

SUMMARY OF RANSOM WRANGLER PROJECT

TOPIC: DEVELOPING A RANSOMWARE AWARENESS GAME FOR INTERACTIVE LEARNING IN CYBER SECURITY

BRIEF INTRODUCTION

Ransomware attacks have become one of the most significant cybersecurity threats in recent years, with their frequency and complexity rising alarmingly (Yin et al., 2023). These attacks often leave individuals and organizations vulnerable, leading to substantial financial and data losses. Traditional methods of raising awareness about ransomware, such as lectures or informational brochures, often fail to engage users, particularly those who are non-technical.

To address this gap, there is a growing need for more innovative and engaging educational tools. A game-based ransomware awareness application offers an interactive and immersive way to educate users about the dangers of ransomware. By simulating real-world scenarios in a controlled environment, this approach not only makes learning about ransomware prevention more engaging but also enhances retention and understanding, empowering users to better recognize and respond to potential threats (Barack, 2021).

PROBLEM STATEMENT

Despite the invention of various mitigation strategies, ransomware still poses a growing threat to both individuals and businesses, with attacks becoming increasingly prevalent and complex (Li & Liao, 2021; Galinkin, 2021). The primary issue lies in the lack of effective cybersecurity education for non-technical users, leaving them unprepared to identify and mitigate these threats (Angafor et al., 2024).

Traditional educational methods fail to engage and inform this demographic, leading to a poor understanding of essential cybersecurity concepts (Zisis Batzos et al., 2023).

Therefore, there is a pressing need for innovative and practical educational tools to enhance ransomware awareness and promote cyber safety among these users.

AIM AND OBJECTIVES

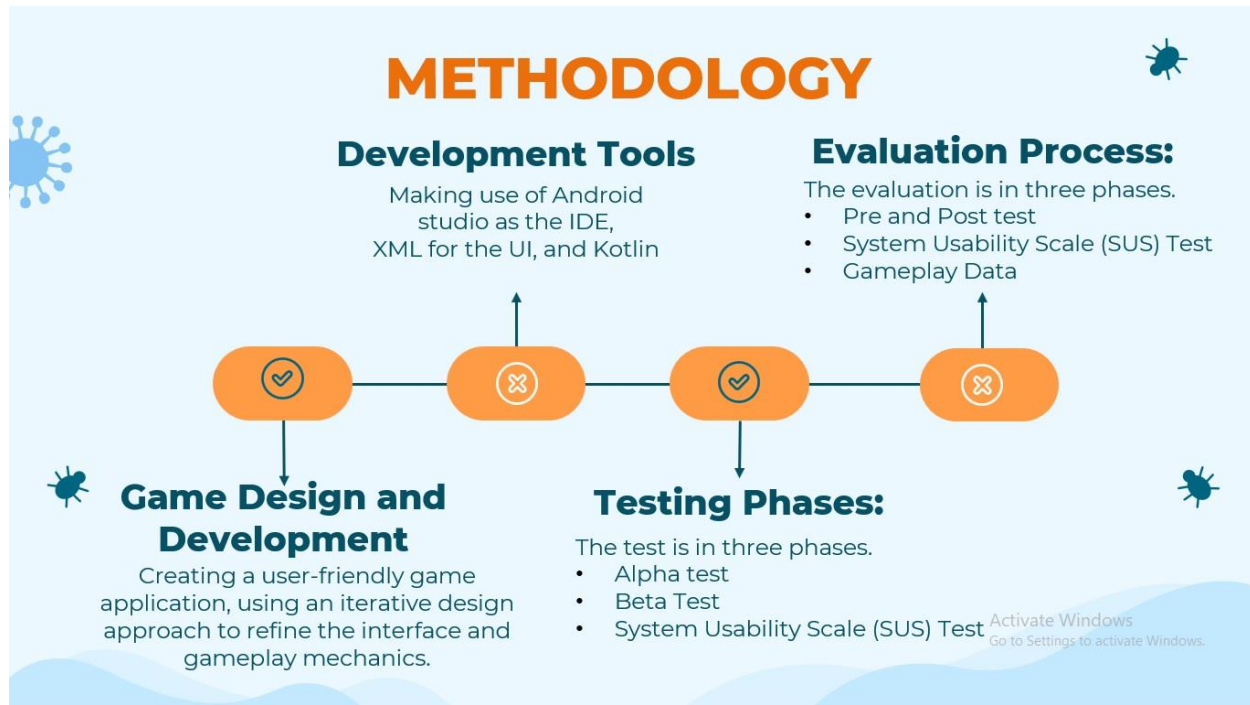
This study aims to develop an Educational user-friendly Game-based application for Enhancing Ransomware Attack Awareness among users.

