Journal of Information Technology and Cyber Security 4(1) January 2026: 16-25 EISSN 2987-386X | PISSN 2987-3878
DOI:10.30996/jitcs.133044

RPG-Based Educational Game for Personal Data Security Awareness in Elementary School Students: A Design and Usability Study

Muhamad Rizal Fahlefi [1], Uky Yudatama [2], Dimas Sasongko [3,*], Nuryanto Nuryanto [4], Setiya Nugroho [5], Purwono Hendradi [6]

[1,2,3,4,5,6] Department of Informatics Engineering, Universitas Muhammadiyah Magelang, Indonesia
* Corresponding author: dimassasongko@unimma.ac.id

Received: 09 January 2026
Accepted: 24 January 2026
Revised: 24 January 2026
Available online: 28 January 2026

To cite this article: Fahlefi, M. R., Yudatama, U., Sasongko, D., Nuryanto, N., Nugroho, S., & Hendradi, P. (2026). RPG-Based Educational Game for Personal Data Security Awareness in Elementary School Students: A Design and Usability Study. *Journal of Information Technology and Cyber Security, 4*(1), 16-25.
https://doi.org/10.30996/jitcs.133044

Abstract

As more and more elementary school-aged children use the internet, they are more likely to be exposed to cybersecurity threats, especially when it comes to keeping their personal information safe. Various educational media have been developed to introduce cybersecurity concepts to children, but most remain passive and do not engage children in simulated real-life digital risk situations. This research addresses this gap by proposing an RPG-based educational game that integrates personal data security concepts into gameplay missions tailored to the cognitive characteristics of children aged 10–12. The goal of this study was to create and assess an educational game that could serve as a substitute learning tool for personal data security. The game was developed using the Game Development Life Cycle framework and implemented using RPG Maker MV. Usability testing involved 20 elementary school students and was carried out through direct observation of 13 game scenes. The success rate indicates the number of students who were able to complete each scene independently. The test results showed that the beginning and end of the game had low success rates, indicating issues with text readability, navigation clarity, and reflective elements. The results showed that iterative improvements in the beta phase improved interface clarity and the gameplay experience. The findings in this study indicate that usability-based improvements have an important role in the design of educational games for children, and RPG-based educational games have the potential to be interactive and contextual personal data security education media.

Keywords: cybersecurity education, game development life cycle, personal data security, RPG, role playing game, usability.

1. Introduction

The development of information technology and internet penetration among school-age children have made this group active online users (Alguliyev & Ojagverdieva, 2019; Alguliyev, Abdullayeva, & Ojagverdiyeva, 2021), but they are vulnerable to various cybersecurity threats, particularly those related to personal data security (Kuzminykh, Yevdokymenko, Yeremenko, & Lemeshko, 2021; Meitarice, Febyana, Fitriansyah, Kurniawan, & Nugroho, 2024; Supangat, Amna, & Rochman, 2025). Cybersecurity threats continue to evolve in complexity and target not only the technical aspects of information systems but also exploit weaknesses in user behavior. Analysis of the cyberthreat landscape shows that the human factor is a crucial component of overall information security, so mitigation efforts cannot rely solely on technical solutions (Jony & Hamim, 2023). Low security awareness among vulnerable user groups, including children, has the potential to increase the risk of misuse of personal data in online activities. In the context of this study, personal data security awareness is defined as a child's ability to recognize personal and sensitive data, understand the risks of unsafe online activities, and respond to simple cyber threats, such as requests

for personal data, suspicious messages, or risky links.

Literature review research indicates the need for specific educational curricula and strategies for children to enable them to recognize and avoid risks such as phishing, personal data leaks, and online exploitation (Sağlam, Miller, & Franqueira, 2023). Based on BPS data, in 2021, 88.99% of children aged 5 years and above used the internet to access social media, and 98.70% of children aged 5 years and above accessed the internet using smartphones (Sasongko & Purwandari, 2023). Research conducted by Rifai et al. shows the high risks faced by children under 17 years of age in using the internet, especially related to personal data security (Rifai, Armansyah, & Hashbillah, 2024). UNICEF reported that in 2024, 32.1% of children shared their personal information with strangers online, and 24% of children met in person with people they knew online. Then, regarding online experiences, 42% of children feel uncomfortable or afraid of their online experiences, and only 37.5% of children have received information on how to use the internet safely (UNICEF Indonesia, 2025).

