

ARI3216 Project — Web Data Mining

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I. INTRODUCTION

A. Motivation

It is clear that many young people find difficulty to transition from adolescence to adulthood as many institutions lack the resources to teach fundamental financial skills to students. These fundamental skills form an understanding of the financial landscape which include managing debt and daily budgeting whilst also learning how to build a safety net and plan for their future. In addition, research shows that people who begin to develop financial capability skills are more likely to be financially secure once they reach adulthood [1]

This project seeks to provide an intuitive and interactive platform which users of ages sixteen to eighteen can use as an introduction for said fundamental financial skills. The platform itself will be a game that mimics real life experiences which revolve around decisions that are taken by the user. This provides a form of risk and reward, with short term and long term goals being affected by these decisions. By introducing this risk-reward system, the users are encouraged to focus more on personal financial capabilities which can then be applied in real life situations.

B. Main Aims and Objectives

The aim of this project is to develop a game which is fun and engaging whilst providing educational lessons for users to manage their income better. Such a game would allow its' users to take constant small steps in the right direction which would eventually lead to financial freedom and long term success.

To be able achieve the aim of this project, the following objectives had to be implemented:

- Make use of the latest economic rates.
- Develop a game supported by most mobile devices.
- Use different approaches to keep the game fun and interesting, such as the use of mini games.

C. Market Research

The decision on creating this game on a mobile device, rather than PC or Console was based on the fact that the Mobile Games Market have been constantly rising since 2012. [2] This is mainly due to constant new innovation in mobile devices and cheaper prices make them widely available. Hence, this is the ideal platform for most to pass time, either when commuting by bus, waiting for an appointment or simply wanting a quick break. This is due to the fact that are lots of

free-to-play games one can simply download with the click of a button and moreover mobiles are constantly with us through out the day. Upon launch free-to-play games such as Clash of Clans expected to generate roughly nine thousand euros daily, nowadays they generate millions of euros a day. [2]

According to market intelligence company Newzoo, they anticipate that by 2021 the Mobile Games Market will be generating nearly 60% revenue [2] of the total global games market, which includes PC and Consoles such as PlayStation, Xbox, etc.

Fig. 1. 2012-2021 Global Games Market [2]



Having decided the ideal platform, we then discussed and researched multiple concepts that would make a game both educational and fun for our users. The user base we primarily are targeting are 16-18 year-old's, this was decided due to the fact that the minimum age for employment in Malta is 16 years old. Hence we thought it would be best to educate these teenagers through a game by researching and implementing current trends of teenagers in game with real life economical concepts.

II. RELATED WORK

Most games nowadays have some sort of financial concept applied to them. This ranges from games which are finance oriented such as The Big Capitalist which places you at the bottom of the business food chain by starting your own lemon juice stand, then moving into bigger and better areas of business. Another prime example would be the classic game of Monopoly where the only objective of the entire game is to manage your finances, through a combination of investments and savings. Moreover, Monopoly has random

events of Chance and Community Chest which give that extra real life twist, and try to deal with what is being thrown at you.

Besides games which focus primarily on finances, games such as Grand Theft Auto (GTA) and FIFA are comprised of economies which the user can make use of to further enhance their experience. In GTA the economy allows users to bank their money in anticipation of losing it to other players. Moreover, users can use their money to purchase vehicles and property, for their characters lifestyle. On FIFA, specifically the FIFA Ultimate Team game-mode the economy is in the form of an open market, which users can make use of by buying and selling player cards based on real life performances. Moreover, users can learn to invest and make anticipated choices to further boost their profits in game. In addition, there are web pages such as FUTBIN which give an indication of how the current market is to help users use their money wisely in terms of investments and purchases for players.

Fig. 2. FUTBIN FIFA Market [2]



III. BUSINESS ASPECT

According to the results of an OECD survey in Malta on Financial Literacy which was carried out on 1,013 Maltese residents aged between 18 and 79 between June of 2018 and September 2018, it was reported that 35% [3] of Maltese adults have very low knowledge of financial matters, 44% [3] have an average level of knowledge whilst only 21% [3] of the overall adult population have a good understanding. Due to this, Malta ranks in lower end when it comes to money making decisions.

It is clearly a problem in our nation, and it should be tackled with immediate action so that future generations don't get into unnecessary debt, which can cause a lot of damage, not just for ones credit score but also mentally. Not having money restricts ones choices and would have a huge emotional and mental impact on ones well being. In the US students go into hundred of thousands of debt to pay their education. According to a study carried out by Stash found out that 10% [4] say that student loans are their biggest worry, 65% [4] lose sleep because of loans, 67% [4] have reported to develop physical symptoms of anxiety and worst of all 1 in 15 borrowers has considered suicide because of student loan debt. [5]

Fortunately in Malta, education is still free however this doesn't stop individuals and young adults to make poor decisions. Going into a loan to purchase that high end car which is

a money pit. Furthermore, even if it was simply a simple cheap car, most would even have to think of getting a loan is due to the fact that they spend their entire income on parties, clubbing and hanging out. Hence this is one of the prime reasons why we need to educate these teenagers to not replicate mistakes which we did ourselves not long ago. Besides that, something that tends repeats itself amongst young entrepreneurs is that they forget that the VAT is not theirs. After having the opportunity to discuss this with several accountants, some young adults go and spend without considering that, and their are penalties for late VAT returns.

