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Gamification about Finance to Educate Emerging Adulthood

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Abstract. Emerging adulthood is an age group that has quite an impact on economic productivity. Unfortunately, they are experiencing a difficult time in this era of rapid technological development. This period is called the Quarter Life Crisis. It makes recent college graduates depressed, anxious, and full of doubts. Life satisfaction is associated with income, social support from friends and family, and identity commitment. This anxiety is identified with a sense of individual unpreparedness to compete in the competitive world of work. This study aims to find a financial literacy index and game design recommendations for emerging adulthood through a quantitative method by survey data taken using a self-administered questionnaire. We conclude the recommended education game for emerging adulthood is role-playing games genre that has levels in the game have challenges that are not complicated but still challenging and fun-orientation gamification such as puzzles, then for the emerging adulthood reward system, they prefer the fun-orientation category, which includes quest elements, rewards/bonuses, avatars, storylines, roleplay, and customization/personalization.

Keywords: *Finance; Financial Literacy; Financial Literacy Index; Gamification; Emerging Adulthood; Game Design.*

1 Introduction

The phenomenon of technology and economy in today's digital era has become so rapid that countries almost have no information boundaries. Technology and economy are two things that are in harmony in this day and age. Both of these things have become commonplace encountered every day. Technological developments cause the economy to grow rapidly so that national boundaries are no longer detected.

Thus the competition to become financially prosperous is getting wider and tighter. There is a paradoxical situation where along with economic progress, the ranking of human capacity development, both the human development index and the inequality-adjusted human development index. [1]. One of the indicators that influence the ranking is access to education and literacy levels (including financial literacy), according to The Economist Intelligence Unit in The Learning

Curve in 2014 placing Indonesia in the lowest rank (40) in terms of development education (education's progress). [2]

In a 2017 OJK press release, the Chairman of the OJK Board of Commissioners, Wimboh Santoso, said that to face the challenges, OJK issued ten main policies for 2017-2022. One of which is to increase the effectiveness of Consumer Education and Protection Activities through financial education to various communities in various regions. More focused [3]. Meanwhile, the government's programs for Indonesia's financial literacy national strategy are the three SNLKI (Revisit 2017) strategic programs [4] consisting of:

• STRATEGIC PROGRAM 1: Financial Competence, covering knowledge, skills, and confidence

• STRATEGIC PROGRAM 2: Wise Financial Attitude and Behavior, including goals, efforts, and plans.

• STRATEGIC PROGRAM 3: Access to Finance, including the development of financial services and products that are suitable for the community.

In economic's growth, the government divides productive age with non-productive. Productive-age has an age range of 15 years to 65 years. They can produce goods and services [5]. In the OJK report in 2019, the age range of 26 years to 35 years had the highest financial literacy around 47.47% and followed by the 18 to 25 year age group around 43.63%. But there is no financial literacy data for this group [6]. Emerging adulthood has different psychology from the previous group. In Robinson's research, 45% of respondents over the age of 30 stated that the crisis state they experienced was at the age of 20 and 29 years (Robinson, 2013). 20 is the age of the final level of college and the age of graduating from college when life transitions are complex so that they are fast exposed to stress and thoughts that are not suitable to compete in the outside world. [7]

The authors examine the Quarter-life Crisis, which is defined in the popular press as an identity crisis. This time of crisis leaves recent college graduates depressed, anxious, and full of doubt. Life satisfaction is associated with income, social support from friends and family, and identity commitment. Income or financial aspect is important for Emerging Adulthood. Financial knowledge is important to know and learn to prevent the impact of the Quarter-life Crisis so that it does not interfere with productivity.

In the digital era, all activities cannot be separated from technology, even to find entertainment using gadgets, according to GGWP.id data, around 69% of mobile

game players in Indonesia are aged 13 to 24 years and 25% are aged 25 to 34 years. Among them are university students, students, and workers who have graduated from college/school [8]. Game media is one of the interactive media that can provide an effective learning experience because in games the delivery of content can be delivered in stages and reciprocally simultaneously with players to provide engagement in the emotions of human motivation. The basis of motivation is generated from facts and events that develop the satisfaction of three levels of human needs, namely, the need for competence (challenging things to get the desired results), autonomy (freedom in making decisions), and relatedness (social interaction). Players are motivated by a game full of challenges, competition, the unexpected, fantasy, social interaction, and overwhelming feelings of joy. Even from some players who prefer the autonomy aspect, they will be presented with gameplay that has a choice of options to complete the objectives in the game including stories that have different endings. [9]

2 Methodologies

In this study, emerging adulthood was taken from the age of 22 years with the age of the final year of college until the age of 29 years. In this age range, data on the level of financial literacy is needed to see the urgency of education about financial literacy. This study is limited to respondents for the West Java region because West Java data regarding financial literacy declined from 2017 to 2019. This paper will outline recommendations on game media that are appropriate for emerging adulthood in Indonesia. Research purposes for Gamification design recommendations on financial literacy which is limited to the implementation of financial literacy education. There we to know What level of financial literacy in Emerging Adulthood and how to educate financially for Emerging Adulthood with a gamification approach.