It would be achieved by the following objectives;

- i. Design a user-friendly game-based application to improve user awareness of ransomware
- ii. Implement engaging gameplay mechanics that simulate real-world scenarios related to ransomware attacks.
- iii. Evaluate the effectiveness of the mobile game application to assess awareness of ransomware

METHODOLOGY

The game was developed by following the steps shown in the figure below;



EVALUATION

A mixed-method approach was adopted to evaluate the game. The approach includes three steps evaluation process;

- i. **a pre-experiment questionnaire** to assess the user's understanding of the cyber security threat ransomware,
- ii. **Gameplay** – Ransom Wrangler, aims to improve user awareness against ransomware cyber security threat, followed by usability test using System Usability Scale (SUS) questionnaire to assess user's satisfaction of the game design,
- iii. **Post experiment questionnaire** to evaluate the Ransom Wrangler effectiveness in improving user education and awareness against the ransomware.

RESULTS OF EVALUATION

1. PRE-TEST ASSESSMENT

The Pre-test quiz assessment had 73 respondents, as shown below in Figure 4.1. Each of the respondents answered 10 basic questions on Ransomware Attacks, to test their knowledge about the attacks. Each question was graded 10, making the quiz on a scale of 100. After the quiz, it was discovered that 47 which is equivalent to 64.38% of the respondents got the score range of 0 – 40, while the remaining 26 (which is equivalent to 35.62%) scored between 50 -80. Hence, the knowledge level of users about Ransomware attacks based on the response was an average of 38.36%.

2. GAME PLAY/SYSTEM USABILITY SCALE TEST

The SUS questionnaire was filled by 50 respondents, which ranges from students, to business owners, to corporate employee, as shown in Table 4.6. The S/N represents the Respondents Identity (ID). The minimum score for the 50 respondents was 67.5, while the maximum was 100. The overall average score was 92.5.

Since the overall average score was 92.5. Hence, it was concluded that users are well satisfied with the usability of the mobile game, Ransom wrangler, and there might be no need for further improvements to the game design.

3. POST-TEST ASSESSMENT

The post-test quiz assessment was carried out to test the user's awareness level but after their interaction with the mobile game. 75 people responded to the quiz, as shown in Figure 4.2. The demographics of the respondents is shown in Table 4.3 below. The quiz contains 10 questions, with each question carrying 10 points. The breakdown of the scores are shown below in Table 4.4. It was discovered that out of the 75 respondents, 3 people got 40 and below, and these 3 people indicated that they did not interact with the game. The remaining 72 respondents got between 50 and 100 points, with total average of 83.87%

Hence, it was concluded from the result that, after the game users' knowledge and awareness about Ransomware attacks increased from 38.36% (from 73 respondents during pre-test quiz) to 83.87% (from 75 respondents that filled the post-test quiz).