Through the use of our game/application we can hit two birds with one stone. Promote financial literacy through an educational game and furthermore it would be an application were users can apply and find jobs in the stream they want to continue studying and developing in. Furthermore, if one wanted to decide to freelance, he would also be guided on how much TAX he has to pay, how to apply for VAT, etc.

The prototype of this game could be tested in the Malta Robotics Olympiad, by giving users a quick walk through of the game. We could ask users what they think of the game and most importantly why they think that. This allows us to get in the mind of that user and we can develop and edit based on their feedback.

Other games already exist such as 'The Big Capitalist' and 'Homeless?' however both suffer from the fact that they don't take into consideration Taxes and furthermore, they are a click game. We intend to tackle both of these issues by making the game have Taxes and start teaching people from a young age on how to split their bills, to take care of their well being whilst also being a fun game with multiple mini games. This would ideally help out audience to become more financial literate and start to change their behaviours by budgeting their expenses whether it's meeting with friends or unnecessary expenses.

To calculate whether such a game would have an impact on individuals or not we could perform a test similar to 'The Marshmallow Experiment'. We can test out individuals with low delayed gratification and see if there are any changes after they have played the game for a certain period of time.

In case our game was a success, the next steps to follow would be to monetize it and start generating some sort of income, through job postings, potential investments news, etc

The below can Lean Canvas Model (Fig 3.) can give us a good education on how to approach and expand this potential business. The below Lean Canvas Model is attached at the very last page in full scale.

Proper branding is what makes a company desirable to its target audience, hence whatever we do in terms of design, both in game and not has to keep the target audience in mind. While the game in itself is important, it is the brand that makes the company stand out from the competitors. This would include a properly designed landing page, social media, etc with proper brand guidelines. A part of this would be a properly designed logo which should be attractive to both genders for our age gap. The current logo which we designed is the one below (Fig 4.)

Fig. 3. Lean Canvas Model

<u>KEY PARTNERS</u> <ul style="list-style-type: none">- Schools- Established companies- Ministry of Education- Recruiting Companies	<u>KEY ACTIVITIES</u> <ul style="list-style-type: none">- Content follows real life teenager experiences- Network of students	<u>VALUE PROPOSITION</u> <ul style="list-style-type: none">- Make finances easier to understand- Promote students current real life available jobs <p><u>Value to Students</u></p> <ul style="list-style-type: none">- Fun & Educational- Earn in game money by watching ads <p><u>Value to Parents</u></p> <ul style="list-style-type: none">- Help teach financial literacy easier	<u>CUSTOMER RELATIONSHIP</u> <ul style="list-style-type: none">- Free to download- Engaging Game- Develop for other countries tax rates	<u>CUSTOMER SEGMENTS</u> <ul style="list-style-type: none">- 16 to 18 years old- 11,829 births between 2002 and 2004 in Malta
	<u>KEY RESOURCES</u> <ul style="list-style-type: none">- Game Developers- Game Designers		<u>CHANNELS</u> <ul style="list-style-type: none">- Google Play- App Store	
<u>COST STRUCTURE</u> <ul style="list-style-type: none">- Potential outsourcing for designers- Advertising and partnership costs		<u>REVENUE STREAMS</u> <ul style="list-style-type: none">- In app purchases,- In app adverts,- Revenue from recruiting companies		

Fig. 4. Rags to Riches Logo



IV. TECHNOLOGICAL ASPECT

This project was developed on the Unity which is a cross-platform game engine whilst Photoshop was used to design certain graphics in the game. Furthermore, Android SDK was used to be able to run and test the game on PC.

V. DESIGN AND IMPLEMENTATION OF THE SOLUTION

A. How your proposed solution works

The game is divided into 5 main areas in this prototype build so far. These are:

- Main Screen
- Wallet
- Hunger
- Equipment Store
- Education
- Jobs

1) *Main Screen*: The main screen is simply the welcome screen and upon further development our character will be animated to react to the current financial situation and the users well being. If the user's health or hunger reaches 0 the user dies and has to restart the game.

2) *Wallet*: In the wallet section, the users have the ability to calculate their owed taxes, income split rate as well as access to their retirement fund.

The taxes are calculated based on their income, and uses current real life rates to calculate how much tax is owed. Further development would include that if the tax is not paid within a period of time, penalties are issued.

The retirement fund is a fund, which earns interest in real time and can only be withdrawn after the user reaches 65 in game. This is funded by the user's split rate. Based on the income the user is making, the user can decide on how much he would like to invest in his retirement fund by adjusting the percentages as he or she pleases.

