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Enhancing the Awareness of Nature Products Based on Augmented Reality Technology (Tualang Honey)

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Abstract: Tualang honey is a unique natural product produced by wild bees that construct their hives on the branches of Tualang trees (Koompassia excelsa). It has demonstrated significant potential as an alternative medicine due to its various therapeutic properties. However, awareness of its benefits remains limited, particularly among young adults, as information on Tualang honey is predominantly available in scientific journals and academic articles, which may not be easily accessible or engaging to the general public. This research aims to bridge this knowledge gap by enhancing awareness and understanding of Tualang honey through marker-based Augmented Reality (AR) technology. To achieve this, an interactive application, Bee-Hind: Tualang Honey, has been developed using Unity software and the Waterfall Methodology. The application incorporates interactive multimedia features, enabling users to engage with the content in an immersive manner, such as by scanning images and playing educational games. By integrating technology with educational content, this study seeks to provide an engaging and interactive learning experience that fosters greater appreciation and understanding of Tualang honey for health. Ultimately, the application is expected to enhance knowledge acquisition enjoyably and shift users' perspectives on the role of honey in daily life.

Keywords: Tualang Honey, Nature Product, health, Mobile Application, Augmented Reality, Educational

JEL Classification: I100, I290, Z00
Paper Type: Research

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1. INTRODUCTION

The use of honey for therapeutic purposes has been documented since the beginning of historical records, which date back around 800 years (Ahmed, 2017; Eteraf-Oskouei and Najafi, 2013). Honey was consumed by the Mayans, the Babylonians, the Romans, the Egyptians, the Chinese, and the Greeks because of its nutritional and therapeutic properties (Azman, 2021; Qamar *et al*., 2020; Khalid *et al.,* 2018). Based on the findings of the recent study, it has been established that Tualang honey is beneficial as an alternative medicine. These are the most commonly discovered and effective implementations of Tualang honey that various individuals worldwide have used.

However, a minority remains unconvinced about the efficacy of Tualang honey in treating ailments. This skepticism partly stems from the integration of honey into ancient medical systems in the area, as seen in the healing practices of Lazo-Amado and Andrade-Arenas (2023). Additionally, awareness of Tualang honey's existence in modern times is lacking, not to mention an understanding of its potential as an alternative medication. Interactive platforms to attract people are insufficient, as most online information about Tualang honey is presented unidirectionally. The reliance on online information or user manuals, which can be challenging to navigate and utilize, creates a gap (Rizki *et al.,* 2023). The scarcity of interactive platforms hinders the dissemination of Tualang honey findings.

To address this gap, this research proposes the utilization of AR technology. A growing number of individuals are averse to reading lengthy, detailed journals, and studies show that today's teens spend more time on digital media and less time reading than previous generations (Ahmed, 2017). Given the prevalent use of digital media, AR technology provides an easily accessible alternative for acquiring information. Through an AR application, users can understand the effectiveness of Tualang honey.

The AR application engages users through augmented reality, enabling them to experience elements like they were in the real world. This application focuses on the most effective uses of Tualang honey, such as treating wounds, stress relief, anti-inflammatory properties, and cognitive enhancement (Cizmeci, 2021). The researcher's intention behind creating this application is to attract a broader audience to comprehend Tualang honey in an engaging and informative manner. Users will receive a physical or virtual pamphlet to scan its contents and experience the AR technology.

This research seeks to demonstrate how interactive platforms can revolutionize education by targeting young adults who are unfamiliar with AR technology. Its primary objective is to educate individuals about the effectiveness of Tualang honey and to introduce and promote awareness of Tualang honey in augmented reality (AR) through the development of this project.

2. RELATED WORKS

The rise of technology has become more revolutionized each day; it is more interesting if newer technology takes over the industrial market, which will be efficient for certain industries to perform their jobs. A long-established way of promoting business is by handing out flyers or brochures, but AR allows users to see and interact with easy access to digital information through smart devices (Yogesh *et al*., 2022; Rizki *et al*., 2023). AR can elevate the traditional way of promoting or delivering information about a company. For example, business cards can be immersive in AR technology (Suhailzal *et al*., 2023;

The Economic Times, 2022; Doukianou *et al*., 2021). This way of interaction will let users access detailed information more easily without relying upon information manually or online. This can be applied to other traditional ways of promoting business as a better, more innovative alternative to delivering information. This method will somehow overshadow the traditional way, but it has nothing to lose and will be able to practice this medium of technology in the future.

