

Learning about children's rights through engaging visual stories promoting in-class dialogue

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ABSTRACT

This paper presents a game-ish approach which helps young students in the early elementary school classes to learn about their rights. Our research path involved utilizing short visual stories accompanied by relevant questions. These stories are accessible through the web. The supporting viewing mechanism can be operated in both individual and collaborative modes and ultimately offers suggestions for the topics that students should focus on for further study. The paper presents the approach, the evaluation methodology and the results of utilizing the visual stories to a cohort of 50 children and 6 teachers. The approach employed pre- and post-intervention assessments to get an estimate of the students' understanding, along with questionnaires to gather the teachers' perspectives. The evaluation results indicate that the stories enhance students' motivation and engagement, ultimately leading to an improvement in their knowledge and they help to efficiently initiate a dialogue among the participants.

Keywords: children rights, serious games, interactive stories, evaluation of learning applications

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INTRODUCTION

Children frequently encounter a multitude of obstacles that jeopardize their welfare and impede their growth. Despite the presence of global agreements and domestic laws designed to protect their rights, numerous children worldwide still endure different types of exploitation, mistreatment, and disregard, even in advanced societies. To tackle these problems, it is necessary to establish not just legal structures but also implement extensive initiatives to educate both children themselves and influential adults who shape their surroundings and encounters. In recent years, there has been a growing recognition of the importance of empowering children with knowledge about their rights. Education and awareness initiatives have been identified as crucial tools for instilling a sense of agency and promoting the protection of children's rights (Archard, 2014; Jerome & Starkey, 2022). However, traditional methods, like lecturing in a class, may not always be effective in engaging children, especially in today's digital age where their attention is often diverted by various forms of media and entertainment.

To address this challenge, there is a need for innovative approaches that leverage technology and multimedia to engage children in learning about their rights in an interactive and engaging manner. Tools for introducing social issues combine elements of gamification, storytelling, and interactive media to present a topic in an engaging way. For example, a tool which, through storytelling, helps students to gain a better awareness of online risks is discussed in Lazarinis et al.

(2020). A review of serious games for preventing and detecting bullying and cyberbullying is presented in Calvo-Morata et al. (2020). The development of social skills through a game-based application is discussed in Papadiou et al. (2021).

The current paper focuses on the utilization of visual stories aimed at raising awareness of children's rights in a fun and accessible way which also enables teachers to initiate relevant discussions with their students. By combining elements of gamification, storytelling, and media, the tool seeks to capture children's interest and encourage active participation in learning about their rights.

SOCIAL AWARENESS THROUGH ICT

Serious games are computer applications designed for instructional or training purposes, rather than for amusement and leisure (Laamarti et al., 2014). Serious games have a wide range of applications in education, teaching, training, and information dissemination. They are also utilized in several domains beyond education, including the military, government, business, healthcare, and environmental issues (Tan & Nurul-Asna, 2023). Social skills could be improved through serious games (Azadboni et al., 2024; Zheng et al., 2021). Other technologies, like virtual reality and augmented reality have been used for developing social skills (Criollo-C et al., 2024; Howard & Gutworth, 2020). Adaptive, computer-based staff training software program for teaching administration of social skills intervention is reported in

Mailey et al. (2021). Big data technologies have been employed for improving social competence (Elfeky et al., 2023).

“A Day at School” is a serious game designed to enhance the social skills of elementary school students by immersing them in an educational situation (Papadiou et al., 2021). In this particular scenario, the protagonist of the game encounters different circumstances throughout a typical day at school. The scenario explores instances of bullying, racism, and children’s social consciousness. Through the utilization of the educational application, students are able to explore suitable conduct and receive the initial impetus for developing their social behaviors. Teachers who evaluated the serious game found the game to be suitable for teaching purposes.

A serious game built to help young children with autism spectrum conditions practice social communication skills is discussed in Bernardini et al. (2014). They utilize an independent educational agent and implementing the most effective pedagogical methods in typical intervention settings. The design of the agent and the learning activities are grounded in principled intervention guidelines, advice from autism practitioners, and input from children themselves and reduce anxiety associated with social interaction.

Chow et al. (2020) found that serious games have been utilized to promote children’s eating behavior. The current research suggests that serious games can effectively improve children’s preferences for healthy eating and their motivation to do so, both in the short and long term. 43 studies, concerning physical and video games, have been reviewed and it was found that the fruit and vegetable intake by students has increased, and nutrition-related knowledge have been improved.

