

UNIVERSITI TUNKU ABDUL RAHMAN
Faculty of Information and Communication Technology



UCCD3223 Mobile Applications Development
(June 2023 Trimester)

Group Assignment 1

Name	Student ID	Course	Practical Group	Group ID	Group Name	Tutor
Ng Jing Ying	2101845	CS	P4	2	Android Saga	Mr Tan Chiang Kang
Grace Lai Meng Huey	2001861	CS	P4	2		Mr. Tan Chiang Kang
Wai Jia Le	2102288	CS	P5	2		Ts.Saw Seow Hui
Wong Tze-Qing, Sarah	2003227	CS	P6	2		Ts.Saw Seow Hui

Marking scheme	Marks	Remarks
Creativity/novelty of concept	X 4	
Completeness of idea	X 3	
Overall design	X 2	
Neat documentation layout	X 1	
TOTAL	/100	

Title: Money Tree – A one-stop financial literacy education mobile application

Table of contents

Chapter 1 Introduction	1
Chapter 2 Problem Statement / Motivation / Market Gap Analysis	1
Chapter 3 Proposed idea / solution / contribution	4
Chapter 4 Initial design of solution	8
References	11

Chapter 1 Introduction

Studies have revealed that financial literacy level of Malaysian university students is still low. Most students are not well equipped with financial knowledge, which results in having poor financial management skill. Unfortunately, existing financial literacy programs in Malaysia have low impact among our future leaders. On the other hand, some financial education platforms in other countries might not be suitable for Malaysians, even though they have good content. To address this problem, we propose Money Tree, a one-stop financial literacy education mobile application that features bite-sized courses and scenario-based simulation challenges. To make our platform financially sustainable, we seek collaborations with reputable financial academies in Malaysia, to offer extra bootcamps and help them promote their paid online courses. In this proposal, we cover problem statement, motivation of the project and market gap analysis in Chapter 2. Then, we cover the proposed solution in Chapter 3. In Chapter 4, initial design of solution is shown.

Chapter 2 Problem Statement/ Motivation/ Market Gap Analysis

It is proven that financial behaviour is the strongest predictor of perceived financial wellbeing (FWB) followed by locus of control (LOC) [1]. Many young adults that were involved in the study [1] are still a part of the low-income group, despite having a higher level of education due to the low minimum monthly wage policy. Therefore, it is highlighted in [1] that financial knowledge is crucial.

Problem Statement

When an individual understands and is proficient with the usage of different financial skills such as investing, budgeting, and personal financial management, that individual is considered as financially literate [2]. Being financially educated gives you the groundwork for a relationship with money that is a lifetime learning process [2]. Unfortunately, university students in Malaysia seem to have low financial literacy as mentioned in [3]. Lacking such awareness leads to financial difficulties such as high debt [3]. It might potentially cause more social issues such as earlier bankruptcy, high susceptibility to scams and bank fraud [3]. The study [3] provides evidence of financial illiteracy among students pursuing tertiary education in Malaysia. On average, students answered less than half of the 25-item test of financial knowledge correctly [3].

As in [4], the existing literatures on studies related to financial literacy among youth to understand the major factors that lead to the bankruptcy cases among youth in Malaysia was reviewed. Most studies found that financial literacy varies according to the respondents' knowledge and skills in basic finance and the bankruptcy cases were primarily due to inability to make payments on financial obligations such as instalment purchases, personal loans, and credit card debt [4].

Talks or short programmes offered in schools is considered not efficient. This statement is proven by the study [5], which has indicated that a higher percentage of student's financial literacy has not improved after taking part in a money management course. Learners can learn but tend to forget what they have learned without applying the knowledge in real experiences. Moreover, attending a money management class does not make a student less eager to stay out of debt [5]. Besides, Malaysia is still far from leveraging education technology into teaching financial literacy among young people.

Motivation

As such, our project aims to improve financial literacy among young people in university. We also aim to enhance effectiveness of financial literacy courses. Other than that, we need to ensure that those courses are accessible to all our target audience which are university students.

Market Gap Analysis

At present, the government and some other non-profit organizations are organizing financial literacy programs for university students to give them the financial knowledge they need. For instance, Agensi Kaunseling dan Pengurusan Kredit (AKPK), which is the Credit Counselling and Debt Management Agency, gives assistances to people to take control of their financial situation [6]. Certified and experienced financial advisors are the people who give the services to users. AKPK provides financial education, gives advice on financial management as well as helps to manage our debt more efficiently [7]. Besides, Malaysian Financial Planning Council (MFPC) also has organised a lot of financial educational workshops and awareness programmes for Malaysians to join to promote the advancement of financial planning [8].

