have greater control over their surroundings: "Interactivity around [the] game e.g., the light turning on via light switch" (female, age 15), "So you can control a character to make it more user interactive" (male, age 13)

2. Multisensory Elements

   Participants and teaching assistants highlighted the importance of colour and sound effects as well as adding a narrator to guide the participants: "Colour. Pencil the end pink black stripes yellow. Sandwich-light shaded orange, green lettuce, put some cheese" (male, age 9) "Noise- hear what they are saying", "Some background music" (TA1), "Colour. The option for the words to be read aloud to the child" (TA2).

3. Navigational Support

   Improve the game introduction to capture player's attention: "Guidance" (female, age 14)
   Provide clear instructions to help participants understand the goal of the game: "And easier ways to start the game, instructions but not boring" (female, age 14)

4. Re-playability

   Introduce re-playability features to encourage participants to revisit the scenarios: "add re-playability to them" (male, age 15)

5. Customisation

   Incorporate character customisation features to allow participants personalise their in-game avatars: "Make your own characters" female, age 6)

6. Diverse learning activities & answer options

   Incorporate varied learning activities like card matching, dragging items to diversify the game experience: "more stages to open the chest. It's kind of really easy. It's too easy you just have to click" (male, age 8)
   Increase puzzle difficulty as participants advance through the game: "make the puzzles a bit harder as you go on" (female, age 14)
   Provide different solutions in answer options instead of just telling an adult: "Differently worded solutions rather than just tell an adult" (male, age 13)

7. Graphics

   Replace abstract elements with real pictures: “Instead of squiggles put real pictures” (female, age 14)
   “Picture- sign friendly for our age group” [EYFS group] (Teacher 4)

8. Game length and content

   Extend the length of the game by including more scenarios and challenges: “Make the game a bit longer” (male, age 15)
   Continue the story after making choices with slideshows that recap the consequences of player choices: “At the end add what would happen if you did one of the wrong situations” (female, age 13)

4. Conclusion

This study reflects on the findings gained from user-testing which sought to capture ideas from children to further develop a law-based learning game designed to improve children’s legal capability. We acknowledge that designing a game for such a varied age range presents certain challenges which we seek to address. By actively engaging diverse groups of children, our intention is to develop a user-friendly and engaging game-based tool for intervention to facilitate children’s understanding of rights and the law.

The testing involved participants of various ages and characteristics, who were invited to engage with the prototype and provide input. The findings revealed both strengths and areas for improvement in the P1.

Participants appreciated the exploration features, the interactive elements, narrative learning components, and rewards mechanism. This feedback indicates the importance of embedding engaging mechanics in educational game tools. While most participants found P1 easy to play, some challenges were identified regarding its usability and accessibility across different age groups. For example, younger participants encountered difficulties understanding the game’s objectives which highlights the need for better clarity and clearer instructions in the beginning. Despite these challenges there was a strong association between enjoyment and knowledge acquisition, and this suggests the potential impact of P1 in engaging the target audience.

However, our study has several limitations. The small sample size may limit the generalizability of our findings as it was tested with a limited number of participants. Additionally, the prototype’s simplicity, which featured limited interactive elements, a monochromatic design, and a limited range of stories may have influenced participants’ perspectives. This, in turn, could have affected the evaluation of the game’s quality as the current prototype didn’t appear as a complete game.

Moving forward, P1 evaluation provides valuable insights for implementing essential changes and additions. Key areas for improvement include enhanced interactivity and clarity to better accommodate a diverse age range, addressing usability issues, and refining the game’s objectives to improve its impact and foster engagement and learning outcomes. Continuous iteration and testing with diverse age groups are critical aspects to validating these improvements and ensuring the game’s effectiveness as an educational intervention tool before its launch across the country.

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References

Anastasiadis, T., Lampropoulos, G. and Siakas, K. (2018) Digital game-based learning and serious games in education. *International Journal of Advances in Scientific Research and Engineering*, Vol 4, No. 12, pp. 139-144.

Bai, S., Hew, K.F. and Huang, B. (2020) Does gamification improve student learning outcome? Evidence from a meta-analysis and synthesis of qualitative data in educational contexts. *Educational Research Review*, Vol. 30, p. 100322.

Barwick, J., Watkins, D., Kirk, E., and Law, E. (2018) Adventures with Lex: The gamification of research?, Convergence: *The International Journal of Research into New Media Technologies*. Vol 24, No 3, pp. 229-250.

Bevan Jones, R., Stallard, P., Agha, S.S., Rice, S., Werner-Seidler, A., Stasiak, K., Kahn, J., Simpson, S.A., Alvarez-Jimenez, M., Rice, F. and Evans, R. (2020) Practitioner review: Co-design of digital mental health technologies with children and young people. *Journal of child psychology and psychiatry*, Vol 61 (8), pp. 928-940.

Children's Parliament (2021) *Rightsburgh.* https://investigates.childrensparliament.org.uk/rightsburgh/

Cresswell, J. (2014) *Research Design: Qualitative, Quantitative and mixed methods Approaches.* 3rd ed. Los Angeles, California, London: SAGE.MA: MIT Press.

Druin, A. (2002) The role of children in the design of new technology. *Behaviour and Information Technology* [online]. 21(1), pp.1-25.

Equality and Human Rights Commission, Submission to the UN Committee on the Rights of the Child (2022) *Children's Rights in Great Britain*.

Fails, J.A., Guha, M.L. and Druin, A. (2013) Methods and techniques for involving children in the design of new technology for children. *Foundations and Trends® in Human–Computer Interaction*, Vol 6(2), pp. 85-166.

Koch, A. B. (2018) Children's perspectives on happiness and subjective well- being in preschool. *Children & Society*, Vol 32(1), pp. 73–83.

Law, E., Watkins, D., Barwick, J, and Kirk, E. S. (2016) An experiential approach to the design and evaluation of a gamified research tool for Law in Children's Lives. In: Proceedings of the 15th International Conference on Interaction Design and Children (IDC '16). Association for Computing Machinery, Manchester, United Kingdom. June 21-24, 2016. 322-333.

López-Faican, L. and Jaen, J. (2020) EmoFindAR: Evaluation of a mobile multiplayer augmented reality game for primary school children. *Computers & Education*, Vol. 149, p.103814.

Lundy, L., Murray, C., Smith, K. and Ward, C. (2024) Young children's right to be heard on the quality of their education: Addressing potential misunderstandings in the context of early childhood education. *British Educational Research Journal*.

Magkafa, D. (2022) *Exploring the design, development and evaluation of an app for autistic children in a museum setting*. Doctoral dissertation, University of the West of England.

Mitgutsch, K., and Alvarado, N. (2012) "Purposeful by Design? A Serious Game Design Assessment Model", Proceedings of the International Conference on the Foundations of Digital Games. Association for Computing Machinery 2012, 121-128

Presser, L., A., Clements, M., Ginsburg, H. and Ertle, B. (2015) Big math for little kids: The effectiveness of a preschool and kindergarten mathematics curriculum. *Early education and development*, Vol. 26 (3), pp. 399-426.

Qian, M., & Clark, K. R. (2016) Game-based Learning and 21st century skills: A review of recent research. *Computers in Human Behavior,* Vol 63*,* pp. 50–58.

Unicef (2019) *Right Runner*. https://www.unicef.org/lac/en/right-runner

United Nations. (1989) *Convention on the Rights of the Child*. United Nations.

Watkins, D., Law, E.L.C., Barwick, J. and Kirk, E. (2018) Exploring children's understanding of law in their everyday lives. *Legal studies*, Vol 38, No. 1, pp. 59-78.