







Understanding User Perspectives on an Educational Game for Civic and Social Inclusion

Edgaras Dambrauskas¹ , Daina Gudonienė¹ , Alicia García-Holgado² ,
Francisco José García-Peñalvo² , Elisavet Kiourti³, Peter Fruhmann⁴,
and Maria Kyriakidou⁵

¹ Kaunas University of Technology, Kaunas, Lithuania
edgaras.dambrauskas@ktu.lt

² GRIAL Research Group, Research Institute for Educational Sciences, Universidad de
Salamanca, Salamanca, Spain

³ Open University of Cyprus, Nicosia, Cyprus

⁴ ZB&V - Narrative Research, Esdoornplantsoen 11, 1326 BW Almere, The Netherlands

⁵ Educational Association Anatolia, Pylaia, Greece

Abstract. This paper presents a comprehensive analysis of user perspectives on an educational game designed to promote civic and social inclusion. The study employed a questionnaire-based survey with 302 respondents, aimed at gathering insights into the players' experiences, perceptions, and attitudes towards the game. The survey explored various aspects such as game mechanics, educational content, user engagement, and the potential impact on civic and social awareness. The results of the study indicated a generally positive reception of the educational game among the respondents. The majority reported finding the game engaging and enjoyable, with a high level of immersion and interactivity. The educational content was deemed informative and relevant, contributing to the players' understanding of civic and social issues. Furthermore, the game was observed to foster empathy and perspective-taking, enhancing the players' ability to appreciate diverse viewpoints. Overall, this research sheds light on the user perspectives regarding an educational game for achieving societal changes. The findings highlight the game's potential as an effective tool for promoting civic awareness, social empathy, and inclusive education. The insights gained from this study can inform the future development of similar educational games, aiding in the design of more engaging and impactful experiences that facilitate civic and social learning among diverse user populations.

Keywords: user testing · Human-Computer Interaction · young people · serious game · game-based learning · user experience

1 Introduction

In this paper, we explore user perception and skill development through the immersive experience of playing a game created to specifically promote social inclusion and civic involvement. Our research intends to reveal the complex relationships between games,

knowledge absorption, and the growth of abilities necessary for engaging in said areas. We want to provide insight into the effectiveness of such interventions in effecting social change by looking at how users interpret information and learn skills within the setting of an educational game.

We get important insights from the players using a well-designed questionnaire-based method, enabling us to record their experiences and viewpoints regarding the game's influence on their knowledge of civic duties and their capacity to connect with various populations. We employ data analysis to identify patterns and trends, revealing the subtleties of user perception and skill development as they move about the virtual environment created to mimic real-world issues by taking control of a fictional character learning about contemporary societal challenges.

By using an extensive questionnaire, we investigate how the game's mechanics, narrative, and interaction aspects contribute to the participants' cognitive and emotional involvement by investigating their experiences. In order to determine the degree to which players' newly acquired knowledge translates into practical abilities applicable to everyday circumstances, we study the manner in which players interpret and absorb the information offered inside the game. Additionally, we look at the game's ability to promote social inclusion and dismantle impediments to personal growth.

The results of this study have the potential for a deeper understating of game design and its effectiveness on educational initiatives that seek to encourage social inclusion and civic involvement. We offer important insights that can guide the creation of the next games and learning platforms by exposing the fundamental mechanics through which users perceive information and learn new abilities. Furthermore, by showing the potential of well-designed games to achieve real-life effects and even lifestyle or behavioural changes, our research adds to the larger conversation on using technology for achieving social changes.

2 Games for Personal and Societal Growth

Games provide a different and engaging way for players to learn about a variety of topics, allowing them to increase their knowledge and comprehension of several societal concerns. People have the chance to learn more about a variety of subjects and explore difficult ideas in an interactive and pleasant way by playing games [1–4]. Additionally, games have the capacity to motivate players to take action outside of the game by fostering a sense of empowerment and promoting in-person involvement with the issues and allow experiencing it digitally [5, 6]. Games have become an effective tool for developing curiosity, increasing learning, and inspiring people to have a positive influence in their communities and beyond by bridging the gap between enjoyment and education.