This research method uses a quantitative survey in the form of a self-administered questionnaire on 160 respondents to obtain data on the knowledge, opinions, and characteristics of emerging adulthood. This research is descriptive [10]. Data analysis techniques and methods to measure financial literacy in this study used validity and reliability tests to see instruments on financial behavior as a valid measuring instrument for respondents than to measure the Financial Literacy Index using the Simple Weighted Method/Weighted Simple Basic and then using descriptive analysis methods. to describe each data including diagrams which will then be processed and used as a reference and navigation of the designed game content.

In this study, two large groups were developed to look at financial literacy abilities. First, to find out Financial Behavior by adopting questions from

Measuring Financial Literacy by OECD INFE [11], this questionnaire uses a Likert scale consisting of 5 scales, namely a score of 1 = strongly agree, 2 = agree, 3 = neutral, 4 = not agree, and 5 = strongly disagree.

This study to determine Financial Knowledge using the Financial Literacy Index by adopting questions from DEFINITE which refers to the research of Van Rooij, Lusardi, and Alessie in 2007 [12]. In the question, there are two groups of financial knowledge, namely Basic Financial Literacy and Advanced Financial Literacy [13]. The following is the data processing process regarding financial literacy knowledge:

Grouping the questions (variables) into two groups consisting of Basic Financial Literacy, in the basic group 7 questions are covering financial concepts such as discounts and interest. Meanwhile, Advanced Financial Literacy contains 10 questions covering the concept of stocks and their risks.

Determine the score on the assessment in each question, the correct answer with a score of 1 and the wrong answer and do not know with a score of 0.

Calculating the weights for the group of questions (variables) using the Simple Weight Method/Weighted Simple Basic, by giving the same weight to each question. The Financial Literacy Index itself is based on the number of correct answers for each respondent to Financial Literacy questions. Respondents who gave incorrect answers were given an index of 0 and respondents who gave correct answers were all given an index based on the number of questions. To calculate the weight as below:

$$W_B = 1/N$$

Keterangan:

W_B is a weighted variable for the *Basic group (Basic Financial Literacy).*

1 is constant.

N is the number of questions (variables) in the group *Basic Financial Literacy*.

3 Result and Discussion

3.1 Financial Literacy Index

The Financial Literacy Index in emerging adulthood was determined by scores from the self-administered questionnaire. The score is the number of correct answers answered by the respondent, if the respondent answers all correctly then the number of answers will be equal to the number of questions. For Basic Financial Literacy (BFL) there are 7 questions, the score for all correct answers is 7, for Advanced Financial Literacy (AFL) there are 10 questions, the score for all correct answers is 10.

Calculating the Financial Literacy Index (FLI), to determine the FLI, the correct number for both Basic/Advanced questions is then multiplied by the weight and then multiplied by 100 to facilitate interpretation, therefore the results from the FLI have a range of 1 to 100. Here is the formula for calculating the FLI:

$$FLI\_Basic = Score_B \times W_B \times 100$$

Description:

1) *FLI_Basic* is *Financial Literacy Index* for the *Basic group*.
2) $Score_B$ is the correct answer for every question in one problem.
3) W_B is a weighted variable for the *Basic group (Basic Financial Literacy).*
4) 100 is constant.

Average *FLI_Basic:*

$$Average\ FLI\_Basic = Sum\ FLI\_Basic / N_{responden}$$
$$Average\ FLI\_Basic = 9200/160$$
$$Average\ FLI\_Basic = 57{,}50$$

$$FLI\_Advanced = Score_A \times W_A \times 100$$

Description:

1) *FLI_Advanced is Financial Literacy Index* for the *Advanced group*.
2) $Score_A$ is the correct answer for every question in one problem.
3) W_A is a weighted variable for the Advanced group *(Advanced Financial Literacy).*
4) 100 is constant.

Average *FLI_Advanced:*

$$Average\ FLI\_Advanced = Sum\ FLI\_Advanced / N_{responden}$$
$$Average\ FLI\_Advanced = 6990/160$$

Average FLI_Advanced = 43,68

To know the average of sum *FLI*, result from average *FLI_Basic* and average *FLI_Advanced* divide by 2. So average *FLI_Total:*

FLI_Total = (FLI_Basic + FLI_Advanced) / 2
= (57,50 + 43,68) / 2
= 50,59

In *Financial Literacy Index*, there are three literacy level assessments according to DEFINIT:

1) Low category if financial literacy index ($0 \leq FLI \leq 60$).
2) Moderate category if financial literacy index ($60 < FLI \leq 80$).
3) High category if financial literacy index ($FLI > 80$).