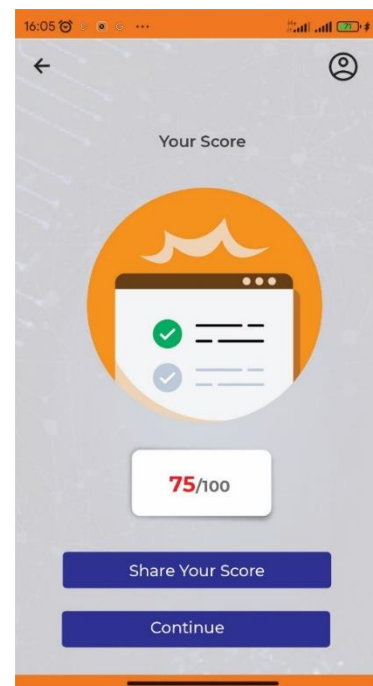
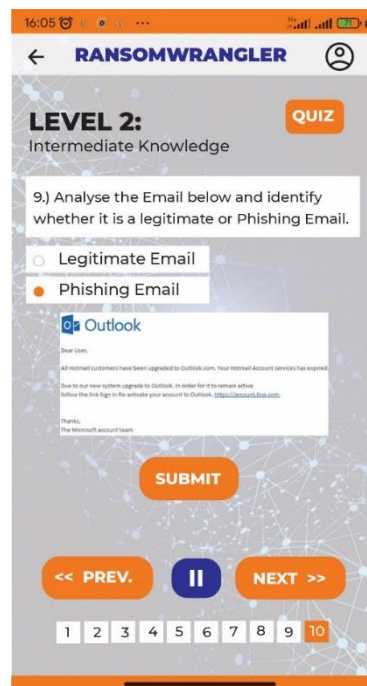
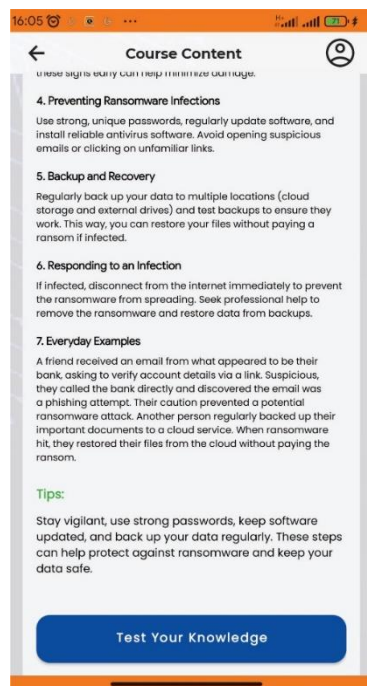
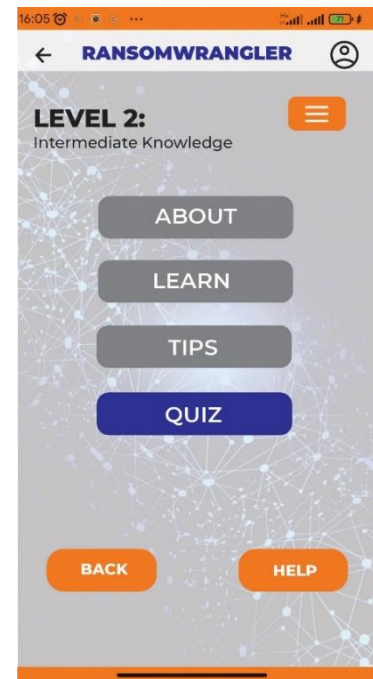
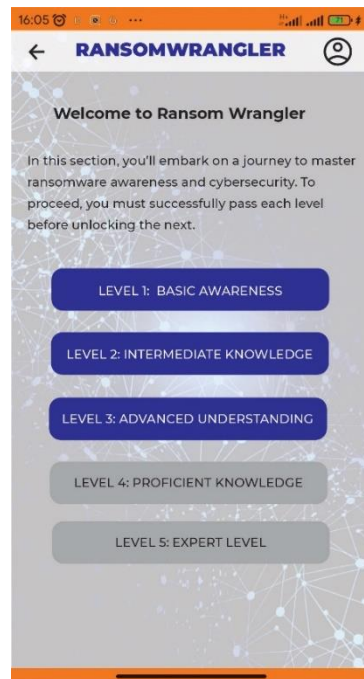
FINDINGS

To a large extent, the game positively impacted ransomware awareness and knowledge among the participants; therefore, achieving the project goals. Large values of user engagement and usability mean the effectiveness of the game in educating users and keeping attention on the screen.

The project contributes to the growing literature supporting the hypothesis that the use of more interactive forms of learning is beneficial for cybersecurity training.

SCREENSHOTS OF THE GAME APPLICATION

Below are few documentations of the operation of the ransomware awareness mobile game – Ransom Wrangler. The screenshots of screen activities are presented below;



RECOMMENDATIONS

For the game improvement, it is recommended that the researcher

- Understand User Interaction
- Consider Game Modifications

- Expand Game Content
- Enhance Educational Potential

For future research,

- Verify impact on a broader audience
- Understand different user interaction with the game
- Expand Game contents
- Enhance Educational Reach

For implementation in Education,

- Incorporate into school curricula
- Collaborate with institutions
- Promote in awareness campaigns
- Enhance educational impact

CONCLUSIONS

Consequently, the aim and objectives of the project are met by the outcomes of the project: design understanding, neat interfaces, game elements, and educational assessment.