Today, among other benefits, games as a tool, do not face the same spatial restrictions as before. Smart gadgets, cloud computing, and game technology have all emerged in the modern period, marking a new beginning in the era of educational possibilities. Therefore, it is now simple to expand classrooms and learning opportunities outside the bounds of conventional brick-and-mortar locations [7]. By utilizing smart devices and access to the massive quantities of data and resources saved in the cloud, it opens new potential for both instructors and students and provides additional flexibility which is

becoming increasingly more important. Additionally, the use of gaming technology in educational contexts has transformed how students interact with course material, promoting immersive and interactive learning environments. As a result, it is now easier to create and apply cutting-edge teaching strategies and learning opportunities, improving the whole educational environment.

It has been exceptionally important and prevalent during the COVID -19 which, expectedly, resulted in larger consumption of digital content in general. Here some scholars point out that [8, 9] there was a serious issue regarding students' motivation in the context of the COVID-19 pandemic, where online learning has become the standard because of mandatory constraints. There have been particular difficulties in making the switch to totally remote learning, with studies showing a considerable drop in student enthusiasm and educational games became one of the solutions for increasing engagement and keeping interest. Games as a tool for education serve more functions than simply keeping their audience engaged as scholars notice that they served a broader range of functions besides entertainment [10]. Schrier [11] claims that games also served as digital communities where 'civic deliberation, public demonstration and values sharing took place'. This expanded function of games during the pandemic highlights their potential to facilitate important social interactions and further emphasizes their significance in the digital era. Themistokleous [12] further notices that due to their innate flexibility and receptivity to civic education activities, the literature overwhelmingly supports the idea that civic education primarily targets the younger generation. Particularly young adults interact with others, educate themselves, and pursue personal development on both online and offline venues. As adolescents have a stronger potential to adjust to new situations and learn from a variety of sources, this age group is seen to be more responsive to civic education activities. Youth-focused civic education initiatives may successfully develop their knowledge of civic duties, encouraging active citizenship and involvement in society.

Some authors suggest [13] that games that successfully combine gameplay and instructional material will have the greatest impact on encouraging civic learning. These video games would let players draw links between their in-game behaviour and larger social systems that exist in reality. By combining moral considerations with effective and efficient thinking, such games would also motivate players to make ethical decisions regarding a wide range of social issues, whether local or national politics or environmental challenges. It is anticipated that by including these components, the games will provide players who want to improve their civic consciousness and comprehension of societal dynamics with an engaging and effective learning experience.

Additionally, a major part of modern games is created with certain educational goals in mind, which restricts their potential and range. Greipl [14] takes a simulation game on sustainability that tries to inform players about environmental challenges as an example and argues that while a game like this could provide insightful information, it frequently lacks full information, and some crucial elements might be missed by students. Therefore, in order to overcome this drawback and ensure a more complete and in-depth comprehension of the subject matter, it becomes crucial to combine the experience provided by the game with other teaching techniques, such as group discussions. Teachers

can fill in the gaps left by individual games and promote a more thorough learning experience for students by mixing different teaching methods.

3 Expectations for Game Design

The active participation of representative users throughout the design process is a fundamental component of user-centred design in the field of game design [15]. It is commonly known that if this important component is ignored, developed games are under a risk of not fulfilling expectations from both creators and target audiences. Designers of video games make an effort to involve representative users at many phases, from conception to execution, because they understand how important this is. Designers may gain insightful information and user input by incorporating players, ensuring that the game meets their tastes, needs, and expectations. This is especially important when designing educational games that have the aim of educating players and making an impact on real-life behaviour as opposed to providing entertainment. This user-centred design strategy encourages the creation of games that are more engaging, fulfilling, and fun for the intended audience.

Engagement is often achieved via in-game goals, such as scoring points, levelling up or other progress-reward mechanics. Egenfeldt-Nielsen [16] points out that it poses a risk for educational games because it interferes with intended goals. Some students tend to ignore or skim important content, usually provided specifically for learning or context purposes. In such cases, players place more importance on the game's aims than on its educational ones and it becomes a major challenge in finding game designs that successfully combine learning and gaming or, at the very least, guarantee that they do not clash. It's still difficult to determine the appropriate ratio between engaging gameplay and insightful instructional material. Furthermore, the adoption of a learning approach is the first component that has a significant influence on students' acceptance of an educational computer game. This introduction has a significant impact on the reported enjoyment, perceived utility, and attitude toward utilizing the game in addition to the perceived simplicity of use [17]. Therefore, while creating instructional computer games, game creators must include appropriate learning methodologies. By doing this, teachers may not only improve their students' learning efficiency but also increase the likelihood that they would accept and participate in these activities. Students will be more likely to actively participate in playing these games as a consequence, and they will gain a lot from them.