However, people are seen as having no interest in registering for it. On the other hand, lack of participation in short programmes also contributes to low effectiveness towards improving financial literacy. In fact, according to WHEC 2022 [9], there are 1.2 million university students in Malaysia, they should get prepared of financial knowledge before

graduation so that they know how to manage their loans, build credit and avoid debt as well as avoid any financial pitfalls.

Therefore, there are a number of financial simulations that can be found in the market today to help learners understand the situation better. For example, Money Wise Game, developed by a USA educational game provider, Dot Dot Fire is aimed to promote financial literacy among all the users [10]. It is a story-based life simulation game that contains a complete city map and non-player characters for players to interact with. Based on the choices made by players, the story, character, and city will be changed accordingly. Knowledge about avoiding scams, fake text messages, fake sales and others is available in Money Wise Game. The game heavily examines learners' financial decision-making skills and teaches relevant information whenever learners picked a decision. However, this award-winning game does not align with Malaysia cultural context.

Moreover, Renegade Buggies, an educational 3D mobile game with financial and mathematical literacy, is also produced by working with National Center for Families Learning (NCFL) and Dollar General Literacy Foundation [11] to provide money management skill and basic budgeting skills with intensive money-saving tips. Furthermore, a non-profit organisation gives financial education by creating Farm Blitz for low-income young people [12]. In this game, players will have to face the difficulties of maintaining a virtual farm by managing their expenses, maximising their profits, and dealing with unforeseen events. Players will be able to learn about the key financial concepts to make the best choices based on different situations.

We should embrace the benefit of mobile application which is mobility as explained in [13] that the basic goal of mobile learning is to give students the freedom to digest knowledge whenever and wherever they choose. Advancement of artificial intelligence (AI) or generative AI such as ChatGPT, personalized learning pace, and real simulation, will improve the memory of learners as the experience is immersive for users which makes it easier to retain information. It was concluded in [14] that pupils who took part in the computer simulation had a higher likelihood of reporting significant learning outcomes.

Chapter 3 Proposed idea / solution / contribution

Due to the low level of financial literacy among university students in Malaysia, as mentioned in the paper [3], we propose Money Tree, a financial literacy education mobile application that can help them improve their understanding of financial knowledge in a convenient manner. University students, aged between 18 and 22, will encounter loan or debt issues after graduating, it is important for them to acquire some financial management skill during their university studies. Hence, this application is mainly designed for the needs of university students in financial field. However, other individuals from different backgrounds are welcomed to benefit from its financial literacy education and resource. In this chapter, non-technical and technical aspect will be covered.

Explanation of each module:

1. Account Module: A user can register an account, monitor the account including subscription and profile information. Each registered user has lifetime access to all the course contents offered.

2. Course Module:

This is the core feature of our application. Our goal is to let all learners to be able to gain all necessary financial knowledge quickly. All the courses are separated into Beginner, Intermediate and Advanced Level. Each course is bite-sized, meaning that all learners shall be able to complete reading the contents and answering the quiz within hours. Learners can only advance to the next level after all courses within a level is complete, the details are as follows:

- a) Beginner Level:

There are around 6 courses in this level which are related to the 5 principles of money management (My Money Five) that are proposed by United States Department of the Treasury: Earn, Save&Invest, Protect, Spend and Borrow [15]. By implementing the 5 principles that are mentioned above, courses in this level are designed specifically for university students which includes financial planning, good habits, ways to achieve financial freedom and low risk investment. Such contents may be directly applicable to their daily lives, or the contents are useful in their future. Our team will have in-house professional course developers that are

capable to design the courses. All the courses are guaranteed to be up-to-date, legitimate, and easy to understand.

b) Intermediate Level:

Courses include low risk to medium risk of investment knowledge. Meanwhile, knowledge for employees such as EPF and, tax reduction tips will also be covered. There will be many more courses compared to beginner level. Some courses will be featured by sponsors, such as taxPOD [16], ValueInMind [17] and VI College [18] which are certified financial education providers in Malaysia. We foresee that a portion of university students who are desperate to learn will be our long-term application users. Such knowledge will be highly useful for their future success.

c) Advanced Level:

In this level, there will be courses directly related to stock market tips. Courses in this level will cover medium to high levels of investment knowledge which may not be necessary for our target audience. For learners who have completed the first two levels and they are interested to learn how to buy stocks, they may pay us a certain amount of money as subscription fee to access the courses that are designed in collaboration with some reputable financial institution. To reward customer's loyalty, some verified live coaching courses will be offered to these users.