Storytelling is employed to enhance pupils’ comprehension of the Internet risks (Lazarinis et al., 2020). Every short story depicts a scenario that children encounter while browsing the Internet. The program aims to prompt students to reflect on their online actions and modify their attitudes by utilizing the emotions of virtual characters and certain visual cues. Digital storytelling has been used to promote inclusiveness and diversity in education (Belda-Medina, 2022). The findings of two-year research show positive effects in the subjects of the study.

A qualitative methodology, mediated by humans, for the purpose of teaching social and emotional learning skills is discussed in Walker and Venker Weidenbenner (2019). In order for children to learn empathy, a crucial socio-emotional skill, using virtual play and technology, it is necessary for a person (such as a teacher, parent, or peer) to facilitate their comprehension and application of the game process and outcomes. Another study argues that the usage of robots to impact the development of empathy in children is uncertain and depends on factors such as their design, intensity, and context of use (Pashevich, 2022). A systematic review of ICTs on evoking empathy through games is presented in Papoutsis and Drigas (2016). Significant advancements have been made in the design and development of ICT games, with the aim of supporting children and adolescents to cultivate empathy, according to the review paper.

The aforementioned research demonstrates a growing body of scholarly literature on the use of software and ICT technologies in building social skills. Various techniques such as serious games, short stories, digital storytelling, and virtual and augmented reality have been employed to enhance different facets of social skills.

Three scenarios concerning the right to participate, the right to education and the right to rest, leisure, play, participate in cultural and artistic have been developed and through a problem bases approach has been taught to university students (Sever et al., 2023). A serious game for human rights with a focus on refugees is discussed in Gabriel (2019). The game attempts to create understanding and empathy for refugees and their dangerous journey. A game for introducing children rights to preschool students is presented in Sakka and Gouscos (2023). Supportive findings towards the potential to promote children’s rights through the use of infographics, movies, and a serious game designed for mobile devices are discussed in Soberano Serrano et al. (2022). Learning about human rights could benefit from the above approaches. Serious games or storytelling can be more engaging and thus more effective for young children. Different approaches have been employed so far to teach children’s rights and human rights more generally.

METHODOLOGY

Research Aims and Design

Improving the social skills of students is crucial for the seamless assimilation of individuals into the culture in which they reside. Their acquisition of knowledge commences within the home context and is then strengthened within the educational institution. Consequently, children are already instructed during their pre-school education. The social skills taught in primary education usually include human rights, volunteering, inclusiveness, mutual respect and diversity. Human rights education should start at a young age and continue life through formal and non-formal education (COE, n.d.; Office for Democratic Institutions and Human Rights), Council of Europe [ODIHR], 2009; Ramirez et al., 2007). Especially for children, it is imperative to introduce them to their rights in order to create a society of respectful individuals who are capable of defending and enforcing human rights (Correia et al., 2019). Thus, our primary objective is to facilitate the teaching and learning of children rights through ICT. After reviewing the aforementioned papers, we believe that exploring digital visual narratives paired with pertinent questions is a promising research direction for engaging young students in the early elementary school age range in learning and discussing their rights. The main research questions of the current work are as follows:

1. Does the proposed approach with the visual stories improve the engagement of students in learning about children’s rights?
2. Does the proposed method improve the knowledge of students on children’s rights?
3. Does the proposed method facilitate the initiation of a more fertile dialogue between teachers and students?

This study employs a mixed-methods research design to explore the effectiveness of the game-ish learning approach in raising awareness of children’s rights among elementary school students. The combination of quantitative and qualitative approaches provides a comprehensive understanding of the educational impact of our approach. The study integrates pre- and post-intervention questionnaires, observational data, and interviews to assess changes in knowledge and attitudes towards children’s rights.

Participants

The participants of this study are early class elementary school students from diverse socio-economic backgrounds. Students were

Επεξεργασία ερωτήσεων


Κατηγορία Δικαίωμα στην ενημέρωση

Ερώτηση Τα παιδιά πρέπει να ενημερώνονται για όσα συμβαίνουν στον κόσμο, έχουν το δικαίωμα να μαθαίνουν τις σημαντικές ειδήσεις του περιγύρου.