Table 1 shows the comparison of existing applications that study the benefits of honey. The first application, Health Benefits of Honey, performs poorly in navigation and uses too much unsuitable text. Besides, the application lacks a multimedia element. The second application, Uses & Benefits of Honey, also uses too much text and lacks multimedia elements. Therefore, this research proposes Bee-Hind: Tualang Honey by implementing AR technology to enhance the application's navigation and interactivity.

Table 1. Comparison of Existing Application.

Application	Platform	Graphic	Strengths	Weakness
Health Benefits of Honey	Android	Images and illustration	Full information provided.	Too much texts, lack of multimedia elements.
Uses & Benefits of Honey	Android	Images and illustration	Full information provided.	Too much texts, lack of multimedia elements.
Bee-Hind: Tualang Honey (Propose Work)	Android	3D, images, audio, and video	Easy to navigate, include multimedia elements, interactive AR.	Lack of animation elements.

3. RESEARCH METHOD

This research used the Waterfall model, a time-honored technique used in the system development life cycle, to design a system using a linear-sequential life cycle model. The phrase "waterfall" refers to the model's downward progression from one phase to the next. The waterfall method is a systematic process with specific activity schedules, documentation, and exit criteria. Large companies often need products with the SDLC technique, especially when developing major IT applications (Twenge, 2018; Sherman, 2015). Besides, according to Marti *et al*. (2020), AR development is suitable for using the SDLC techniques in product development.

3.1 Phase 1: Requirement

This phase is about gathering ideas and information about this project. The information regarding Tualang honey has been gathered to analyze the problem statement. The developer installed a few applications related to the research to analyze the pros and cons of certain applications and the proposed project, Bee-Hind: Tualang Honey.

3.2 Phase 2: Design

The developer began to design the application flow with a detailed wireframe for a clearer view of the application, as shown in Figure 1. The developer progressed with a sitemap for the application. This interactive application includes media elements, 3D objects, videos, audio, text, images, and games to allow users to experience AR more effectively

and fun. The application is designed and developed using Unity 2020 by implementing the AR technology as shown in Figure 2. This application using own 3D modelling by using the Blender for designing all the 3D model as illustrated in Figure 3.