Once the learners complete a specified course, those learning materials will be downloaded into their phone. This allows them to review those materials anytime and anywhere without Internet connection.

3. Challenge Module

It is often difficult to let learners imagine some scenarios without real life experience. Based on the paper [16], besides teaching the learner about the finance management skills, they should experience some realistic scenarios in order to have strong understanding in financial literacy. Therefore, there are a total of 100 challenges with different learning outcomes and challenges which simulate some real-world scenarios that are introduced in this application and it will be updated from time to time. With the help of ChatGPT and in-house course developers, each challenge will begin with a short story which is related to either one or several beginner courses as well as starting money. For instance, we create a "Loan Shark" story, with the background originated from Malaysia news, and we let ChatGPT to restructure the storyline to turn it into a fiction. After that, our challenge module which is powered by GPT-3.5 will transform this story

into a text-based role-playing game. For each challenge, learners can monitor the status of Non-Player Characters (NPC) including happiness level and money. Learners are required to make decisions by selecting the options provided or typing their own custom actions. In the end of the challenge, challenge outcome will depend on mission achievement and money earned, and a list of improper decisions will be provided with details explanation, so the learners can learn from their mistakes.

To access this module, learners may find one or more challenges within a course, or they can explore more challenges in “Challenge” tab.

4. Gamification Module

To improve learning experience and bring more fun to our users, low level gamification is embedded within our application.

a) Maintain the Streak

Users are encouraged to check in our application to learn every day. As long as the learner finishes at least 1 section within a course, or complete a challenge in Challenge tab, the streak is maintained.

b) Experience Point (XP)

With every section of courses is completed, learners will be entitled to 20XP which is valid for only 48 hours.

c) Leaderboard

A leaderboard ranked according to the XPs of learners is introduced. Learners may gain extra gratification when they see they are on the top of the leaderboard, this intrinsically motivates them to learn within our application.

d) MT Coins

In the challenge module, the learners will be given some starting money to play the challenges. Those moneys will be deducted or added based on the decision made in the challenge. At the end of the challenge, if the learners have won the challenge with remaining money, the money can be exchanged into MT Coins. MT Coins can be accumulated from time to time, it can be used to subscribe to some available subscriptions or redeem vouchers that are sponsored.

5. Calculator Module

Along the beginner level courses, we will teach learners ways to estimate the year which they can achieve financial freedom, ways to stack the fixed deposit interest, ways to plan for a car loan and so on. Therefore, a series of financial calculators such as budget calculator, debt calculator and mortgage calculator will be provided to enhance app usability.

Technical aspects:

1. **Splash Screen:** To improve user experience, a splash screen is introduced every time the user launches our app, during the display of splash screen, our app will connect to all necessary services and load all contents.
2. **Firebase Authentication:** Users may register a new account using email, Google, or other SSO options.
3. **Firebase Realtime Database:** A noSQL database containing user registration details, course progress, XP, coins, course contents and challenge contents is designed in safe and secure manner.
4. **SQLite Local Database:** Course contents, progress will be saved locally, even without internet access. However, services that require update firebase or accessing GPT API cannot be accessed when user is offline.
5. **Firebase Google Analytics:** To understand our user's learning experience, google analytic is used to track user intention and usage details.
6. **OpenAI GPT-3.5-turbo:** Proper prompts are designed to ensure Challenge module can operate properly, at the same time it is optimized so minimal tokens is consumed to achieve great accuracy.

Contribution

Currently, there are more than 1 million university students in Malaysia. Our solution fosters a positive relationship between private financial academy and tertiary institutions, such that it encourages these financial academies to create rigorous curriculum, and young people in Malaysia will raise their financial knowledge, which will eventually bring a better living standard.

Chapter 4 Initial Design of Solution

The mobile application will be developed using Android Studio, with Firebase services, OpenAI chat completion and SQLite local storage serving as the application backend. In the frontend, 5 main modules are displayed to user.