Research on personal data security and cybersecurity education for children has flourished recently. One widely used approach is visual storytelling, such as interactive comics. Studies by Zhang-Kennedy et al. showed that interactive comics can increase children's awareness of privacy and cybersecurity issues and generate high levels of engagement due to their narrative approach, which is close to children's everyday experiences (Zhang-Kennedy, Baig, & Chiasson, 2017; Zhang-Kennedy, Biddle, & Chiasson, 2017; Zhang-Kennedy & Chiasson, 2017). Previous research by Sasongko and Purwandari also developed an Android-based interactive comic using the ADDIE method and demonstrated satisfactory usability and positive acceptance among children aged 10–12 (Sasongko & Purwandari, 2023). However, these studies also indicated that the interaction provided was still passive, as children acted as readers and were not involved in the decision-making process or simulated consequences of actions. These limitations restrict children's opportunities to practice decision-making and understand the consequences of their actions when faced with personal data security risks in the digital environment.

Literature reviews by Quayyum et al. and Videnovic et al. confirm that educational games have a greater potential than conventional media in enhancing children's cybersecurity awareness (Quayyum, Cruzes, & Jaccheri, 2021; Videnovik, Vold, Kiønig, & Trajkovik, 2025). However, most of the studies reviewed primarily concentrate on design and user engagement, with limited empirical evaluation of learning outcomes. Similar findings were reported in literature reviews of cybersecurity serious games, indicating that many of these games are developed without a structured development cycle and lack clear measurements of cognitive improvement (Hill, Fanuel, Yuan, Zhang, & Sajad, 2020; Ng & Hasan, 2025).

Based on previous research, most personal data security educational media for children are still passive or semi-interactive, so they do not fully support role-based learning and decision-making that represent real situations in the digital world. Although several studies have developed cybersecurity educational games and reported increased understanding of basic concepts, the use of the Role-Playing Game (RPG) genre as a serious game that explicitly embeds personal data security risk scenarios is still limited. This study concentrates on the development of an RPG-based educational game that incorporates personal data security concepts into mission-oriented gameplay. The learning material is delivered through narrative interactions, player decision-making, and interactive quizzes designed to suit the cognitive characteristics of elementary school students. The contribution of this study lies in the game design approach that is oriented towards child-centered usability and the integration of personal data security content into the game mechanics in a contextual manner. Based on this description, this study aims to design and evaluate an RPG-based educational game intended as a learning medium to support personal data security awareness in elementary school students.

2. Methods

This study used the Game Development Life Cycle (GDLC) development method, which is an iterative and systematic approach to designing and developing educational games. The GDLC method has been proven to be a systematic framework for creating effective and efficient games (Ariyana, Susanti, Ath-Thaariq, & Apriadi, 2022; Widjaja, Jefferson, Siahaan, & Chow, 2024). The GDLC in this study is framed as a development management framework rather than a learning design method. This approach ensures that the quality of game design is assessed through the design process and usability evaluation in the subsequent stage. The GDLC consists of six phases: Initiation, Pre-Production, Production, Testing, Beta, and Release, as shown in Fig. 1 (Fujiati & Rahayu, 2020). To ensure the quality and functionality of the game in this study, the GDLC method phases were carried out sequentially as follows:

1. Initiation

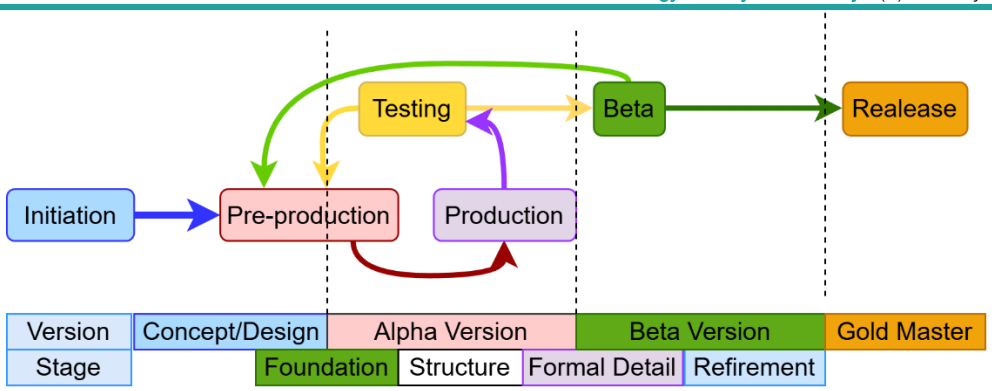

Fig. 1. Game Development Life Cycle (GDLC) (Chueca, Verón, Font, Pérez, & Cetina, 2024).

This phase involves identifying problems based on observations of internet use among elementary school–aged children. Specifically, it focuses on children's lack of understanding of online risks such as cyberbullying, phishing, and the disclosure of personal data. Data were collected through direct observations at elementary schools and questionnaires related to personal data security and experiences in using information technology. The data obtained was then analyzed to identify problems experienced by students and formulate the desired needs of the proposed system.