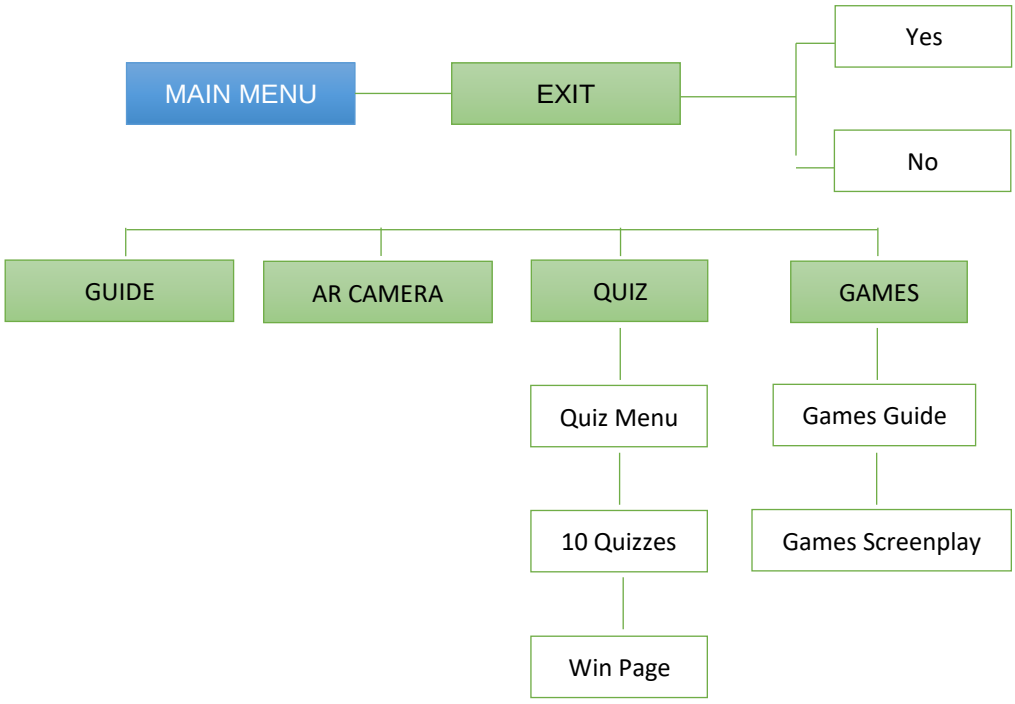

Fig. 1. Sitemap of Bee-Hind: Tualang honey

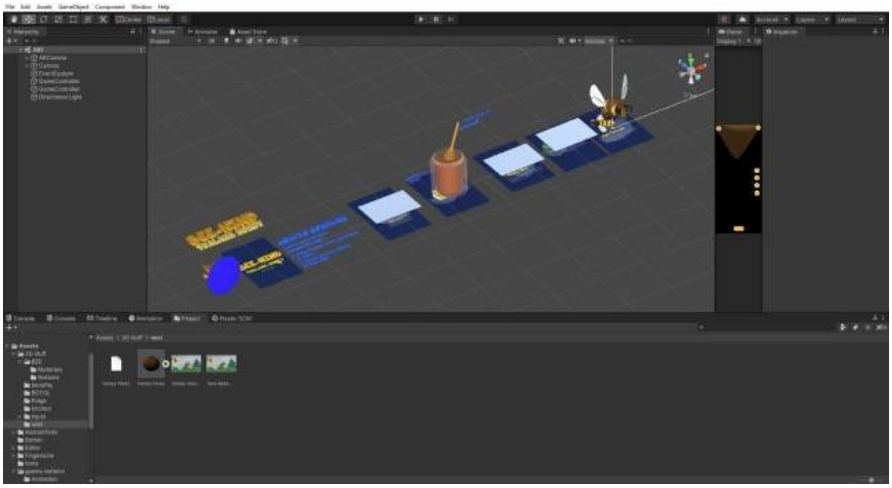

Fig. 2. Development in Unity 2020 software

Fig. 3. 3D object designing in Blender

3.3 Implementation

Once the design phase has been done, the developer starts implementing the design into the software to begin the development. The developer will print the pamphlet in A4 size and create an Android application as an APK file. The developer begins to write the coding to create a functional AR application that includes 3D popups, videos, and games. The developer begins to write the coding to create a functional AR application that includes 3D popups, videos, and games.

The interface of the Main Menu Page is straightforward, with four main buttons that lead the user to each content's page: Guide, AR Camera, Quiz, and Games. There is also a button on the top right of the screen, the 'X' button, to confirm the exit page. On the Exit Confirmation page, users will be asked, "Are you want to exit this application?" they can close or exit the application by clicking the right button or the "X" button to return to the previous page. Figure 4 depicts the Bee-Hind Tualang Honey application sample for the main menu page, Interactive Pamphlet, and demo of the AR camera.

a) 

b) 

c) 

Fig. 4. (a) Main Menu Page; (b) Interactive Pamphlet; (c) AR Camera "Apis Dorsata"

3.4 Phase 4: Verification and Testing

This phase will reflect the efficiency of this application. It is to ensure no errors or malfunctions occur. The developer will analyze the flaws of the application and the results of the effectiveness of this application among the respondents of the target user. Respondents will be asked to install the APK files through a QR code or hyperlink in the survey form. The respondents must have an Android smartphone device to install the APK files. This will help the developer understand the required information to include in the future for a better experience and develop information regarding Tualang honey.

3.5 Phase 5: Maintenance

After gathering the data from the respondent's survey during the testing phase, the maintenance phase is the end of the five stages, in which the developer will identify bugs, inadequate features, and other mistakes that happened during the manufacturing process after gathering the data of the respondent's survey during the testing phase. The developer will fix the bug issues and improve the application with a better feature before Bee-Hind: Tualang Honey is officially released.