Σωστή απάντηση Σωστό

Λάθος απάντηση Λάθος

Εικόνα Browse... No file selected.

 Διαγραφή

Κατηγορία Δικαίωμα στην ισότητα

Ερώτηση Όλα τα παιδιά, σε όλο τον κόσμο, πρέπει να έχουν τα ίδια δικαιώματα.

Σωστή απάντηση Σωστό

Λάθος απάντηση Λάθος

Εικόνα Browse... No file selected.




Figure 1. “Add new questions” interface (the authors’ own work)

selected using purposive sampling to ensure a representative mix of age, gender, and socio-economic status. The only requirement was the consent from parents or guardians for minors’ participation. For teachers, we selected those who expressed their willingness to try the visual stories in their classes. Teachers had to be included as participants due to the significance of their observations and opinions regarding student engagement.

Data Collection and Analysis

Data collection involved a combination of questionnaires, interviews, and observations. Initially pre- and post-intervention questionnaires were administered to students to assess changes in students’ knowledge towards children’s rights. The questionnaires included multiple-choice and Likert-scale questions concerning the knowledge of students about children rights (**Appendix A**).

Teacher observations were recorded with the aid of a questionnaire aimed at assessing the learning value and the engagement and interaction of the students with the tool (**Appendix B**). Most of the questions were on a 5-Likert scale (strongly disagree to strongly agree). Through open-ended questions teachers could provide deeper insights into participants’ experiences and perceptions of the games’ educational value.

The study was conducted in three phases, as follows:

1. **Preparation:** Students were recruited, and consent was obtained from parents or guardians. An orientation session was held to brief participants on the study’s objectives and procedures and then students had to complete a pre-intervention questionnaire to measure their knowledge in children’s rights.
2. **Implementation:** Students under the supervision of their teachers utilized stories through the web for two teaching

hours. Sessions with different students were conducted in a classroom setting with the support of a teacher, who observed student interaction and facilitated discussions on the game content afterwards.

3. **Post-intervention:** Following the game sessions, post-tests were administered for students. Teachers had also to record their opinions and observations.

Ethical protocols included obtaining informed consent from parents or guardians and assent from child participants. Confidentiality and anonymity were maintained, as all the questionnaires were anonymous. The study also ensured that participation was voluntary, and participants could withdraw at any time without penalty.

Pre- and post-intervention data were analyzed using descriptive statistics and Chi-square (χ^2) tests to compare the scores. This analysis assessed the significance of changes in knowledge and attitudes towards children’s rights. The open questions administered to teachers were analyzed using steps of the thematic analysis (Clarke & Braun, 2017) to identify common topics and insights related to participants’ experiences and perceptions.

The tool was utilized by four distinct student classes, including a total of 50 children, for 2 hours each. Thus, the tool was used for 8 teaching hours in total. The students attend the second and third grades of primary school, indicating that they were between the ages of 7 and 8. There were 32 females and 18 males. 6 female teachers supervised and facilitated the process, all of them had a minimum of 5 years of teaching experience and they also participated in our questionnaire.

THE “LEARN YOUR RIGHTS” GAME

The purpose of creating a digital game was to enhance the digital educational resources available for teaching youngsters about the importance of respecting their rights and preventing violations against them. Given that social skills education in the early years of primary school, centers around human rights and, consequently, children’s rights, as already discussed in the bibliography above, we believe that teachers should have access to digital gaming approaches, among other digital resources, that effectively and captivantly aids children in comprehending their rights. The tool presents visual stories with associated questions shown in a random order. Each question corresponds to a specific category of children’s rights.

The game is designed to function as a web tool. Additionally, it features a responsive interface. Users have the option to engage in either individual or group mode. Upon start, users can read the objectives and rules of the game, to edit/add questions (**Figure 1**) or to select the number of questions and play the game in single mode or in team mode (**Figure 2**). The capacity to input new questions renders it simultaneously a platform for generating analogous games.

The game features hand-drawn and colored images, which are inspired by freely available online photos (**Figure 3**). The questions are presented to the student-player in a random order, with one question for each category of children’s rights.

Upon completion of the game, a comprehensive table is displayed, presenting the accurate and erroneous responses, areas that require more study, and the winning team in the event of team gameplay (**Figure 4**). This game allows students to reinforce their understanding of children’s rights and identify instances where they are violated.