2. Pre-production
   Designing the game concept, including determining the storyline, game genre, characters, and learning scenarios. The game was designed using a story-based approach to suit the understanding level of children aged 10-12 years.
3. Production
   Creating visual assets and music, writing program code, and implementing educational scenarios into gameplay using RPG Maker MV. The visual language and interactive elements were made as engaging as possible to suit children's learning styles. This implementation stage translated the concept developed in pre-production into RPG Maker MV. The minimum device specifications used in game development are as follows: (a) Operating System: Windows 7/8/8.1/10 (32bit/64bit), (b) Processor: Intel Core 2 Duo or better, (c) Memory: 2GB or more, (d) Graphics: GPU compatible with DirectX 9/OpenGL 4.1, (e) Storage: Installation requires more than 2GB, (f) Resolution 1280x768 or better.
4. Testing
   The game was tested using usability testing methods. Usability testing was conducted by the developer to identify weaknesses in the user interface. Testing was conducted with 20 elementary school students aged 10–12 years old as respondents. Due to accessibility, participants were selected using a convenience sampling technique from one elementary school. All participants played the game individually under the researcher's observation and completed the entire sequence of game scenes. Usability testing was conducted through direct observation of 13 game scenes. During play, the researcher recorded whether participants were able to complete each scene without additional assistance. The reported success percentage represents the proportion of students who were able to complete a scene independently. A low percentage indicates issues with interface clarity, text readability, or navigation that needed improvement.
5. Beta
   User feedback during the testing phase was used to refine the game. Revisions were made to any game content or mechanics that were confusing or unappealing. The goal of this phase was to refine the system to align with user needs and be ready for comprehensive implementation.
6. Release
   The release phase is the final stage of the development process. At this stage, the game, which has undergone testing and improvements, is declared a final prototype, ready for use as an alternative learning medium in elementary schools. The final version of the game meets the requirements of functionality, system stability, and suitability for learning objectives.

The first stage of game development using the GDLC is initiation. This phase involves formulating the basic concept of the educational game, establishing learning objectives related to personal data security, and identifying the target audience, specifically elementary school students. This foundational concept will guide the development of the storyline and educational missions in the subsequent stage.

The second stage, pre-production, focuses on creating use case diagrams, data architecture, and

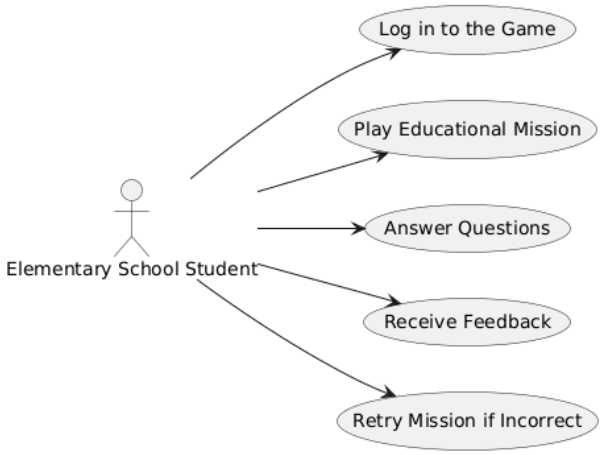

Fig. 2. Use case diagram.