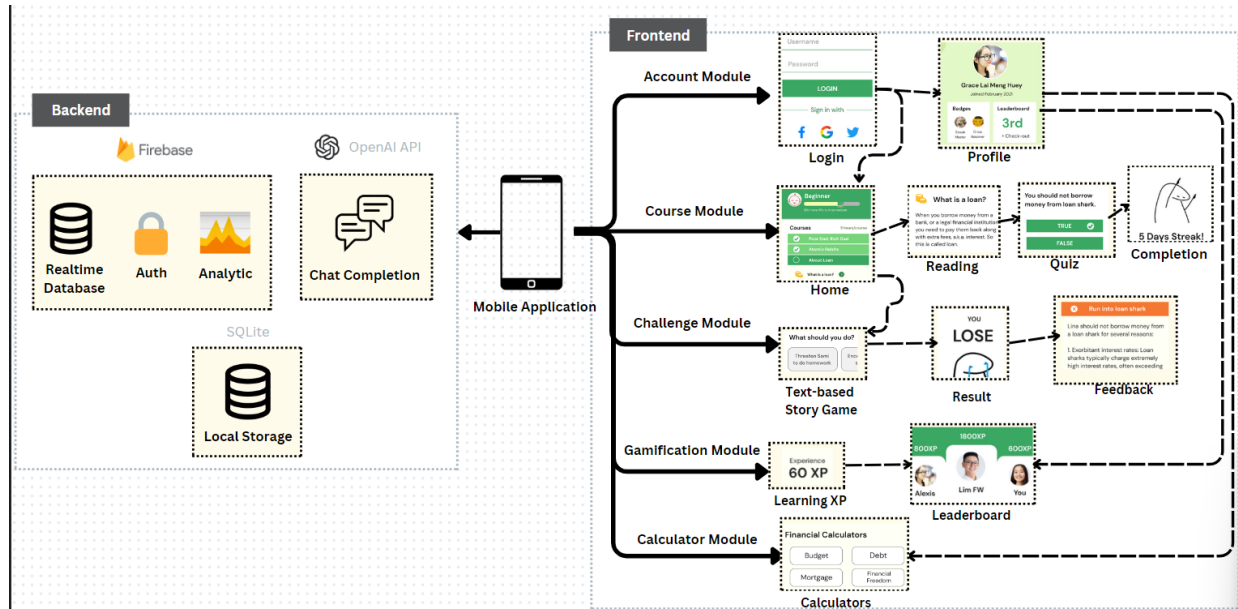
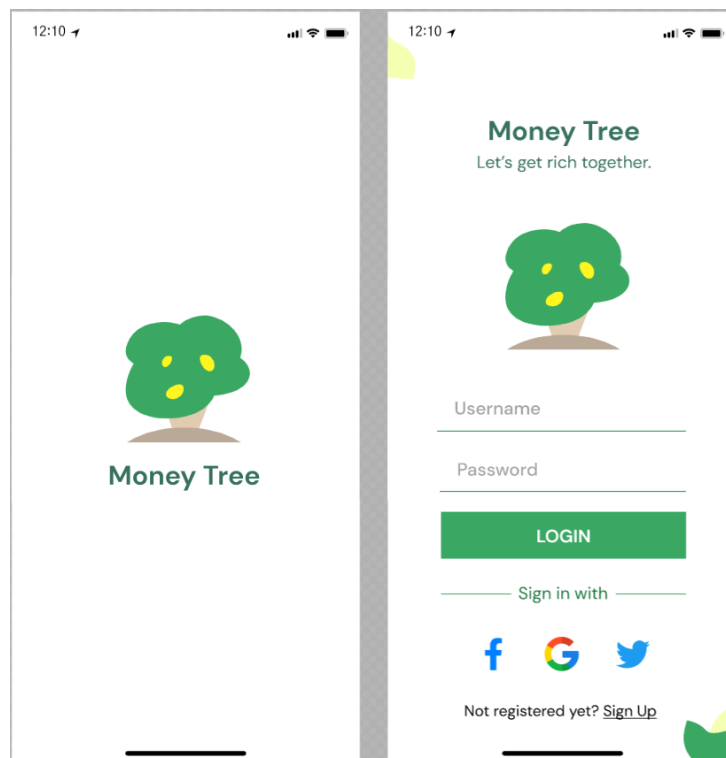
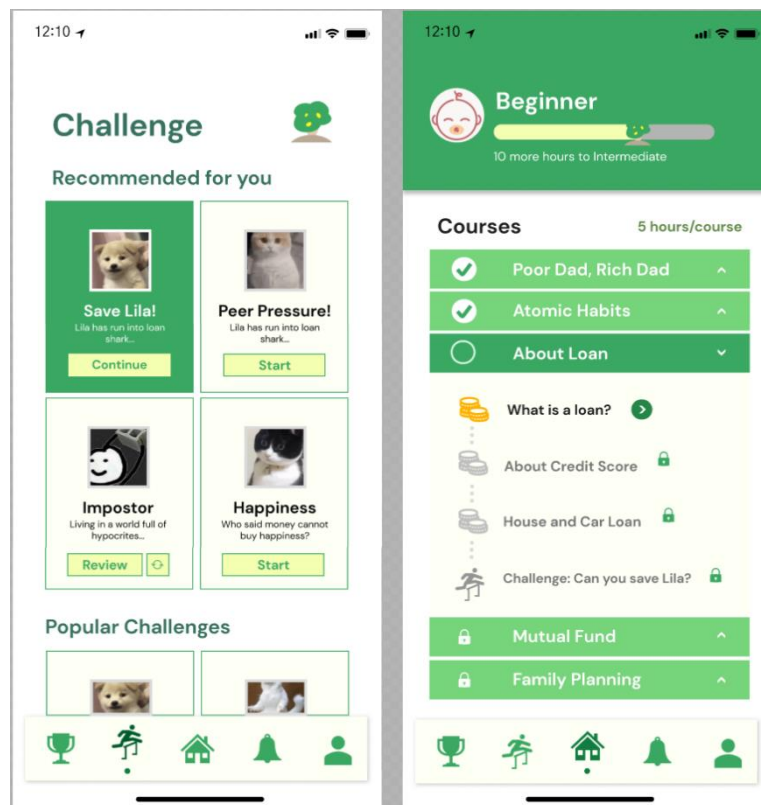