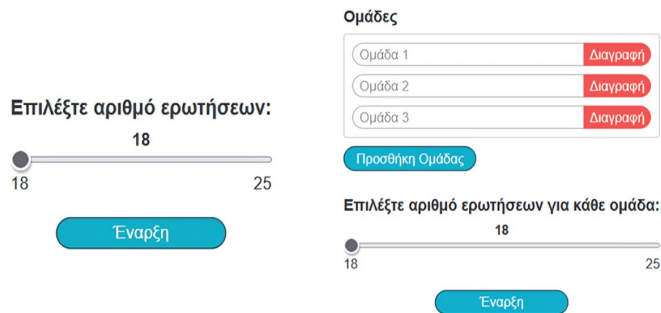


Figure 2. Selection of single or team playing mode (the authors' own work)

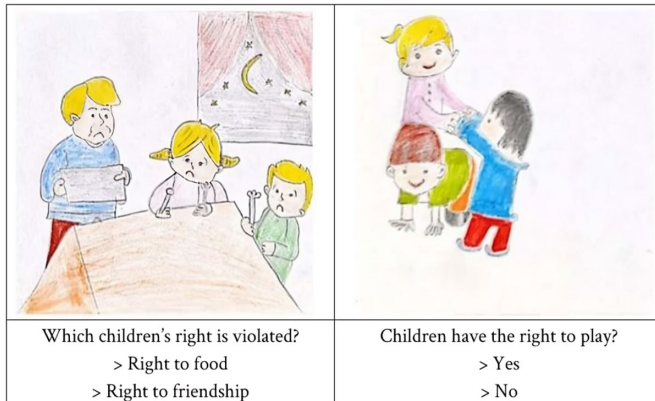


Figure 3. Examples of questions (the authors' own work)

Βαθμολογία		
#	Ερώτηση	
1	Όλα τα παιδιά, σε όλο τον κόσμο, πρέπει να έχουν τα ίδια δικαιώ...	✓
2	Ένα από τα δικαιώματα των παιδιών είναι και το δικαίωμα στη φι...	✗
3	Τα παιδιά πρέπει να ζουν σε συνθήκες πολέμου.	✗
4	Ποιο δικαίωμα των παιδιών φαίνεται στην εικόνα ;	✗
5	Έχουν δικαίωμα τα παιδιά να λένε αυτό που σκέφτονται, όσα πισ...	✓
6	Ποιο δικαίωμα των παιδιών δείχνει η εικόνα ;	✗
7	Στην εικόνα φαίνεται ένα παιδί να κοιμάται στο δρόμο. Ποιο δικαί...	✗
8	Τα παιδιά στην εικόνα δε φοράνε ρούχα. Ποιο δικαίωμά τους έχι...	✓
9	Τα παιδιά στην εικόνα απολαμβάνουν το δικαίωμά τους στο φαγ...	✓
10	Στην εικόνα φαίνονται άνθρωποι να διασκεδάζουν. Τα παιδιά έχο...	✗
11	Στην εικόνα απεικονίζεται η καταπάτηση του δικαιώματος των πα...	✗
12	Γιατί το παιδί κρατάει την ελληνική σημαία ; Ποιο δικαίωμα απεικ...	✗
13	Τα παιδιά πρέπει να ενημερώνονται για όσα συμβαίνουν στον κό...	✓
14	Το παιδί νοσηλεύεται στο νοσοκομείο. Απολαμβάνει το δικαίωμα ...	✓
15	Το παιδί στην εικόνα κάνει προσευχή. Έχει το δικαίωμα αυτό ;	✓
16	Τα παιδιά έχουν δικαίωμα να είναι καθαρά.	✓
17	Η εικόνα δείχνει παιδιά να δουλεύουν αντί να πηγαίνουν στο σχο...	✓
18	Τα παιδιά έχουν δικαίωμα να παίζουν ;	✗

Τι πρέπει να μελετηθεί ξανά

Νέο παιχνίδι

Figure 4. Results shown to students (sample run) (the authors' own work)

Table 1. Pre-intervention answers of the students with respect to children's rights