4. RESULT AND DISCUSSION

Bee-Hind: The Tualang honey application will start testing out on the beta users. This test determines the user's understanding of the prototype and how users understand the various features, designs, contributions, and information presented in this application. Following the experience of using the AR application, users will be required to answer the questionnaire with 16 questions, breaking into three sections: demographics, knowledge about AR, and prototype evaluation. The questionnaire will be distributed to 30 respondents that match the research scope using a Google Form.

Figure 5 illustrates that the age distribution of the respondents is predominantly within the sphere of young adults, commonly referred to as Generation Z. The majority, constituting 56.7%, falls within the age range of 22-28 years. The remaining 33.3% of the total respondents are aged between 18-21 years, with an additional 6.7% falling within the 26-30 years bracket. A mere 3.3% of respondents represent the age group of 31 years and above.

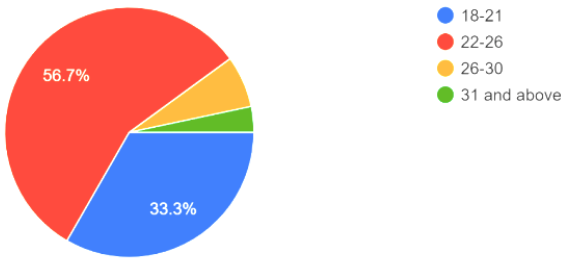

Fig. 5. Repondent's Age

Figure 6 presents an illustration wherein 14 respondents (46.7%) know about Tualang honey. Meanwhile, 10 respondents (33.3%) are uncertain about their familiarity with

Tualang honey, and an additional six respondents (20%) indicate a complete lack of awareness regarding Tualang honey.

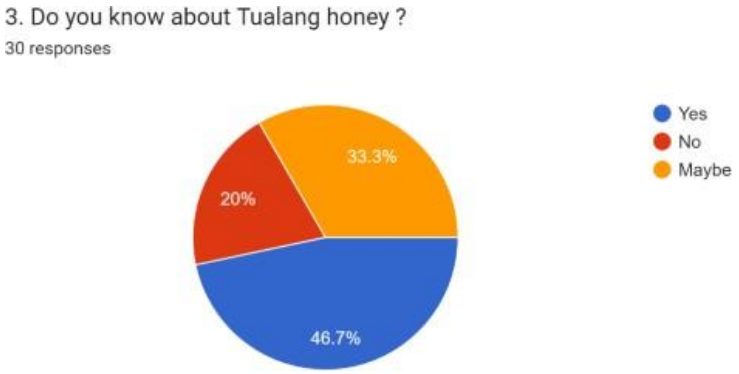

Fig. 6. Survey Knowing about Tualang Honey

About 90% of respondents agree that this AR application are helpful to gain their understanding about Tualang honey without having to read a long journal or article as illustrated in Figure 7. While only one respondent disagreed with the statement, the other 2, or 6.7% of respondents, were unsure that this application was helpful for them.

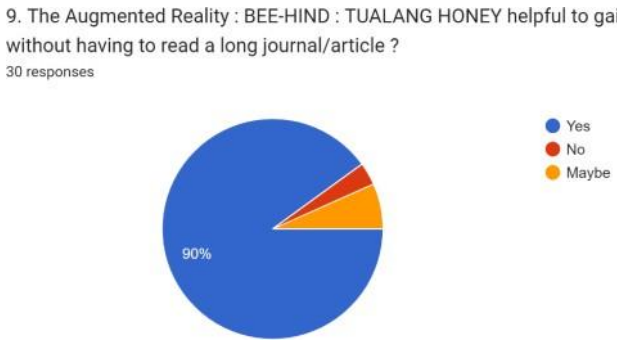

Fig. 7. Effectiveness of BEE-HIND application compared to reading the information in the article

As shown in Figure 8, 100% of them, which consists of 30 respondents, agree that this application helps them gain more knowledge and awareness about Tualang Honey.

