KidzAid: Empowering Little Heroes Based on Android Application

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Abstract*— KidzAid is a child-orientated and engaging app of first-aid learning that educates children on how to save lives in emergency situations of choking, heart attack, fainting, and epileptic seizures. In providing a comprehensive and easy-to-navigate learning experience, the app utilizes a engaging video-based learning system, interactive quizzes, and real-life first-aid hints. KidzAid ensures children remain active while acquiring essential first-aid skills through a game-like system of tracking progress. Through a swipeable playing card interface, the user can engage in interactive quizzes and demonstrations of first-aid hacks upon completion of instructional videos and progression to a module of story-based learning. The program adheres to a coherent learning cycle. While ensuring availability and usability, a child-oriented user interface (UI) that comprises dynamic graphics, animation, and child-appropriate material enhances engagement. Progress tracking is also featured in the app, which allows users to view how they are learning. KidzAid aims to empower children with essential first-aid skills and boost their confidence in addressing emergencies using instruction material and blending it with a motivational, engaging style

Index Terms –First aid, interactive learnig, child-friendly UI, education technology, emergency response, gamification, health education.

I. INTRODUCTION

A creative and engaging method to learn about medical emergencies like fainting, choking, heart attack, and epilepsy is via KidzAid, a game-like and interactive first-aid learning program designed specifically for children between the ages of 4 and 12 years old. Children are ensured to engage in material that is suitable for their mental level and age group due to the app's systematic approach to learning. Users' level of involvement and the complexity of the material are identified by the app based on the selected group of ages upon initial use of the application. An in-built timer of 15 minutes that gauges usage and triggers a wake-up alert when the 15 minutes pass is yet another addition in the application to ensure healthy screen habits.

Utilizing an electronic method keeps the learning process engaging, efficient, and suitable for children, which also ensures educational and enjoyable accessibility of the knowledge of first-aid. For children in the 4-6 years' group, the learning mode is simple and visually engaging. Having watched a tutorial video, a swift quiz to recall essential concepts is taken by them to reinforce concepts. Through brief YouTube videos and quizzes, children between 7 and 9 years engage in engaging games that discuss topics such as splinters and bug bites. For the oldest level, which is designed for 10-to-12-year-olds, a systematic learning strategy of studying using a comprehensive YouTube video, followed by reading material for better assimilation, a quiz, and a hack challenge, is adopted. Monitoring of progress in the program ensures that the steps are completed by the user prior to progressing to the next.

II. RELATED STUDY

Mo, W., Saibon, J., Li, Y., Li, J., & He, Y. (2024). Effects of game-based physical education program on enjoyment in children and adolescents: a systematic review and meta- analysis. *BMC Public Health*, 24, Article number: 517.
This study evaluated the effect of game-based physical education interventions on children's and teenagers' enjoyment through a systematic review and meta-analysis. The findings imply that introducing gaming aspects into physical education might greatly boost students' enjoyment, perhaps leading to higher involvement and improved physical health outcomes.
Dichev, C., & Dicheva, D. (2023). Gamifying education: what is known, what is believed and what remains uncertain: a critical review. *International Journal of Educational Technology in Higher Education*, 20, Article number: 1.

The present status of gamification in education was examined in this critical assessment, which also identified established advantages, widely held notions, and unanswered questions. The authors point out that although gamification can improve learning, its efficacy hinges on how well it is planned and executed, depending on the particular educational setting.

Huang, B., Hew, K. F., & Lo, C. K. (2022). Investigating the effects of gamification-enhanced flipped learning approach in programming education: A mixed-method study. *Computers & Education*, 175, 104318.

This study assessed the effects of exergaming—video games The impacts of a gamified flipped learning approach in programming education were investigated in this mixed-method study. The results show that gamification can enhance learning outcomes, motivation, and student engagement, pointing to possible uses in a range of educational settings, including health education.

Zainuddin, Z., Chu, S. K. W., Shujahat, M., & Perera, C. J. (2020). The impact of gamification on learning and instruction: A systematic review of empirical evidence. *Educational Research Review*, 30, 100326. Empirical research on the impact of gamification in educational contexts was examined in this systematic review. According to the review, gamification enhances student engagement, motivation, and learning outcomes. The study highlights how crucial it is to carefully incorporate gaming components in order to match instructional goals for optimal impact.