Similarly, both players having limited and those having extensive gaming experience, place a high value on a game's degree of engagement and enjoyment. Casual players, who seldom play games and mostly for entertainment purposes are looking for a smooth, enjoyable, and simple experience. If the primary goal of a game is to provide information or knowledge, players are unlikely to actively seek it out or devote time to it unless the gameplay incorporates educational elements in a pleasant and interesting way. Therefore, some players might not find a convincing reason to play a game that divides gameplay and information into different components. On the other side, experienced players often respect the harmony between the mechanics, the story, and the content. Therefore, it causes a similar problem as with casual players if the information component is blatantly and independently provided from the action [18].

In terms of user expectations, there are a number of motives that can act as a catalyst for a player to continue playing and learning new concepts. Research conducted during the “PaGamO” testing indicates that the following motives were among the most important for players: (1) fun, (2) self-learning, (3) want to get a higher grade in the final examination, (4) challenging, (5) want to get a higher score in the game, (6) enjoyment, (7) I can choose when to play, (8) self-achievement, (9) want to win, and (10) the game has high relevance to my learning [19].

It should be noted that in certain cases, instructional games stray from the traditional strategy of teaching students preset knowledge. Instead, they provide the students with the freedom to direct their own educational path by letting them choose the inquiries and pursuits they are interested in [20]. To improve the learning process, this procedure may include input from instructors, activity leaders, or peers. Furthermore, the task of assessing the learned information falls outside the game’s boundaries. Participants and teachers are free to choose how they use the game and how they evaluate their learning outcomes in light of their unique objectives. Within the context of instructional gaming, this learner-centred methodology promotes¹ autonomy, engagement, and individualised progress [xx].

4 User Experience with the INGAME

In this paper, we analyse the data acquired from the questionnaire after testing the educational game under the INGAME² project. The INGAME project initiative places a lot of emphasis on online games and digital literacy for the advancement of young people’s abilities and civic literacy. It utilizes the most recent advancements in educational technology and attempts to build the skills and knowledge required for fostering interest in public involvement through online gaming. The game introduces and integrates gaming into school teaching techniques and practices, particularly those relevant to the disciplines of civic literacy and pedagogy, and will, directly and indirectly, improve the digital, language, reading, communication, and cooperation abilities of the users. Users will be encouraged to engage in informal, outside-of-classroom learning and civic involvement thanks to the convergence of innovation and education.

The educational scope of the game encompasses the acquisition of social and civic skills, values, and relevant knowledge through player engagement and interaction. Players are required to possess certain skills to effectively interact with the game, and through their participation, they will acquire new skills and knowledge. It is important to consider the learning outcomes and identify which game activities contribute to their achievement. The narrative and storyline of the gameplay a significant role in shaping the game’s world [21]. This includes the background story, character descriptions, behaviours and interactions, settings, action sequences, plot points, ethical dilemmas, conflict resolutions, and the design of the game’s challenges. The game does not focus on a single aspect such as puzzles or narrative but also influences the motivations for player actions and

¹ <https://www.learningliftoff.com/the-benefits-of-video-games-in-education>.

² <https://ingame.erasmus.site/>.

the available types of actions. Players are motivated by various factors to take specific actions within the game and learn more about the consequences of these actions.

The questionnaire for evaluating the game was conducted in a number of countries simultaneously, with the majority of respondents being from Lithuania, Italy, Spain, Greece and Cyprus. Total number of respondents – 302. Respondents are working young people. The questionnaire was divided into several categories with each of them dedicated to a different segment of the overall digital product. These categories are as follows:

- Goals of the game
 - Overall game goals were presented in the beginning of the game
 - Overall game goals were presented clearly
 - Intermediate goals were presented in the beginning of each scene
 - Intermediate goals were presented clearly
- Feedback
 - I received feedback on my progress in the game
 - I received immediate feedback on my actions
 - I was notified of new tasks immediately
 - I was notified of new events immediately
 - I received information on my success (or failure) of intermediate goals immediately
- Hints and in-game support
 - The game provided “hints” in text that helped me overcome the challenges
 - The game provided “online support” that helped me overcome the challenges
 - The game provided video or audio auxiliaries that helped me overcome the challenges
 - The difficulty of challenges increased as my skills improved
 - The game provided new challenges with an appropriate pacing
 - The game provided different levels of challenges that tailor to different player
- Sense of being in control
 - I felt a sense of control and impact over the game
 - I knew the next step in the game
 - I felt a sense of control over the game
- Immersion
 - I forgot about time passing while playing the game
 - I became unaware of my surroundings while playing the game
 - I temporarily forgot worries about everyday life while playing the game
 - I experienced an altered sense of time