Diagram 4.1 System Block Diagram

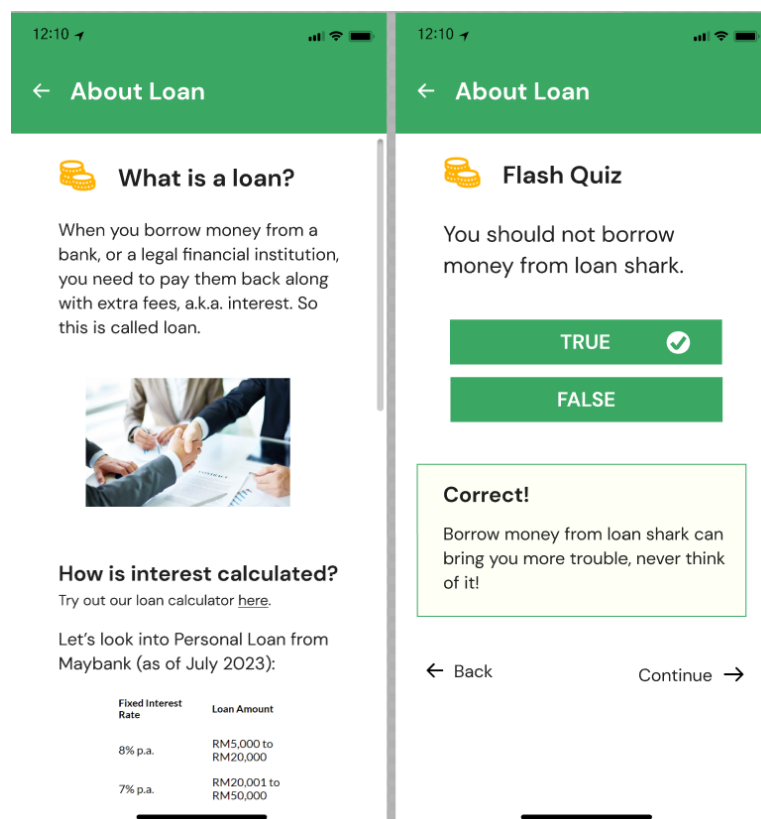
4.1 Splash Screen and Login Page



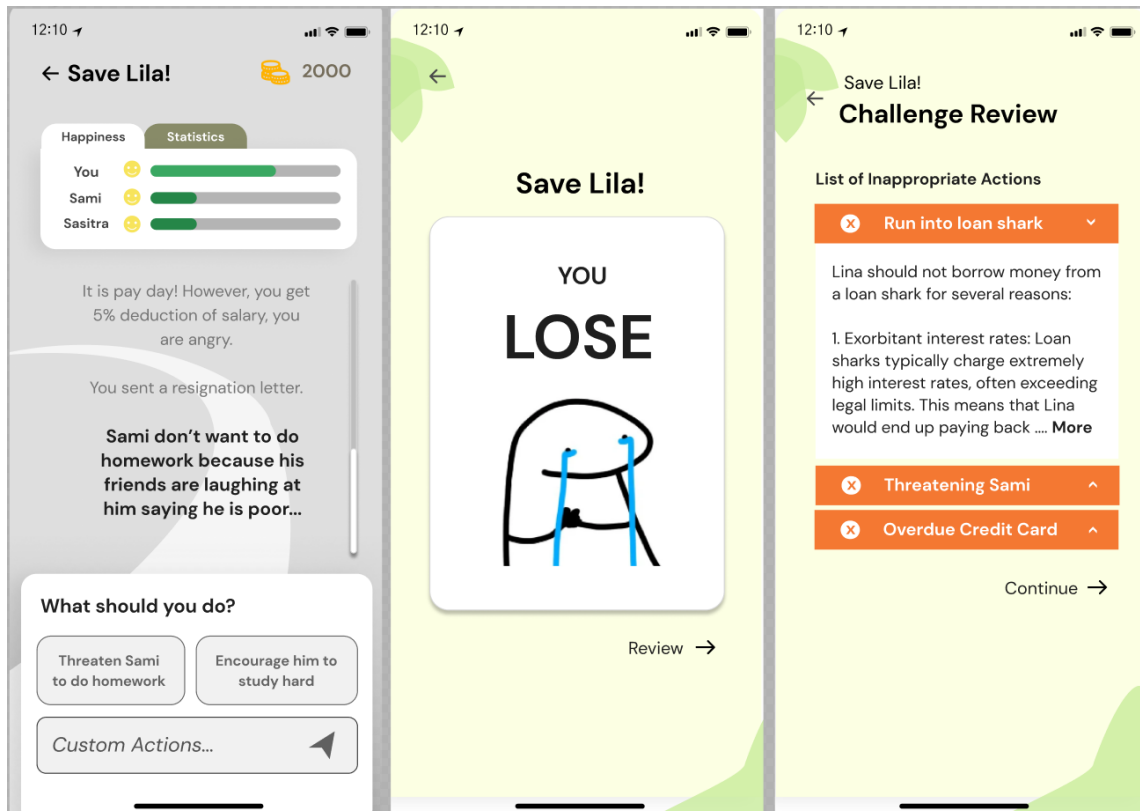
4.2 Challenge List and Course List Page



4.3 Course Content and Quiz Page



4.4 Challenge, Challenge Outcome and Challenge Review Page



4.5 Leaderboard and Profile Page



References

- [1] M. F. Sabri, R. Wahab, N. S. Mahdzan, A. S. Magli, and H. A. Rahim, "Mediating Effect of Financial Behaviour on the Relationship Between Perceived Financial Wellbeing and Its Factors Among Low-Income Young Adults in Malaysia," *Frontiers in Psychology*, vol. 13, May 2022. Accessed: Jun. 29, 2023. doi: 10.3389/fpsyg.2022.858630. [Online]. Available: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9161296/>
- [2] J. Fernando, "Financial Literacy: What It Is, and Why It Is So Important," *Investopedia*, Mar. 2023, [Online]. Available: <https://www.investopedia.com/terms/f/financial-literacy.asp#:~:text=Financial%20literacy%20is%20the%20ability,a%20lifelong%20journey%20of%20learning>. Accessed: Jun. 29, 2023.
- [3] M. F. Sabri, M. MacDonald, T. K. Hira, and J. Masud, "Childhood Consumer Experience and the Financial Literacy of College Students in Malaysia," *Family and Consumer Sciences Research Journal*, vol. 38, no. 4, pp. 