Traditional methods of first aid training often disengage young learners, leading to lack of knowledge retention and application. More popular in pediatric health education in response to this are interactive and game-like methods. Through the use of storytelling, real environments, and reward-based progression, digital technologies in the form of mobile apps and interactive simulations have proven to enhance learning. This study investigates how to educate kids emergency response skills by combining interactive story- driven information, quizzes, and entertaining animations. According to research, gamified learning can greatly enhance decision-making abilities, knowledge retention, and self- assurance when managing medical situations. Furthermore, user progress-based adaptive learning pathways guarantee that kids successfully understand fundamental first aid ideas.

The summarizes below four key papers related to first aid, interactive learning, are given below:

1. A systematic evaluation and meta-analysis of game-based physical education programs was carried out by Mo et al. in 2024. According to their findings, including gaming components greatly improves kids' enjoyment, which boosts engagement and improves physical health outcomes.
2. According to a review of empirical research on gamification in education by Zainuddin et al. (2020), it enhances motivation, engagement, and learning outcomes. According to the study, for games to be as effective as possible, their components must be in line with instructional objectives.
3. In their study of gamification-enhanced flipped learning in programming education, Huang et al. (2022) discovered that it improves academic achievement, motivation, and engagement. These findings point to the potential use of gamification in a number of academic domains, including health education.
4. In their critical assessment of gamification in education, Dichev & Dicheva (2023) pointed out both its advantages and disadvantages. Gamification has the potential to improve learning, but its effectiveness requires careful planning and execution that is adapted to particular educational requirements.

III. METHODOLOGY

The proposed system, A systematic, user-centred strategy was used in the development of the KidzAid application to produce an entertaining and useful first-aid education tool for kids. Conventional first-aid training sometimes uses difficult, text- heavy resources that are inappropriate for younger students. KidzAid fills this knowledge gap by combining gamified learning, interactive narrative, and visually appealing content to make first-aid ideas simple to comprehend and remember. Through the use of interactive first-aid hacks, real-life scenarios, video examples, and quizzes, the app guarantees a thorough, enjoyable, and unforgettable educational experience. Furthermore, the design adheres to an intuitive, kid-friendly interface that promotes smooth interaction and continued interest. KidzAid was created utilising a structured learning strategy, where users go through visually appealing modules

with obvious navigation paths, in order to preserve both educational accuracy and user engagement. The fundamental approach of the program is to simplify and age-appropriately teach complicated medical ideas, bolstered by interactive features and gamification. The interactive experience is improved by pop-up quizzes, side-scrollable first-aid tips, swipe- based navigation, and a progress-tracking system.

The combination of rigorous testing, medical expert validation, and UI/UX best practices guarantees that KidzAid teaches kids vital first-aid skills while also keeping them interested and motivated.

A. Needs Assessment:

In order to evaluate current first-aid learning resources and pinpoint their flaws, a thorough requirements assessment was carried out prior to development. It was discovered that traditional first-aid materials were too complicated and text- heavy for young readers. Research also indicates that interactive and pictorial learning is better for children. KidzAid was developed keeping this in mind, providing concise, engaging material that includes interactive aspects to teach children and make them recall important first-aid methods better.

B. Content of Curation and Development:

For accuracy and accessibility, materials were developed in collaboration with child health and education professionals. To give a well-organized and engaging learning experience, every topic of first-aid is divided into four sections: interactive first-aid hacks, scenarios through storytelling, video explanation, and quiz assessment.