- I could become involved in the game
- I felt emotionally involved in the game
- I felt viscerally involved in the game
- Knowledge
 - The game increased my knowledge
 - I caught the basic ideas of the knowledge taught
 - I tried to apply the knowledge in the game
 - The game motivated the player to integrate the knowledge taught
 - I want to know more about the knowledge taught
- Open-ended information
 - Indicate any highlights or positive aspects of your experience playing the game (optional)
 - Indicate any problems or negative aspects of your playing experience (optional)

According to Dixon [18], the level of prior gaming experience that players possess has a direct impact on their receptiveness to game content, as well as their expectations. The amount of previous experience individuals have with games in general significantly influences their attitudes towards new game offerings and their overall engagement with the gameplay. Additionally, players' prior experiences shape their perception of what constitutes a satisfying gaming experience, thereby influencing their expectations regarding game mechanics, narrative elements, and overall game design. In the provided figure (Fig. 1), it can be observed that the majority of respondents expressed their infrequency

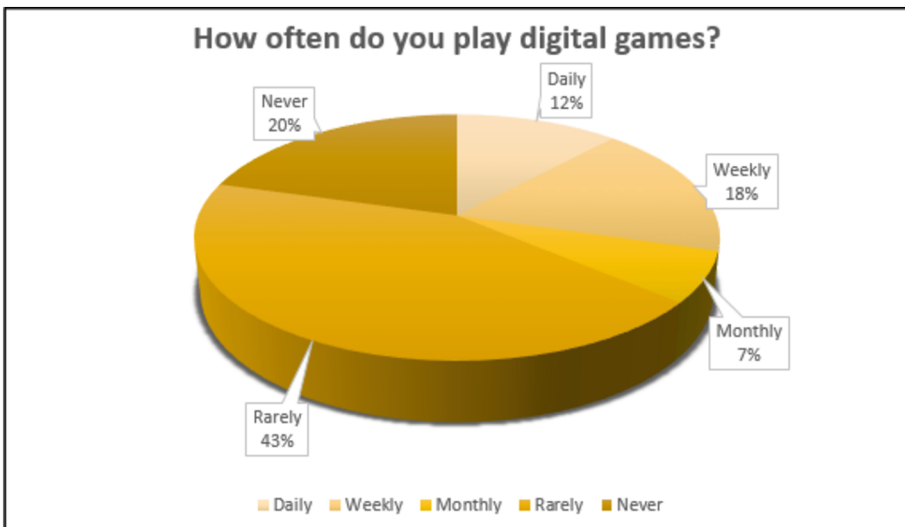


Fig. 1. Frequency of playing games

in playing games in general. Specifically, only 30% of the participants reported engaging in gaming activities on a daily or weekly basis, while a significant proportion of 20% indicated that they do not play games at all. These findings suggest that a substantial portion of the surveyed individuals either have limited interest in or limited access to gaming, highlighting the diversity of preferences and behaviours among the respondents.

Goals of the Game

The initial section of our survey sought input on the game's goals, both intermediate and ultimate, in terms of their clarity. 140 participants responded to our survey, expressing their satisfaction with the overarching objectives laid forth at the start of the game and agreeing or disagreeing with their clarity. In addition, 152 respondents said that during their games, the intermediate goals were well-explained and unambiguous. These results show that the majority of players thought the game's ultimate and intermediate objectives were clear and understandable as well as indicate that the game design is sufficient at explaining its goals to the players so they knew what they were playing for and where they were going. Additionally, the good comments on the clarity of intermediate goals suggest that the game gave players clear direction and instructions as they advanced through different stages of the game that differ in terms of topics and gameplay. Since players could easily comprehend their short-term goals and follow their progress in the game, it allowed them to retain motivation and a sense of accomplishment throughout the experience. Overall, these findings show that the game was successful in communicating its objectives to players, both at the beginning and throughout playtime and the user experience and satisfaction were enhanced by the concise description of these objectives, both overall and intermediate.