455–467, Jun. 2010. Accessed: Jun. 29, 2023. doi: 10.1111/j.1552-3934.2010.00038.x. Available: https://www.researchgate.net/publication/227765035_Childhood_Consumer_Experience_and_the_Financial_Literacy_of_College_Students_in_Malaysia
- [4] P. R. Tahir, N. F. Sudarmoyo@Suffari, F. Mat Saman, and T. Husin, "Financial Literacy Among Youth in Malaysia: Insights from Literature for Conceptual Framework Development," *International Journal of Accounting, Finance and Business (IJAFB)*, vol. 7, no. 45, pp. 1-10, 2022. Accessed: Jun. 29, 2023. doi: 10.55573/IJAFB.074501 [Online]. Available: https://www.researchgate.net/profile/Putri-Rozita-Tahir/publication/366005694_Financial_Literacy_and_Bankruptcy_Among_Youth_in_MalaMala_Insights_From_Literature_For_Conceptual_Framework_Development/links/638d960a7d9b40514e171cd9/Financial-Literacy-and-Bankruptcy-Among-Youth-in-Malaysia-Insights-From-Literature-For-Conceptual-Framework-Development.pdf
- [5] J. Farinella, J. Bland, and J. Franco, "The Impact of Financial Education on Financial Literacy and Spending Habits," *International Journal of Business, Accounting & Finance*, vol. 11, no. 1, pp. 1-12, 2017. <https://discovery-ebSCO-com.libezp2.utar.edu.my/linkprocessor/plink?id=7576d1a4-b533-3e31-b2ce-91a79c30c734>. Accessed: Jun. 29, 2023.