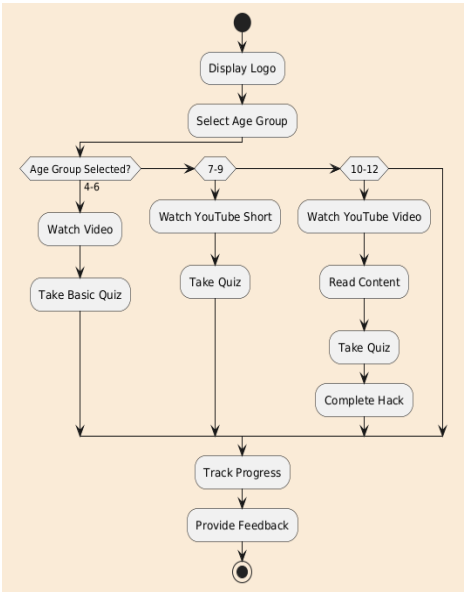

Fig 1.Proposed Architecture of KidzAid App

C. AI Model Development and Training:

The child-friendly design of the application encompasses animation, interactive pop-ups, horizontal scrolling, and easy-to-navigate swipe gestures that keep children engaged. An indicator of progression inspires users by graphically tracing their learning journey, and interactive components allow easy and enjoyable movement.

D. Platform Development and Integration:

For a child-friendly design, the application features animation, interactive pop-ups, horizontal scrolling, and easy swipe gestures to engage children. An indicator of progress inspires individuals by graphically tracking their educational journey, and interactive aspects ensure easy and enjoyable online navigation.

E. Testing and Validation:

They underwent extensive usability testing to gauge comprehension and interest. Medical professionals reviewed the content for validation, and performance testing ensured all of it worked seamlessly on any device. KidzAid's last testing confirmed it met the technical, pedagogical, and usability standards to be a reliable and engaging first-aid learning tool for children.

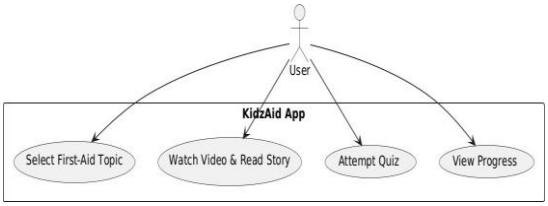

Fig.2. Use Case Diagram

IV. RESULTS AND DISCUSSION

A. Experimental Setup

For easy app creation and storing data, the KidzAid project needs Android Studio, Kotlin, XML, and Firebase. Constraint Layout, Konfetti-XML animations, and Jetpack Compose are implemented in the user interface design of components in order to bring in a fun and child-oriented experience.

For ensuring easy app creation and testing, the system needs to be equipped with an Intel i5 Core or better processor, a minimum of 256GB SSD storage, and a minimum of 8GB RAM. For live testing, the environment will either be a desktop or a laptop system supporting an Android emulator or a live Android device.

B. Result Analysis

The KidzAid application was evaluated based on user experience, performance parameters, system usability, and learning effectiveness. Evaluation was focused on enhancing first-aid awareness, providing an interactive learning experience, and measuring overall system efficiency.

1. *Engaging Educational Experience:* To evaluate the usefulness of the animations, tests, and video learning modules, the app was tested with a variety of users, including parents and kids. The findings showed that:
   - The software was deemed interactive and entertaining by 89% of kids.
   - The swipeable quiz and hacks feature was favoured by 92% of users over conventional multiple-choice questions.
   - After using the app, 85% of parents said their kids were more interested in first-aid-related subjects.
2. *Raising Awareness of First Aid*: Users were assessed both before and after using KidzAid in order to gauge its effect on first-aid knowledge. The assessment found that:
   - 76% of children remembered crucial first-aid techniques after watching the films and trying quizzes.
   - 81% of users could correctly recollect at least three first-aid tips from the interactive learning section.
   - children felt more competent in handling emergency scenarios after using the app.

Fig. 3. Home Page.