Feedback

Based on the results of the questionnaire, a total of 133 respondents agreed that they were provided with feedback during the gameplay (agree/partially agree). Meanwhile, 92 respondents expressed the opposite sentiment about the game. Furthermore, 148 respondents received immediate feedback on their actions within the game, whereas 88 respondents did not. These findings suggest a mixed response in terms of user satisfaction with the game's progress. A significant number of respondents agreed or somewhat agreed with their perceived progress, indicating a positive experience and a sense of advancement within the game. However, a considerable portion of the respondents expressed disagreement or partial disagreement, suggesting that particular game levels require. Additionally, the discrepancy in immediate feedback indicates that a higher proportion of respondents benefited from receiving instant information about their actions compared to those who did not. This suggests that immediate feedback may positively impact the user experience, providing players with a more responsive and engaging gameplay environment. Overall, the data highlights the importance of providing clear and timely feedback to players in order to enhance user satisfaction and improve the gaming experience. Responses also suggest that addressing areas of concern related to progress and incorporating more immediate feedback mechanisms could be beneficial for further enhancing user satisfaction and engagement in the game. It appears that the amount of feedback required for players heavily depends on the experience level as out of 92 respondents 61 also indicated that play digital games rarely or never, therefore,

additional efforts should be put into providing additional and well-structured feedback for those with limited game experience.

Hints and In-Game Support

This section of the questionnaire is dedicated to learning whether the in-game support and additional assistance were sufficient for players. According to the results, 132 respondents thought in-game support and additional assistance were sufficient, while 94 said they thought that they were not. Even though this educational game was not supposed to be challenging or difficult in a traditional sense, players experienced varying levels of difficulty provided by the game (Fig. 2) These results are consistent with the opinions expressed regarding in-game feedback provision. In addition, 139 respondents said the game provided auditory or visual aids that helped them get through obstacles, whereas 90 people disagreed. Given that more than half of the respondents said they played video games rarely or never, it is important to note that there is a considerable association between the availability of such auxiliary devices and past gaming experience. These observations highlight the significance of offering thorough in-game assistance, suited to the various demands and skill levels of players, to ensure a positive gaming experience. It becomes important as new players can often benefit greatly from these hints and in-game assistance as they go through a game. They offer important advice and instruction that can help players who aren't familiar with the gameplay, controls, or game mechanics comprehend and advance in the game more quickly. Furthermore, in the case of educational games, they can also be used to explain certain educational aspects and highlight why certain learning material is important, for example, some information regarding recycling provided as part of the game can further be used as part of short quiz and such information on the structure of the game could be beneficial for new players.

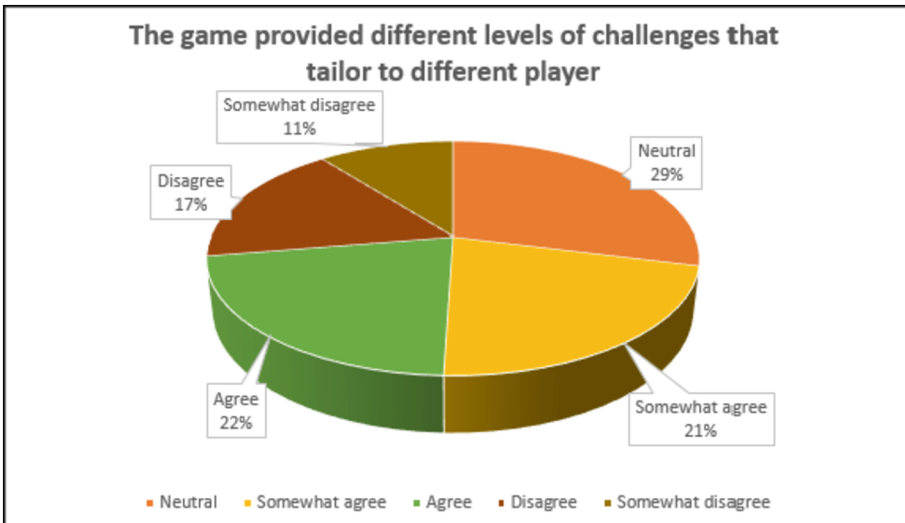


Fig. 2. Tailoring difficulty levels for different players

These clues, which assist novice players in overcoming obstacles and learning essential abilities, might take the form of covert indications, prompts, or explicit directions. Game design containing a sufficient amount of such assistance empowers players to feel more self-assured, engaged, and driven by providing easily accessible and thorough help, enhancing their overall experience and success in the game.