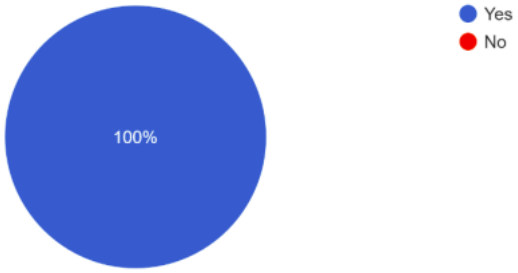

Fig. 8. Feedback on awareness about Tualang Honey

The researcher inquired whether this AR application is suitable for entertainment and serves as a tool for education and marketing, which aligns with the project's incorporation of AR into marketing and education. Out of the total respondents, 70%, or 21 individuals, evaluated it as an excellent AR tool, while the remaining 30%, or nine respondents, considered it a good tool, as depicted in Figure 9.

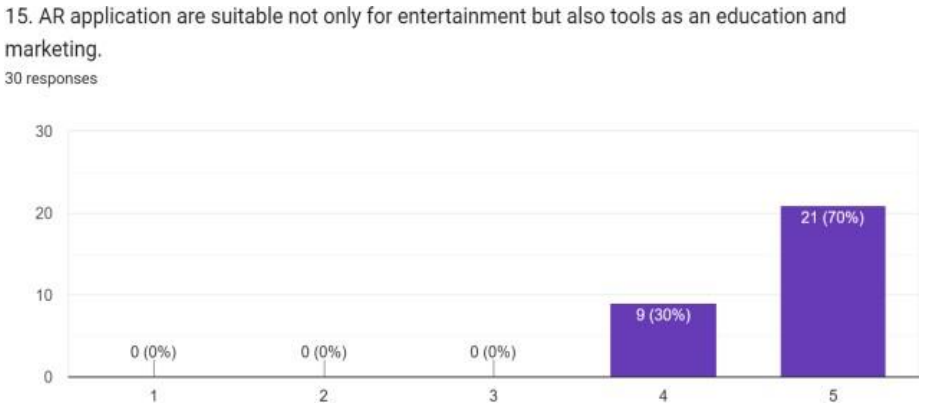

Fig. 9. Survey on the AR BEE-HIND application usability

As shown in Figure 10, 50% or 15 respondents rate it as very good, 43.3% or 13 respondents rate the readability of this application as good, and the remaining 2 respondents rate it as neutral.

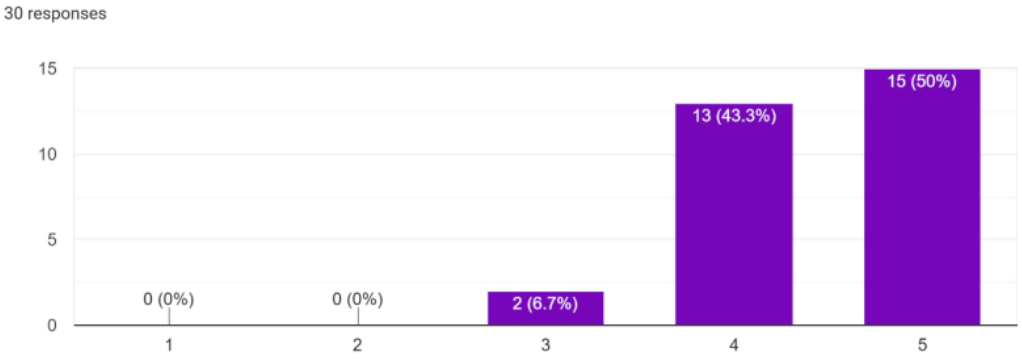

Figure 10: Readability (font size, typeface, font and color)

5. CONCLUSION AND FUTURE WORK

In conclusion, the Bee-Hind Tualang honey application is an interactive mobile application that employs augmented reality to educate users on the process of Tualang honey and its effectiveness. The application also provides quizzes to test users' knowledge about Tualang honey after they have experienced the AR and to make it even more entertaining. The researcher has included the games page. Based on the testing results, all respondents agreed that Bee-Hind: Tualang honey helps to gain more knowledge and awareness about Tualang honey, and above all, it achieves the objectives of this project.

The researcher has considered and reviewed a few recommendations. The enhancement that the researcher should improve is to produce a book of documentation for details about Tualang honey. The respondents suggest separating the 3D elements and videos into different AR pages. In addition, to make them more readable, the videos can be improved by adding subtitles to each of the videos included. Finally, a scoreboard for the gameplay will be included. If the users collect the points in the games, there will be a scoreboard display at the end of the games.

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