Question	Answers
Q1	a. Yes: 90% (45 students) b. No: 10% (5 students)
Q2	a. 54% (27 students) gave an example of a correct right, e.g., the right to play, to go to school b. 46% (23 students) did not answer or provided wrong examples, e.g., the right not to go to school or the right to own a mobile phone
Q3	a. The right to play: 62% (31 students) b. The right to own a mobile phone: 20% (10 students) c. The right to stay up all night: 18% (9 students)
Q4	a. The right to work: 6% (3 students) b. The right to education: 74% (37 students) c. The right to travel: 20% (10 students)
Q5	a. Yes: 66% (33 students) b. No: 34% (17 students)

Additionally, teachers can use the game to assess whether students really comprehend the concept of rights or a specific right. The game can be also used in lower classes, e.g., in kindergarten, where the children are not yet able to read, where the teachers could act as co-players of young students.

The user can choose to play individually or in a group. In the individual game mode, the player has the option to select the desired number of questions to play with, with a maximum limit of eighteen.

RESULTS

Student's Pre-Intervention Test

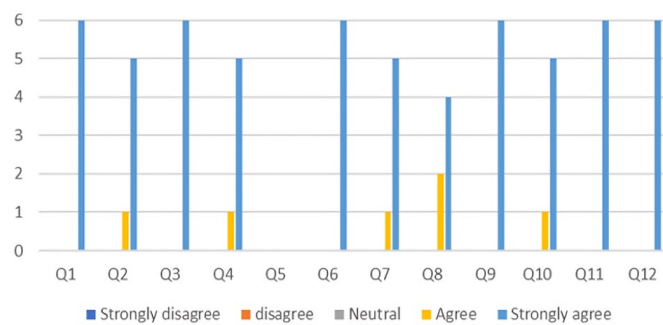
The short questionnaire shown in **Appendix A** was distributed to the 50 participating students. A large number of students are aware that they have distinct rights, demonstrating widespread awareness. This is

demonstrated by 90% of participants who confirmed their understanding of children's rights. However, a closer examination reveals a discrepancy between general knowledge and specific understanding. When asked to provide an example of a right for children, over half of the participants gave erroneous or inappropriate options, such as the right to own a mobile phone or the right to stay awake all night. This implies that, while children are aware about the concept of rights, their conception of what constitutes a fundamental children's right is restricted.

Similarly, when asked to name specific rights from a list, a large proportion of children were unable to discriminate between genuine rights and non-rights (**Table 1**). For example, 20% thought that owning a cell phone was a right, whereas 18% thought that staying up all night was a legitimate right. Furthermore, while 74% correctly identified the right to education, 4% incorrectly regarded the right to work as a child's right. These findings suggest that, while there is widespread awareness

Table 2. Post-intervention answers of the students with respect to children's rights

Question	Answers
Q1	a. Yes: 100% (50 students) b. No: 0% (0 students)
Q2	a. 96% (48 students) gave an example of a correct right, e.g. the right to play, to go to school, to have food, etc. b. 4% (2 students) provided wrong examples, e.g. the right to play all day
Q3	a. The right to play: 100% (50 students) b. The right to own a mobile phone: 0% (0 students) c. The right to stay up all night: 0% (0 students)
Q4	a. The right to work: 2% (1 student) b. The right to education: 96% (48 students) c. The right to travel: 2% (1 student)
Q5	a. Yes: 100% (50 students) b. No: 0% (0 students)

**Figure 5.** Teachers' questionnaire results (the authors' own work)

of the existence of children's rights, there is a clear need for more targeted education on the specific rights that children have.

Student's Post-Intervention Test

After engaging with the game-ish tool, students were required to retake the test. We can observe a substantial improvement (Table 2). A χ^2 test for independence in questions Q2 to Q5 yields χ^2 values ranging from 9.79 to 23.46, with p-value < 0.05 in all cases. This shows that the pre- and post-test response distributions differ significantly. As expected, there is no significant difference in the distribution of responses between the pre- and post-test for Q1, but this is a generic question which is expected to be answered correctly independently of any teaching activities.

Teacher's Questionnaire

Figure 5 presents the results of the opinions of the 6 teachers. The questionnaire responses were highly favorable, with the majority of participants responding "strongly agree" to several critical items, highlighting the considerable influence of the game-ish learning strategy. Teachers reported a significant improvement in students' awareness of children's rights as a result of the game, demonstrating its effectiveness in delivering ideas in an interesting, engaging and memorable manner. Teachers' feedback indicates that pupils not only easily understood the educational content but also felt it to be adequately matched with the theme of children's rights, so complementing the regular-book-based-approach.