Sense of Being in Control

The analysis of user satisfaction results reveals intriguing insights regarding the perceived level of control among players in the tested game. The data indicates a peculiar trend, with 124 respondents expressing dissatisfaction with the sense of control and impact they experienced while playing. This finding suggests that a significant portion of the players felt limited or constrained in their ability to influence the game's outcome. Furthermore, 129 respondents reported feeling uncertain about the next steps to take within the game, indicating a potential lack of clarity or guidance in terms of gameplay progression. These results shed light on important areas for improvement, emphasizing the importance of enhancing player agency and providing clearer objectives or directions to enhance the overall gaming experience. On the other hand, this presents another issue. A lack of control can foster a sense of discovery and exploration, allowing new players to engage with the game world in a more immersive manner. By encouraging curiosity and experimentation, it can lead to a deeper engagement with the game's narrative, mechanics, and hidden secrets, such as finding interactive objects. This can enhance the overall enjoyment and sense of wonder for new players, as they uncover new possibilities and experiences within the game. At the same time, lack of control, especially for new players, may lead to finding the game and its mechanics overwhelming as something that may seem intuitive for some, may very likely seem confusing for others, therefore linear or semi-linear game attempts to solve this issue making the game more suitable to a wider audience.

Immersion

This category is intended for how immersed players were during the gameplay. 152 respondents did not become unaware of their surroundings while playing the game, 145 did not experience an altered sense of time and 160 did not temporarily forget worries about everyday life while playing the game. These results suggest that the game did not create a distorted perception of time or make it feel either slower or faster, indicating that the game did not provide a strong enough distraction or immersion to divert their attention from real-life concerns. These findings suggest that the tested game may need improvements in terms of creating a more immersive and captivating experience for players, as it currently does not seem to fully engage or captivate their attention. These results point to certain areas where the educational game intended to promote civic involvement and engagement needs to be improved. The game might benefit from additional interactive features that promote active engagement in order to improve user immersion. A more engaging experience may be achieved by including additional obstacles requiring players to put in additional effort and presenting a reasonable challenge for the age of the target audience as well as slight alterations to gameplay systems. Additionally, adding gamification components like achievements, prizes, and a feeling of development might increase player motivation and deepen their immersion. By taking into account these

elements, the educational game may provide a more engaging and satisfying setting, encouraging players to finish the game and experience the whole content our game has to offer.

Knowledge

Based on the questionnaire results, the findings reveal encouraging outcomes regarding the knowledge section of the tested game. Out of the total 164 respondents, it was reported that the game effectively enhanced their knowledge, indicating a positive impact on the players' understanding and learning. Additionally, a significant number of 178 participants grasped the fundamental concepts and ideas presented in the educational content of the game. These results hold particular significance for a game that prioritizes the development of new skills and knowledge, as they indicate the game's potential in providing practical and applicable insights for real-life situations. Overall, the findings underscore the game's efficacy in fostering learning and its relevance in offering valuable knowledge for users to apply beyond the digital environment.

These results were also supported by further feedback in at least one country (Greece) where College students who pilot-tested the game, were asked to evaluate it in a separate assignment for their political science class. The feedback that was given in the form of response papers a few days after pilot testing suggests that through exploring the different levels of *ENGAME*, the main learning points attained are both knowledge-based and skills-based. Students were acquainted with concepts new to them such as gentrification and greenwashing and reflected on similar issues they had experienced and on how important their engagement could be on these matters. In their words, they learned 'how to distinguish a credible from a non-credible sustainable business and how to avoid falling prey to greenwashing'. The learning objectives achieved through the game embrace individual and collective values. Students also connected especially with the levels referring to social equality, ethnic background and housing situation for students and how these can affect their overall performance.

5 Conclusions

The research on piloting the game intended for fostering civic participation and social inclusion as well as data from the questionnaire provided valuable insights for further developing the *INGAME* content as well as an aspect to pay attention to when developing other educational games. First of all, attention should be paid to the familiarity with playing digital games that the target audience already possesses. This should be regarded as one of the key elements dictating the creation of further content and mechanics as players with prior experience with games intuitively understand simplistic mechanics and additional efforts can be put into the educational aspect and other knowledge-building activities. At the same time, less experienced players may find themselves struggling to learn controls or figure out game mechanics, for example, using bookshelves as platforms for the controlled character in order to reach an interactive object, therefore, this more of a hand-holding approach may discourage experienced players. Secondly, newly acquired knowledge appears to be valued positively, indicating that minor technical issues or lack of familiarity with certain game mechanics are not an obstacle towards obtaining new

information. This can be achieved through clear and clever level design as well as well-written in-game content, that, in turn, increase interest and immersion rates as well as keep the player engaged.