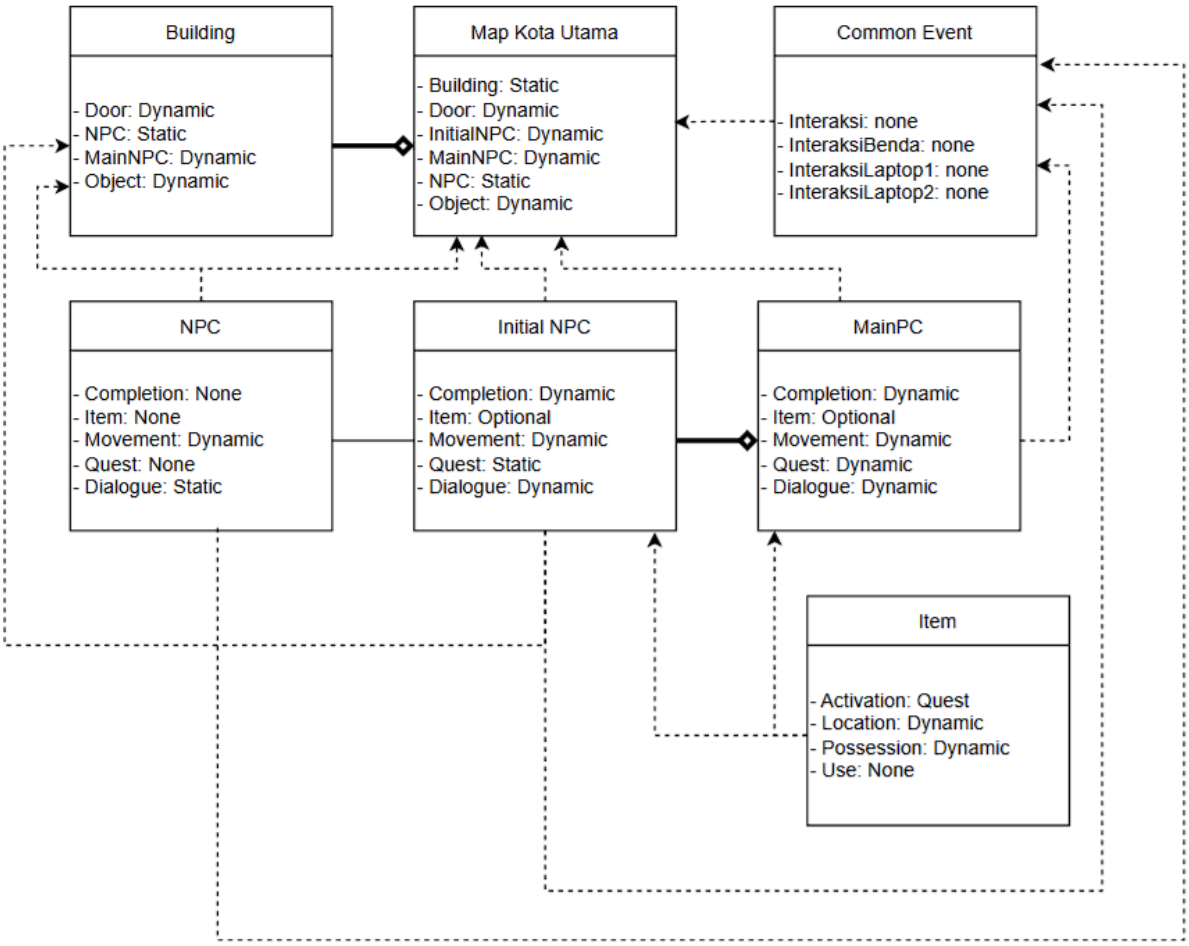

Fig. 3. Data architecture.

activity diagrams. The use case diagram, illustrated in Fig. 2, begins with system login and is followed by the presentation of educational missions designed as an interactive game. Each mission presents a question or learning challenge for students to answer. The system provides immediate feedback on their responses, and if a student answers incorrectly, they are encouraged to repeat the mission until they achieve a correct understanding. This mechanism applies the principle of mastery learning through a gamification approach tailored to the cognitive characteristics of elementary school children. The flow design incorporates three key components of effective learning: the presentation of material through games (educational missions), formative evaluation (questions), and corrective feedback.

The data architecture diagram shown in Fig. 3 represents the logical structure of the game designed

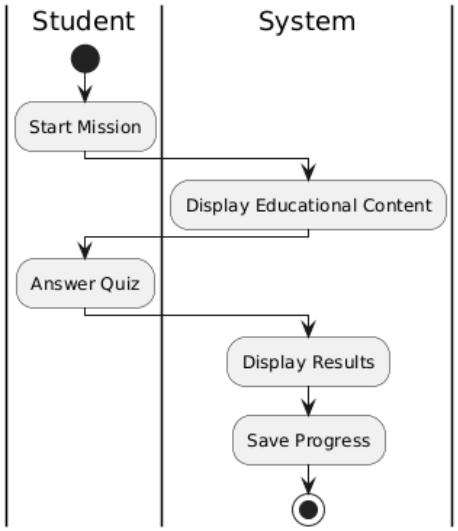

Fig. 4. Activity diagram game.

using RPG Maker MV. This diagram explains the relationships between the main elements in the game, such as the main city map, Non-Playable Characters (NPCs), buildings, items, and common events, which are integrated to run the educational mission scenario. The main map acts as a control center where all NPCs, objects, and doors to other cities are located and is where players access four mission crystals that lead to cities with their respective educational missions.

As illustrated in Fig. 4 of the activity diagram, the first step in the game involves starting a mission, which signifies the initiation of a specific task within the system. The process then advances to the NPC interaction phase, where the player engages with NPCs as part of the game's mechanics. The subsequent stage involves answering a quiz, representing a challenge in the form of questions or knowledge tests specifically related to personal data security material. Upon successfully completing the quiz, the system moves on to the mission completion phase, which confirms that all mission requirements have been met. The final step is saving progress, during which the system records all advancements made by the player, including mission status and quiz results, to facilitate continuation of the game in the next session.