Furthermore, the preference for an interactive game style over traditional conversation in teaching this subject shows a significant pedagogical movement toward active learning approaches. Students' active participation and motivation during the sessions show a high level of engagement, which is essential for effective learning. Teachers also commented that the game was an effective tool for starting

important conversations about children's rights in the classroom, perhaps leading to long-term interest and understanding.

In the second part of the questionnaire teachers had to answer open ended questions sharing their thoughts about the utilization of the game-based application. In the first question "What features did you like most about this game?" a list of different themes has been compiled:

The game was easy to use and navigate.

The game was suitable for young students aged 5 to 9.

The game had appealing visuals.

The game used diverse characters which made it inclusive.

The results at the end of the game help teachers to identify problematic areas.

The second question "What do you believe should be changed or added to the game?" the basic features requested are:

More interactive elements to increase engagement and active participation.

Multiple language support to cater to non-native speakers.

Implementing options for players with disabilities, such as screen readers and color-blind modes.

In response to the final question, which invited teachers to provide any additional comments, the primary observations noted were:

I should do more tests with team-based mode to see if it's even more engaging.

Similar applications which are simple games could be used for geography, mathematics and other topics to help students to be more engaged.

The game really helped students to be more engaged and they found some funny images which created a nice atmosphere in the classroom.

The input received from educators regarding the presented tool utilized in educational environments highlights both notable strengths and areas that need enhancement. Teachers agreed that the game is easy to use and suitable for children between the ages of 5 and 9. They

observed that the attractive graphics and variety of images and characters made the game more inclusive and engaging. This is a very important finding which was our primary research aim. Moreover, the game's capacity to identify the erroneous answers is important to help teachers to adjust their teaching. Nevertheless, recommendations for improvement were also provided with the aim of making the game accessible to all students. Furthermore, they proposed that comparable uncomplicated gaming applications may be advantageously utilized in other disciplines demonstrating a wider range of potential uses for this captivating instructional method.

The anticipated long-term educational benefits, as well as the ambition to include such digital games into future teaching practices, demonstrate an awareness of the value that this creative approach brings to education. Overall, the findings indicate that the game was not only helpful to students in understanding children's rights, but it was also a good educational tool that teachers want to utilize more frequently.

DISCUSSION

In the previous sections we presented an application for young children which utilized short visual stories to show the student rights. The tool has been tested with the help of students and teachers and it was found beneficial both in terms of learning and in terms of engagement.

The questionnaire received positive feedback from teachers, which strongly reinforces the first research objective of evaluating whether the suggested game enhances student participation in learning about children's rights. Based on the feedback, teachers noted that the game was more efficacious than conventional classroom discussions in fostering student involvement with the subject matter. The participants observed an increase in engagement and a noticeable rise in students' enthusiasm and motivation when engaging with the game. Not only was this engagement evident during the playtime, but it also impacted teachers' views on teaching methods, with many expressing a desire to integrate similar digital games into their future teaching approaches. The widespread agreement regarding the game's benefits for students further emphasizes its efficacy as a pedagogical instrument, showcasing its ability to actively and significantly involve students in the study of children's rights.

The feedback from teachers clearly supports the second research objective, indicating that the proposed game greatly enhances students' understanding of children's rights. Teachers observed that the game successfully improved students' comprehension of the subject matter, with many commenting that pupils easily understood the educational content. This demonstrates an enhancement not just in the acquisition of knowledge but also in comprehension, as the material of the game was particularly customized to be appropriate for instructing youngsters about their rights. Teachers also emphasized the game's ability to supplement and enrich the traditional curriculum, showing that it is a great teaching tool that connects theoretical learning with interactive involvement. The game's pedagogical usefulness was highlighted, with teachers recognizing its overall advantage in enhancing students' learning experiences.

Further, the outcomes of the pre- and post-game assessments with students offer additional evidence in favor of the second research objective, demonstrating that the suggested game effectively enhances

students' understanding of children's rights. Students exhibited a measurable improvement in the quantity of accurate responses on the post-game assessment in comparison to their scores on the pre-game assessment. This result is a positive indication of the effectiveness of the game in captivating students' interest and in enhancing their understanding of children's rights.