References

1. Abrams, S.S.: Emotionally crafted experiences: layering literacies in minecraft. *Read. Teach.* **70**(4), 501–506 (2017)
2. Ashtari, D., de Lange, M.: Playful civic skills: a transdisciplinary approach to analyse participatory civic games. *Cities* **89**, 70–79 (2019)
3. Neys, J., Jansz, J.: Engagement in play, engagement in politics: Playing political video games. *Playful Citizen* **36** (2019)
4. Apperley, T., Walsh, C.: What digital games and literacy have in common: a heuristic for understanding pupils' gaming literacy. *Literacy* **46**(3), 115–122 (2012)
5. Constantinescu, T., Devisch, O., Huybrechts, L.: Civic participation: serious games and spatial capacity building. School of Architecture, Design & Environment and i-DAT (Institute of Digital Art and Technology), Plymouth University (2015)
6. Dishon, G., Kafai, Y.B.: Connected civic gaming: rethinking the role of video games in civic education. *Interact. Learn. Environ.* **30**(6), 999–1010 (2022)
7. Papadakis, S., Trampas, A.M., Barianos, A.K., Kalogiannakis, M., Vidakis, N.: Evaluating the learning process: the “ThimelEdu” educational game case study. In: *CSEdu* (2), pp. 290–298 (2020)
8. Krouska, A., Troussas, C., Sgouropoulou, C.: Mobile game-based learning as a solution in COVID-19 era: modeling the pedagogical affordance and student interactions. *Educ. Inf. Technol.* 1–13 (2022)
9. Nisiforou, E.A., Kosmas, P., Vrasidas, C.: Emergency remote teaching during COVID-19 pandemic: lessons learned from Cyprus. *Educ. Media Int.* **58**(2), 215–221 (2021)
10. Whitton, N., Hollins, P.: Collaborative virtual gaming worlds in higher education. *ALT-J* **16**(3), 221–229 (2008)
11. Schrier, K.: *We the Gamers: How Games Teach Ethics and Civics*. Oxford University Press, Oxford (2021)
12. Themistokleous, S., Avraamidou, L.: The role of online games in promoting young adults' civic engagement. *Educ. Media Int.* **53**(1), 53–67 (2016)
13. Raphael, C., Bachen, C., Lynn, K.M., Baldwin-Philippi, J., McKee, K.A.: Games for civic learning: a conceptual framework and agenda for research and design. *Games Cult.* **5**(2), 199–235 (2010)
14. Greipl, S., Moeller, K., Ninaus, M.: Potential and limits of game-based learning. *Int. J. Technol. Enhanc. Learn.* **12**(4), 363–389 (2020)
15. Tan, J.L., Goh, D.H.L., Ang, R.P., Huan, V.S.: Participatory evaluation of an educational game for social skills acquisition. *Comput. Educ.* **64**, 70–80 (2013)
16. Egenfeldt-Nielsen, S.: Overview of research on the educational use of video games. *Nordic J. Digit. Lit.* **1**(3), 184–214 (2006)
17. Huang, Y.M.: Exploring students' acceptance of educational computer games from the perspective of learning strategy. *Aust. J. Educ. Technol.* **35**(3) (2019)
18. Dixon, M., Gamagedara Arachchilage, N.A., Nicholson, J.: Engaging users with educational games: the case of phishing. In: *Extended abstracts of the 2019 CHI Conference on Human Factors in Computing Systems*, pp. 1–6 (2019)
19. Cheung, S.Y., Ng, K.Y.: Application of the educational game to enhance student learning. In: *Frontiers in Education*, vol. 6, p. 623793. Frontiers Media SA (2021)

20. Niederhauser, D.S., Stoddart, T.: Teachers' instructional perspectives and use of educational software. *Teach. Teach. Educ.* **17**(1), 15–31 (2001)
21. Hopson, J.: Behavioral game design. *Gamasutra* (2001)