The center of the game's mission navigation system lies in a special zone called the Mission Crystal Zone. Within this zone are four glowing crystals that serve as portals to each mission world. The first crystal takes players to the Digital City, which focuses on introducing digital devices and basic data protection. The second crystal leads to the Data Forest, which teaches the importance of internet security. The third crystal leads to the Firewall Palace, which provides lessons on defending personal data from digital threats. Finally, the fourth crystal unlocks after completing all three cities and serves as the gateway to the final mission, where players' understanding is thoroughly tested before the game's conclusion. Each crystal zone that the main character visits feature three main missions. Each mission begins with a conversation between the main character and a local NPC. These interactions occur through dialogue events that include multiple-choice quizzes. Players receive an explanation of the material before being asked to answer questions. If they answer correctly, the system awards points to their score.

3. Results and Discussion

This research produced an RPG-based educational game with a personal data security theme aimed at elementary school students. The game was developed using RPG Maker MV by applying the GDLC method, which acts as a structured framework in the game development process. However, the quality of the interface design and the resulting gaming experience are greatly influenced by the findings in the usability testing stage and the iterative improvement process in the beta phase. The game integrates learning materials into the storyline and game missions through a story-based learning approach. The game is designed for players to assume the role of the main character, exploring the digital world and completing a series of educational missions. Each mission represents a specific topic related to personal data security, such as personal data recognition, digital threats, and digital identity protection. The game accommodates that by providing NPC interactions, and quiz mechanics, all developed based on use case diagrams, data architecture, and activity diagrams from the pre-production phase. This approach aims to ensure the

Fig. 5. Game mission navigation.

Fig. 6. NPC Interaction.

learning process is contextual, interactive, and appropriate to the cognitive characteristics of elementary school-aged children.

The main features of the resulting game are as follows:

1. Educatinal mission system
   The mission system is implemented as the primary mechanism for delivering personal data security material. Each mission represents a specific learning topic and must be completed sequentially by the player. The implementation of this system is a direct implementation of the gameplay design developed during the pre-production stage. The mission display is shown in Fig. 5.
2. NPC interaction as a learning medium
   NPCs are implemented as supporting characters whose function is to convey learning material, provide instructions, and trigger educational quizzes. NPC interactions with the player are designed in the form

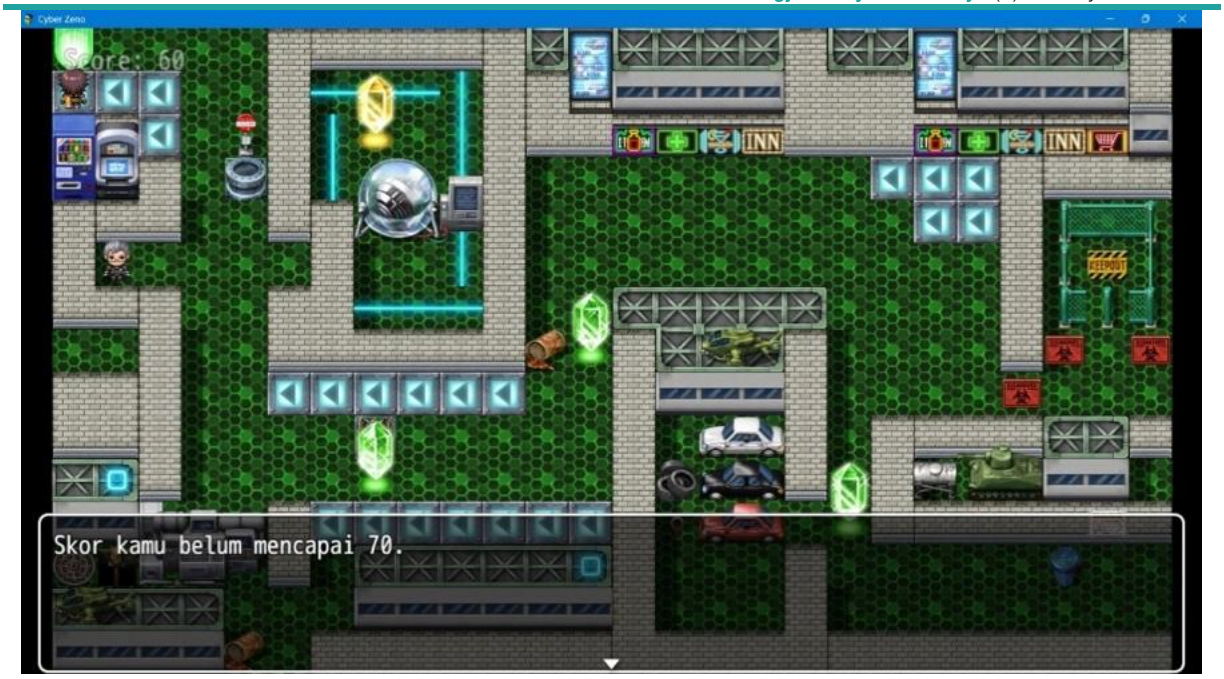

Fig. 7. Scoring system.

of simple interactive dialogues to be easily understood by elementary school students. An example of NPC interaction is shown in Fig. 6.