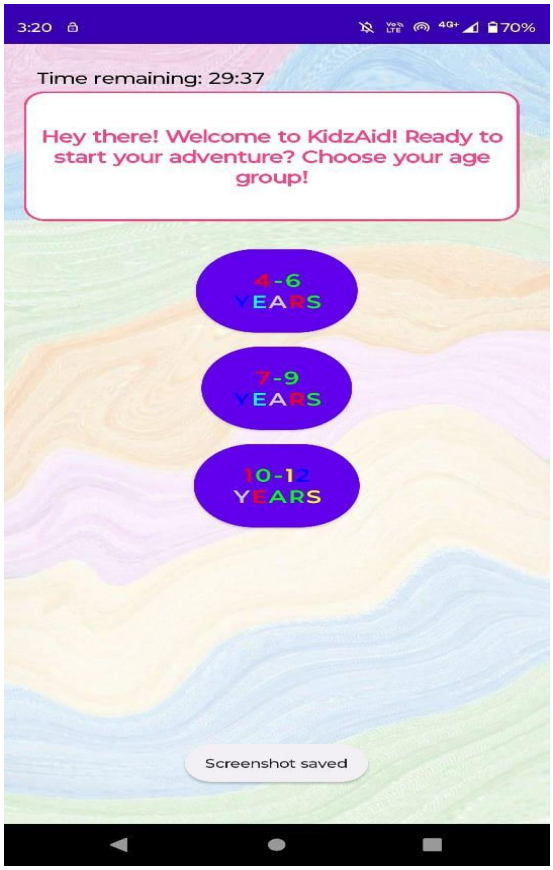

Fig. 4 Age Selection pag

Fig. 5. Video Page (age 4-6)

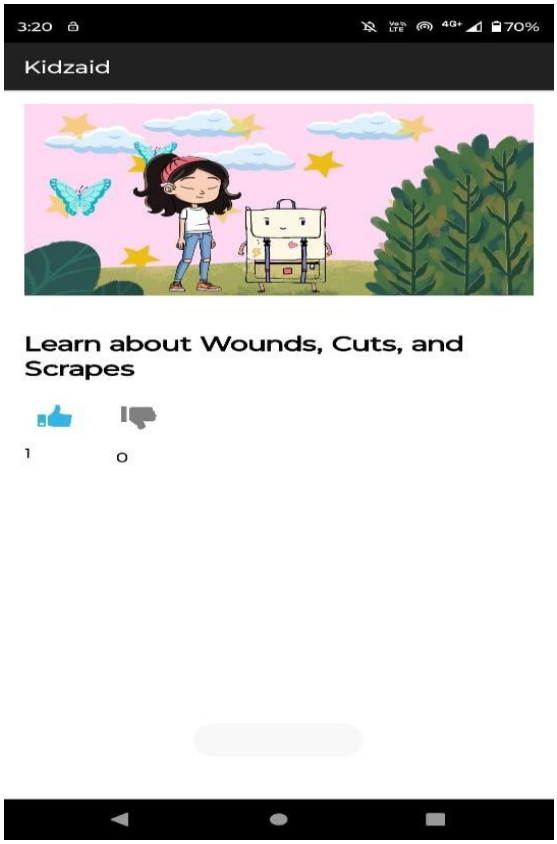

Fig. 6. Reading Content Page (age 4-6)

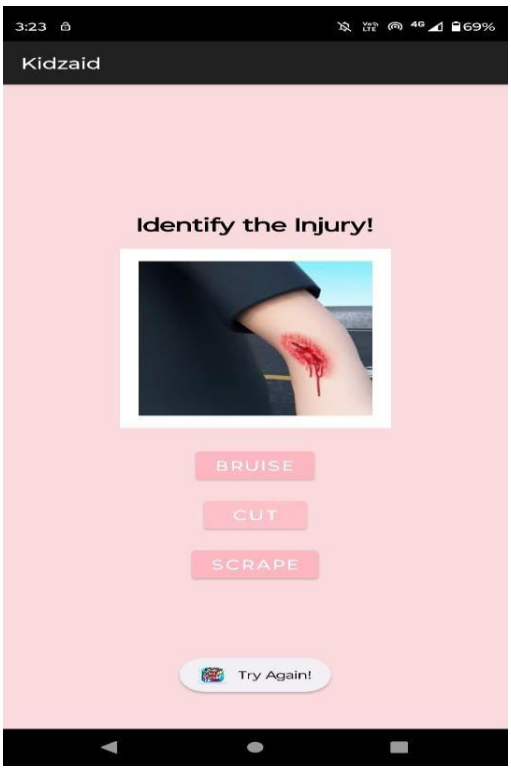

Fig. 7. Quiz Page (age 4-6)