Fig. 5. Main Screen



Fig. 6. Wallet Screen



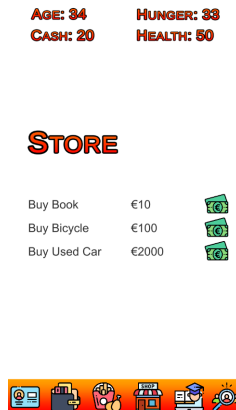
3) *Hunger*: Being in a good financial position is important, however this can not sabotage ones well being hence rather we need to balance our lifestyle. The user can go cheap and eat junk food however this will have a bad effect on the user's health. Whilst eating at home at a slightly higher price, will effect the user more financially however he would better health benefits. This would be the users choice to decide on what he or she will eat according to the financial situation they are in.

Fig. 7. Food Screen



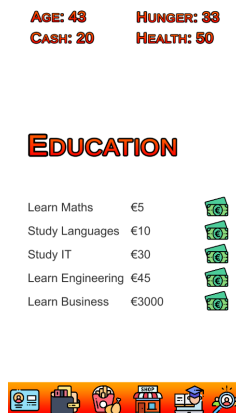
4) *Equipment Store*: The stores main use is to replicate real life opportunities if you have certain objects. For instance if the user buys a car, this would unlock him better job opportunities he can apply for. This goes for everything however since this is still a proof of concept we decided to only add bicycle and car for now. This can also be applied for fishing, i.e. the user would require a fishing rod, etc. This would also help the user to realise to purchase things which can help you in your day to day life and are practically a necessity to continue growing, rather than going on a shopping spree on stuff which you could have gone without.

Fig. 8. Equipment Store Screen



5) *Education*: Considering that we want to educate individuals, we made education a very high priority in this game. For the users to be able to do certain jobs to start earning a better income they have to learn certain skills and enroll in certain courses before they are able to. If we were lucky to win and continue developing this game, we could make mini games related to the subjects they enroll. For instance, simple mental mathematics questions for a math course, or fill in the blanks for a sample code if it was programming.

Fig. 9. Education Screen



6) *Jobs*: Malta has has the second highest rate just after Spain when it comes to early school leaving with a rate 17.5%. [6] Hence to display the importance of higher education, in game we decided to offer a variety of jobs some which pay better than others. For example if the user wanted to be able to do a certain job which pays better the user would have to first enroll in this subject through the education panel.

Furthermore, the users will have the opportunity to play job related mini games. So far 3 mini games have been implemented as a proof of concept.

Fig. 10. Jobs Screen

AGE: 47 HUNGER: 33
CASH: 20 HEALTH: 50



Fig. 11. Mini Game 1

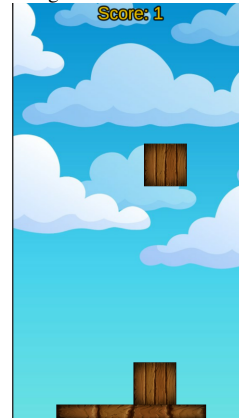
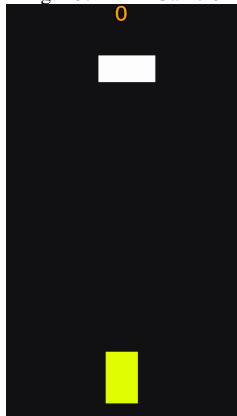


Fig. 12. Mini Game 2



Fig. 13. Mini Game 3



B. How the developed prototype fits into the proposed solution

The current stage of the game tackles each area we wanted to target in the time frame we were given. Make the game fun and educational. The main goal is to teach the user proper balancing, both in terms of a financially healthy lifestyle and in terms of a physical and mentally healthy life.

Having said that, if we had the opportunity to continue developing this game, ideally the final product would have the following 3 main characteristics:

- In-Game Mini Educational Courses
- In-Game Income for ad viewing
- Real Life Job Applications

C. Any technical problems and challenges faced and any 3rd party libraries/applications/APIs used.

No technical problems were encountered, however there is a bug that we know of which appears to only be an issue when the game is tested on mobile, i.e. this issue doesn't replicate on the unity engine game tester. The issue mentioned above is the update of the scores after the user plays a mini game.

VI. TESTING AND EVALUATION

This game was tested through out the entire process amongst ourselves. We tested mainly for functionality to see if the

game meets the goals we set. Having said that, if we had the opportunity to further develop this game, this would ideally be tested by our target audience, either via school visits, online surveys which would incentive the individual to take part of our testing.

VII. CONCLUSION AND FUTURE WORKS

All in all, such a game should be able to promote a good balance lifestyle.

TO CONTINUE

As explained in section 5(B), this game would ideally continue being further developed and the following will be implemented along the way. In-Game educational courses would promote education through the platform whilst also teaching them something that they might have previously not known. This could be a combination of simple fun exercises. Furthermore, if the game was to be a hit, a way to monetize it would be through ads, we would promote ad viewing by incentivising the user in game which would help us in a way to earn income and also be an educational way of teaching our user base to take such opportunities which provide something free in return for a few seconds of their time. Finally we think it would be a good idea to help users finding a job in the area they want to continue developing in.

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