3. Interactive quizzes and scoring system
   Interactive quizzes are implemented using the show choices and conditional branch features in RPG Maker MV. Player answers are validated directly by the system and then linked to the scoring system. The scoring system serves as both feedback and learning motivation throughout the game. An example of the scoring system display is shown in Fig. 7.
4. Child-Friendly user interface
   The game interface is designed to be simple and intuitive, with easy-to-understand menu navigation. This interface implementation exemplifies the user interface design developed during pre-production, considering the user characteristics of elementary school-aged children.

3.1. Usability Testing Results

Usability testing was conducted in stages based on 13 main scenes representing the gameplay from beginning to end. Each scene was analyzed based on the user interface elements considered to influence player comprehension, navigation, and comfort, particularly for elementary school students, the target audience. This evaluation was conducted using direct observation during a beta testing session, where 20 students played the game independently, while researchers watched their reactions and the difficulties they encountered at each stage. The reported success percentage represents the number of students who were able to complete a scene without assistance from the researchers.

The usability testing results, as shown in Table 1, showed relatively low success rates for Scenes 1 through 3, at 40%, 35%, and 30%, respectively. These percentages indicate that most students were unable to complete the initial part of the game independently without assistance. This data indicates that the visual presentation and interaction instructions in the initial stages of the game were not clear enough for child users. Scene 13, the closing part of the game, also showed a low success rate of 25%, indicating that the final part of the game did not provide enough reflective and instructional elements for players. The closing part's minimal interaction or less attractive final display likely caused this decline. These findings became the main basis for the interface improvement process during the beta stage, such as adding text breaks, increasing visual contrast, adding crystal path markers, and improving the closing part of the game.

Based on interviews and observations during usability testing, four main points of difficulty were identified for child players: the running text prologue, crystal zone navigation, understanding the game's initial instructions, and the game's ending. Children had trouble reading the text due to unclear scrolling speed and visual contrast, confusion in navigating the main map, a lack of understanding of how to initiate missions through character interactions, and a lack of reflective reinforcement at the end of the game. These findings indicate that text readability, clarity of visual cues, and reflective learning elements are important

Table 1
Usability evaluation results across 13 game scenes.

Scene	Game Section	UI Evaluation Focus	Success Rate (%)
1	Prologue / Scrolling Text	Text readability, font color contrast, scrolling speed	40
2	Crystal Zone (Map)	Crystal navigation, character position clarity	35
3	Initial Game Instruction	Clarity of interaction to start mission	30
4	Transition to City	Scene transition and loading speed	80
5	Mission 1 (Dialog + Quiz)	Dialog comprehension and quiz choice clarity	100
6	Mission 2	Dialog consistency and layout	100
7	Mission 3	Dialog consistency and layout	100
8	City 1	Direction clarity, map color, object placement	100
9	City 2	Direction clarity, map color, object placement	100
10	City 3	Visual effects and map layout	100
11	Final Mission	Final instruction clarity and simplicity of design	100
12	Score HUD	Score position and readability	100
13	Game Ending	Closing text, motivational message, final score display	25

components in educational game design for children. Improvements made included adjusting the text speed, increasing visual contrast, adding interactive markers such as lighting effects and directional cues, and redesigning the game's ending with reflective and motivational elements.

3.2. Discussion

The research results indicate that the GDLC serves as a structured framework in the development of an RPG-based educational game focused on children's personal data security. The production phase effectively translated the conceptual design from pre-production into functional game features, including a mission system, NPC interactions, interactive quizzes, and a scoring system that supports a story-based learning approach.

User interface evaluations showed that the visual design and interaction flow significantly impacted young players' comprehension and comfort. Challenges faced by children in the early stages of the game highlighted the need for clearer visual cues and text that is appropriately paced. Additionally, the low success rate observed at the end of the game underscored the necessity of incorporating reflective learning elements in the design of educational games for children.

In contrast to the passive nature of interactive comics discussed in previous studies, the RPG-based educational game approach empowers children to engage in decision-making and experience the consequences of their actions. This interactivity fosters a more contextual learning experience, as children not only read the material but also apply it in simulated scenarios.