The favorable response from educators regarding the influence of the suggested game on classroom conversations about the rights of children provides substantial backing for the third research objective of promoting a more productive exchange between teachers and students. Teachers observed that the game was more successful than traditional class discussions in capturing students' attention and involvement with the subject matter, highlighting its potential as an educational tool for fostering more comprehension and enthusiasm. Moreover, the game's ability to facilitate instructors in initiating discussions on children's rights in the classroom holds great importance. This suggests that the game not only offered a thought-provoking educational experience but also facilitated opportunities for substantial engagement and exchange of ideas between students and teachers.

CONCLUSIONS

This paper introduces a web tool that utilizes visual narratives and accompanying questions to educate youngsters about their rights in an engaging and interactive manner. This work contributes to the existing research on technology-mediated interventions aimed at promoting educational themes. It provides insights into the design considerations and problems associated with developing captivating instructional aids for young audiences. By equipping children with information regarding their entitlements and cultivating a society that values and promotes their rights, we may strive towards establishing a global community where every kid can flourish in a secure and nurturing setting. Based on the findings of the questionnaire, it can be concluded that even simple applications that include visual narratives and game features can improve interest and engagement, as well as facilitate information acquisition among students. The program underwent rigorous testing solely in single player mode, which poses a limitation on our evaluation efforts. However, even in single used mode tangible educational benefits have been produced. Furthermore, it has been discovered that educators express a keen interest in supplementary software that incorporates even minimal elements of gaming. These applications have the capacity to increase student enthusiasm and expand their understanding. Additional assessments including both younger and older children are necessary to evaluate the applicability of the tool across different age groups. Additionally, it is necessary to evaluate the team-mode in order to fully comprehend its instructional capabilities. To fully understand the benefits of our technique, it is necessary to compare it with other methods, such as lecture-based instructional activities.

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Ethics declaration: The research reported in this article is exempt from institutional review. Per the institutional guidelines, research projects carried out in the context of a diploma thesis "may request" approval from

the ethics committee of the Hellenic Open University. The authors confirmed that all the statistical data have been collected from anonymized questionnaires researching only the opinions of the participants on the suitability of educational software and that all the involved parties provided written consent prior to their involvement.

Declaration of interest: Authors declare no competing interest.

Data availability: Data generated or analyzed during this study are available from the authors on request.

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APPENDIX A: SHORT TEST TO EVALUATE THE KNOWLEDGE OF YOUR STUDENTS WITH RESPECT TO CHILDREN RIGHTS

1. Do you know that children have specific rights?
 - a. Yes
 - b. No
2. Can you describe something that you know or believe should be a right for children?
3. Which of the following is a children's right?
 - a. The right to play
 - b. The right to own a mobile phone
 - c. The right to stay up all night
4. Which of the following is a children's right?
 - a. The right to work
 - b. The right to education
 - c. The right to travel
5. Do you think you have the right to express and share what you learn, think and feel?
 - a. Yes
 - b. No

APPENDIX B

Table B1. Questionnaire for the teachers opinions on the value of the game-based application

No	Question	Scale
Q1	The game facilitated students' understanding of children rights.	5-Likert scale
Q2	Students understood the educational content easily.	5-Likert scale
Q3	The content of the game is suitable for the topic of children rights.	5-Likert scale
Q4	The game is more effective than simply discussing the topic in a class.	5-Likert scale
Q5	The game enhances the traditional curriculum.	5-Likert scale
Q6	The pedagogical value of the game is significant.	5-Likert scale
Q7	Students participated very actively in the game.	5-Likert scale
Q8	Students seemed interested and motivated while interacting with the game.	5-Likert scale
Q9	The game helped me to initiate a dialogue about children rights in the classroom.	5-Likert scale
Q10	The game has long-term educational benefits for the students.	5-Likert scale
Q11	I am going to incorporate similar digital games into my future teaching practices.	5-Likert scale
Q12	Overall, the game was beneficial for the students.	5-Likert scale
Q13	What features did you like most about this game?	Open-ended
Q14	What do you believe should be changed or added to the game?	Open-ended
Q15	Please provide any additional observations or comments about the students' engagement, interaction with the content, collaborative behaviors during the game or any other aspect.	Open-ended