- [6] "About introduction," *AKPK*, <https://www.akpk.org.my/about-introduction>. Accessed: Jun. 29, 2023.
- [7] ComapreHero.my Team, "What Actually Happens When You Go To AKPK For Help?," *CompareHero.my*, <https://www.comparehero.my/debt-management/articles/manage-your-debts-with-akpk>. Accessed: Jun. 29, 2023.
- [8] "MFPC background," *MFPC*, <https://www.mfpc.org.my/mfpc-background/>. Accessed: Jun. 29, 2023.
- [9] UNESCO National Commission Country Report Template, *WHEC 2022*, <https://whc2022.net/resources/Country%20report%20-%20Malaysia.pdf>. Accessed: Jun. 29, 2023.
- [10] "Gaming ethically," *Dot Dot Fire*, <https://www.dotdotfire.com/play/money-wise-game>. Accessed: Jul. 16, 2023.
- [11] "Mobile: Renegade buggies," *FableVision Studios*, <https://www.fablevisionstudios.com/renegade-buggies>. Accessed: Jun. 29, 2023.
- [12] "Game: Farm blitz," *FableVision Studios*, <https://www.fablevisionstudios.com/farm-blitz>. Accessed: Jun. 29, 2023.
- [13] M. L. Crescente and D. Lee, "Critical issues of M-Learning: design models, adoption processes, and future trends," *Journal of the Chinese Institute of Industrial Engineers*, vol. 28, no. 2, pp. 111-123, 2011. Accessed: Jun. 29, 2023. doi: <https://doi.org/10.1080/10170669.2010.548856>. [Online]. Available: <https://pure.psu.edu/en/publications/critical-issues-of-m-learning-design-models-adoption-processes-an>
- [14] D. Vlachopoulos and A. Makri, "The effect of games and simulations on higher education: a systematic literature review," *Int J Educ Technol High Educ*, vol. 14, no. 22, 2017. Accessed: Jul. 1, 2023. doi: 10.1186/s41239-017-0062-1. [Online]. Available: <https://educationaltechnologyjournal.springeropen.com/articles/10.1186/s41239-017-0062-1>
- [15] "My Money Five," *MyMoney.gov.*, <https://www.mymoney.gov/mymoneyfive> Accessed: July.16, 2023.

- [16] “taxPOD,” YYC., <https://learn.taxpod.my/> Accessed: July. 16, 2023.
- [17] “Value in Mind,” *ValueInMind.*, <https://valueinmind.co/en/> Accessed: July.16, 2023.
- [18] “Investing made easy for everyone,” VI., <https://www.vicollege.com/vicollege/> Accessed: July. 16, 2023.
- [19] A. Amagir, W. Groot, H. Maassen van den Brink, and A. Wilschut, “A review of financial-literacy education programs for children and adolescents,” *Citizenship, Social and Economics Education*, vol. 17, no. 1, pp. 56–80, 2017.
doi:10.1177/2047173417719555. [Online]. Available:
<https://journals.sagepub.com/doi/full/10.1177/2047173417719555>