Overall, these findings suggest that the developed game possesses a good level of usability as an educational medium for personal data security. However, this study did not quantitatively assess improvements in understanding or awareness, which limits the findings to aspects related to design and user experience. The results from development and usability testing indicate that this game has the potential to serve as an alternative medium for educating children about personal data security. The developed game model has the potential to be adapted for other age groups, such as junior high school students, by adjusting the complexity of the story and material. The educational mission concept can also be applied to other cybersecurity topics.

4. Conclusions

This research resulted in a prototype RPG-based educational game designed to support personal data security education for elementary school students through a story-based approach, NPC interactions, and interactive quizzes. The development process utilized the GDLC framework, which helped structure the game's design and implementation stages.

Usability testing results revealed that text readability, navigation clarity, and visual cues within the game significantly influenced children's playing experience. These findings confirm that the quality of interface design in educational games for children depends not only on the development process but is also heavily influenced by direct evaluation of user interactions and an iterative improvement process based on usability findings.

The developed game demonstrated a good level of usability as a medium for personal data security education. Although this study did not quantitatively measure increases in understanding or awareness, the development and evaluation results indicate that the RPG-based educational game approach has potential as an interactive and contextual learning medium for children.

The research findings also provide practical design insights into how children interact with educational games, particularly regarding visual clarity, initial instructions, navigation, and reflective elements at the end of the game. This insight can be a reference in the development of serious cybersecurity-themed games for children in the future.

5. Declaration of AI and AI assisted technologies in the writing process

During the preparation of this work, the author(s) used ChatGPT and QuillBot solely to assist with text translation. After using these tools/services, the author(s) reviewed and edited the content as needed and take full responsibility for the content of the publication.

6. CRediT Authorship Contribution Statement

Muhamad Rizal Fahlefi: Conceptualization, Data curation, Formal Analysis, Investigation, Project administration, Resources, Software, Validation, Visualization. **Uky Yudatama**: Conceptualization, Supervision, Validation, and Writing – review & editing. **Dimas Sasongko**: Conceptualization, Supervision, Validation, and Writing – review & editing. **Nuryanto**: Supervision, Formal Analysis, Investigation, Project administration. **Setiya Nugroho**: Supervision, Formal Analysis, Funding acquisition, Investigation, Project administration. **Purwono Hendradi**: Validation, Resources, Software, and Writing – review & editing.

7. Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

8. Acknowledgments

The authors would like to thank the anonymous referees for their helpful comments and suggestions.

9. Data Availability

Data will be made available on request.

10. References

Alguliyev, R. M., Abdullayeva, F. J., & Ojagverdiyeva, S. S. (2021). Log-File Analysis to Identify Internet-addiction in Children. *International Journal of Modern Education and Computer Science (IJMECS), 13*(5), 23-31. doi:https://doi.org/10.5815/ijmecs.2021.05.03

Alguliyev, R., & Ojagverdieva, S. (2019). Conceptual Model of National Intellectucal System for Children Safety in Internet Environment. *International Journal of Computer Network and Information Security (IJCNIS), 11*(3), 40-47. doi:https://doi.org/10.5815/ijcnis.2019.03.06

Ariyana, R. Y., Susanti, E., Ath-Thaariq, M. R., & Apriadi, R. (2022). Penerapan Metode Game Devlopment Life Cycle (GDLC) pada Pengembangan Game Motif Batik Khas Yogyakarta. *INSOLOGI: Jurnal Sains dan Teknologi, 1*(6), 796-807. doi:https://doi.org/10.55123/insologi.v1i6.1129

Chueca, J., Verón, J., Font, J., Pérez, F., & Cetina, C. (2024). The consolidation of game software engineering: A systematic literature review of software engineering for industry-scale computer games. *Information and Software Technology, 165*. doi:https://doi.org/10.1016/j.infsof.2023.107330

Fujiati, F., & Rahayu, S. L. (2020). Implementasi Algoritma Fisher Yate Shuffle Pada Game Edukasi Sebagai Media Pembelajaran. *Cogito Smart Journal, 6*(1), 1–11. doi:https://doi.org/10.31154/cogito.v6i1.174.1-11

Hill, W. A., Fanuel, M., Yuan, X., Zhang, J., & Sajad, S. (2020). A Survey of Serious Games for Cybersecurity Education and Training. *KSU Proceedings on Cybersecurity Education, Research and Practice.* Retrieved January 24, 2026, from https://digitalcommons.kennesaw.edu/ccerp/2020/Research/7/

Jony, A. I., & Hamim, S. A. (2023). Navigating the Cyber Threat Landscape: A Comprehensive Analysis of Attacks and Security in the Digital Age. *Journal of Information Technology and Cyber Security, 1*(2), 53–67. doi:https://doi.org/10.30996/jitcs.9715