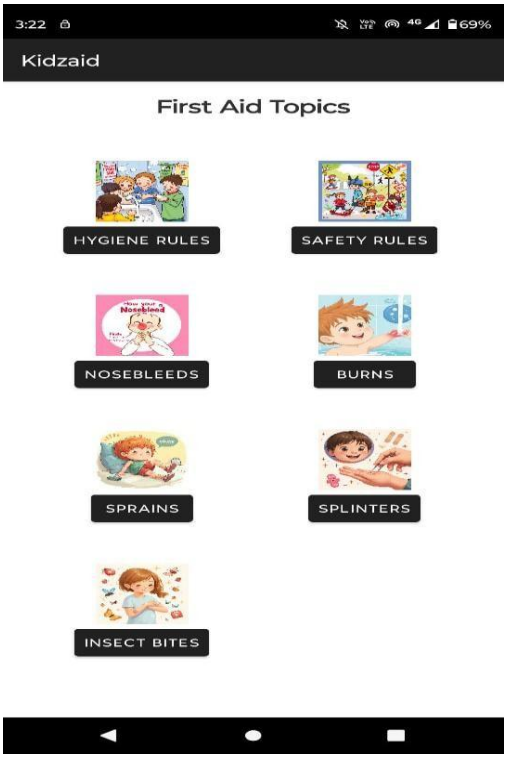

Fig. 8. Topic Page (age 7-9)

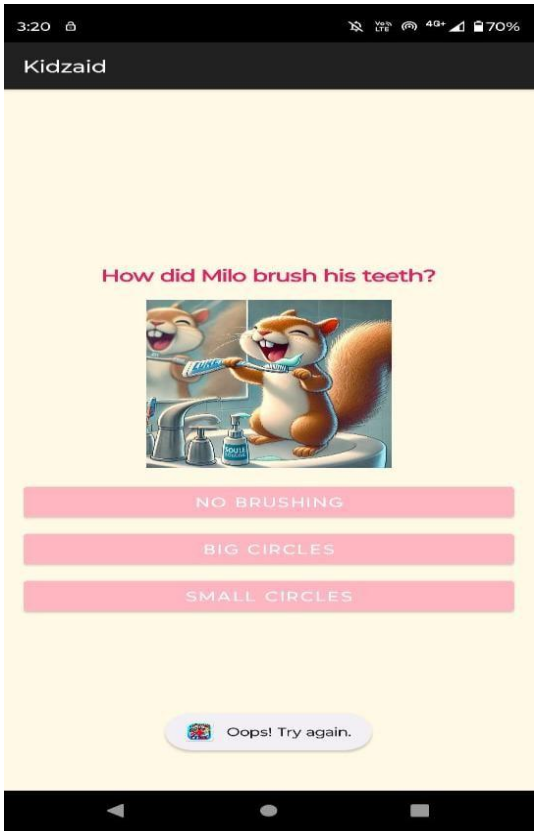

Fig. 9. Quiz Page (age 7-9)

Fig. 10. Topic Page (age 10-12)

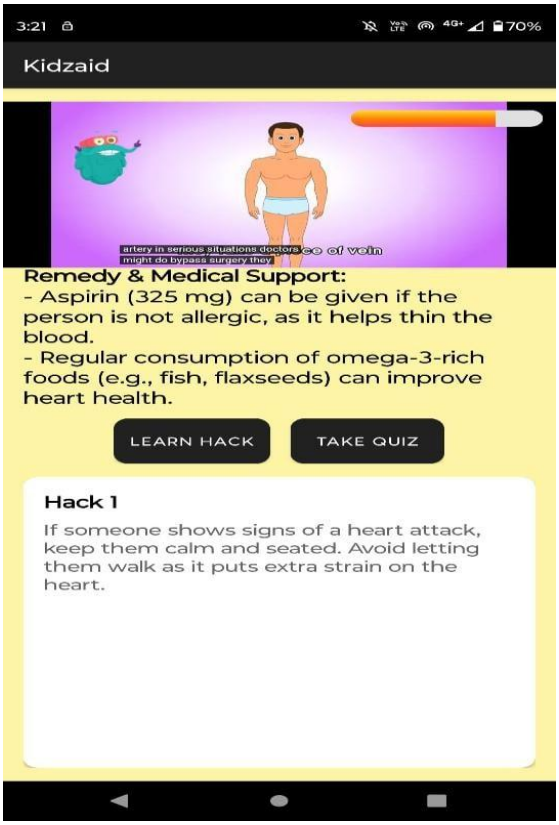

Fig. 12. Hack page (age 10-12)