Kuzminykh, I., Yevdokymenko, M., Yeremenko, O., & Lemeshko, O. (2021). Increasing Teacher Competence in Cybersecurity Using the EU Security Frameworks. *International Journal of Modern Education and Computer Science (IJMECS), 13*(6), 60-68. doi:https://doi.org/10.5815/ijmecs.2021.06.06

Meitarice, S., Febyana, L., Fitriansyah, A., Kurniawan, R., & Nugroho, R. A. (2024). Risk Management Analysis of Information Security in an Academic Information System at a Public University in Indonesia: Implementation of ISO/IEC 27005:2018 and ISO/IEC 27001:2013 Security Controls. *Journal of Information Technology and Cyber Security, 2*(2), 58–75. doi:https://doi.org/10.30996/jitcs.12099

Ng, C. Y., & Hasan, M. K. (2025). Cybersecurity serious games development: A systematic review. *Computers & Security, 150*. doi:https://doi.org/10.1016/j.cose.2024.104307

Quayyum, F., Cruzes, D. S., & Jaccheri, L. (2021). Cybersecurity awareness for children: A systematic literature review. *International Journal of Child-Computer Interaction, 30*. doi:https://doi.org/10.1016/j.ijcci.2021.100343

Rifai, M. A., Armansyah, R. A., & Hashbillah, M. R. (2024). Keamanan Internet Untuk Anak Dibawah Usia 17 Tahun. *Journal of Informatics and Information Security, 5*(2), 59-72. doi:https://doi.org/10.31599/pf56qp88

Sağlam, R. B., Miller, V., & Franqueira, V. N. (2023). A Systematic Literature Review on Cyber Security Education for Children. *IEEE Transactions on Education, 66*(3), 274-286. doi:https://doi.org/10.1109/TE.2022.3231019

Sasongko, D., & Purwandari, S. (2023). Penerapan Metode Addie pada Pengembangan Komik Interaktif sebagai Media Edukasi Keamanan Data Pribadi bagi Anak. *Jurnal Indonesia: Manajemen Informatika dan Komunikasi, 4*(3), 698-708. Retrieved January 24, 2026, from https://journal.stmiki.ac.id/index.php/jimik/article/view/267

Supangat, S., Amna, A. R., & Rochman, M. Y. (2025). Penetration Testing and Vulnerability Analysis of SINTA Platform to Strengthen Privacy and Data Protection. *Journal of Information Technology and Cyber Security, 3*(2), 79–83. doi:https://doi.org/10.30996/jitcs.12216

UNICEF Indonesia. (2025, February). *Pengetahuan dan Kebiasaan Daring Anak di Indonesia: Sebuah Kajian Dasar 2023*. Retrieved January 24, 2026, from UNICEF Indonesia: https://www.unicef.org/indonesia/id/perlindungan-anak/laporan/pengetahuan-dan-kebiasaan-daring-anak-di-indonesia-sebuah-kajian-dasar-2023

Videnovik, M., Vold, T., Kiønig, L., & Trajkovik, V. (2025). Game Strategies to Engage and Empower Students: A Study on Perceptions of Cybersecurity Lesson. *International Journal of Game-Based Learning (IJGBL), 15*(1). doi:https://doi.org/10.4018/IJGBL.391304

Widjaja, J. A., Jefferson, L., Siahaan, M. F., & Chow, A. (2024). Utilizing Game Development Life Cycle Method to Develop an Educational Game for Basic Mathematics Using Unity 2D Game Engine. *International Journal of Computer Science and Information Technology, 1*(1), 20-30. doi:https://doi.org/10.55123/ijisit.v1i1.6

Zhang-Kennedy, L., & Chiasson, S. (2017). Cyberheroes: An Interactive Ebook for Improving Children's Online Privacy. *HCI '17: Proceedings of the 31st British Computer Society Human Computer Interaction Conference.* doi:http://dx.doi.org/10.14236/ewic/HCI2017.66

Zhang-Kennedy, L., Baig, K., & Chiasson, S. (2017). Engaging Children About Online Privacy Through Storytelling in an Interactive Comic. *HCI '17: Proceedings of the 31st British Computer Society Human–Computer Interaction Conference.* doi:https://doi.org/10.14236/ewic/HCI2017.45

Zhang-Kennedy, L., Biddle, R., & Chiasson, S. (2017). Secure Comics: An Interactive Comic Series for Improving Cyber Security and Privacy. *HCI '17: Proceedings of the 31st British Computer Society Human Computer Interaction Conference.* doi:http://dx.doi.org/10.14236/ewic/HCI2017.65