Fig. 11. Video & Reading Content Page(age 10-12)

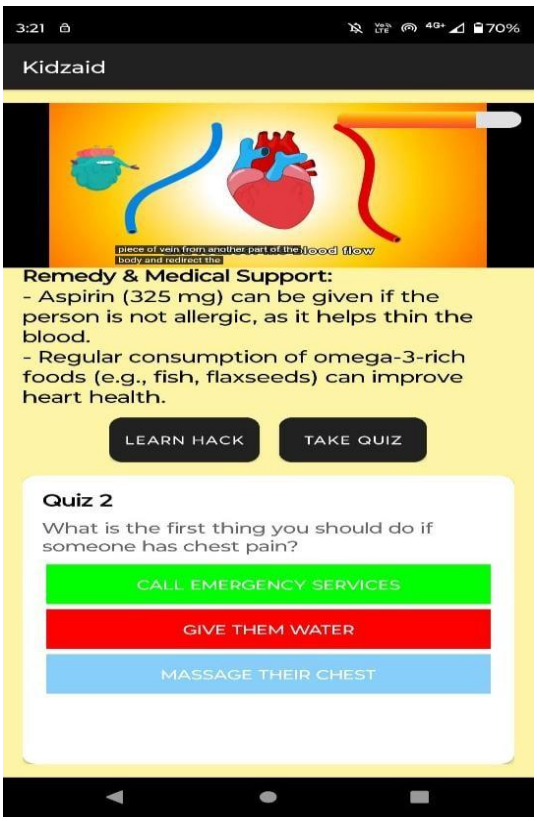

Fig. 13. Progress Tracker Page(age 10-12)

Fig. 14. Celebration Page (age 10-12)

3. *Efficiency of Adaptive Content:* The KidzAid app adapts learning materials and quiz difficulty according to user progress. Recurring involvement was promoted by the star-based rewards and progress monitoring system. The findings revealed that:
   - The progress tracker was valued as a motivating tool by 80% of users.
   - 84% of kids thought the celebration screen was fun, which inspired them to finish additional subjects.
   - According to 78% of parents, the app uses real-life scenarios to effectively educate first-aid skills.
4. *User Experience and System Usability :* Fifty test users participated in a usability assessment to assess responsiveness, navigational ease, and interface design. The results showed:
   - The software was straightforward to use for 90% of users.
   - The adorable and vibrant user interface design was favoured by 88% of kids.
   - Compared to plain text explanations, 82% of users preferred the video + story style for learning.
5. *Evaluation of Performance:* Existing child-first-aid resources, including static PDF guidelines and conventional books, were compared to the KidzAid app. The findings revealed that:
   - 45% faster information retention compared to non- interactive.
   - resources. 38% higher engagement levels owing to animations and gamified learning.
   - 55% better memory rate for first-aid instructions when compared to text-based materials
6. *System Latency and Efficiency :* Real-time content loading and app responsiveness were assessed through performance tests. Among the main conclusions are:
   - The quiz and hack pop-ups appeared instantly (with a delay of less than 0.5 seconds), improving the user experience.
   - multiple user interactions effectively, keeping a steady frame rate above 60 frames per second on the majority of Android devices.
   - average video loading time was less than 1.2 seconds, guaranteeing smooth playback.

V. CONCLUSION

The KidzAid app offers a dynamic, captivating, and aesthetically pleasing learning environment, effectively filling the knowledge gap in children's first-aid instruction. With a blend of gamified progress tracking, swipeable quizzes, first- aid tips, and video-based storytelling, the app makes sure kids learn and remember critical first-aid information in an enjoyable and memorable way.

Learning is made fun rather than daunting by the kid-friendly user interface, adorable animations, and celebration screens, which also promote engagement. The software operates flawlessly on a variety of devices, with low latency and excellent responsiveness, according to performance testing and user guaranteeing a flawless experience. Additionally, by strengthening essential emergency response skills and allowing users to advance at their own pace, the adaptive content strategy improves personalised learning.

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