3.2 Gamification

In the second data collection, this questionnaire was conducted to determine the respondent's habits, frequently used media, and preferences for interactive media. In variable 1, respondents are asked to choose what gadgets are often used, including for playing games to know what media is right for game design.

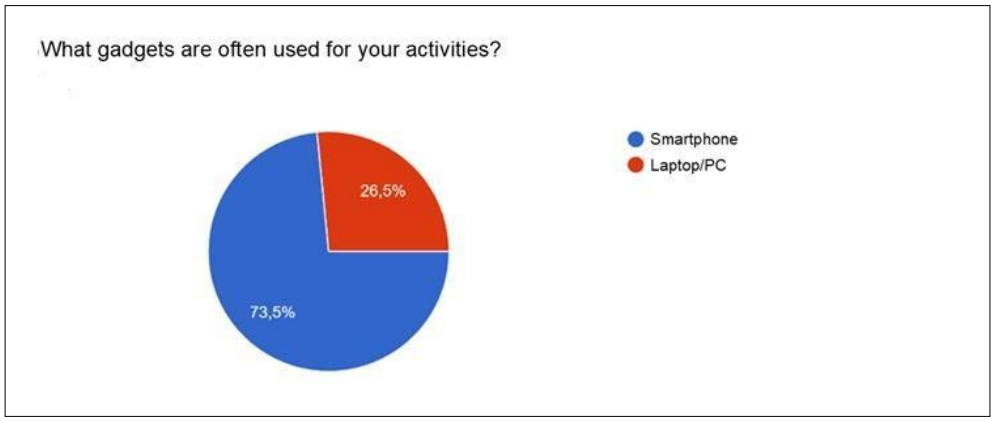

Figure 1 Gadget preference in daily activity

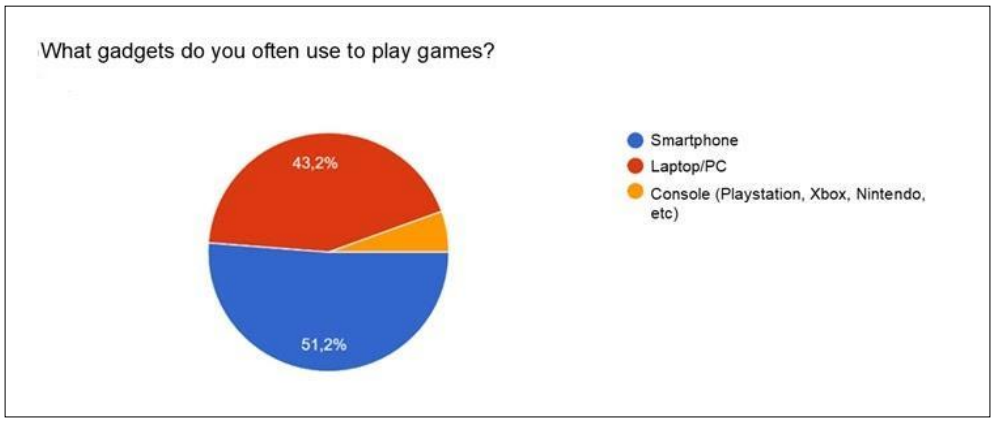

Figure 2 Game platform preference

From the diagram above, it can be seen that 73.5% of respondents use smartphones instead of laptops, then as many as 51.2% of respondents choose smartphones to play games rather than using laptops with a percentage of 43.2% so it can be concluded that respondents use smartphones more like media. their activities include playing games.

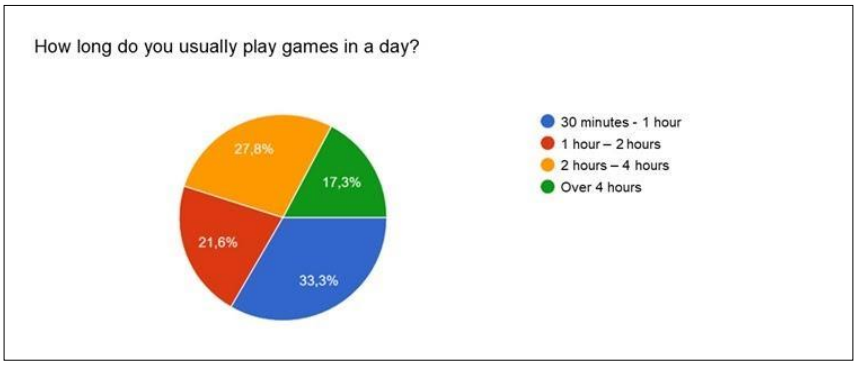

Figure 3 Screen time in playing games for a day

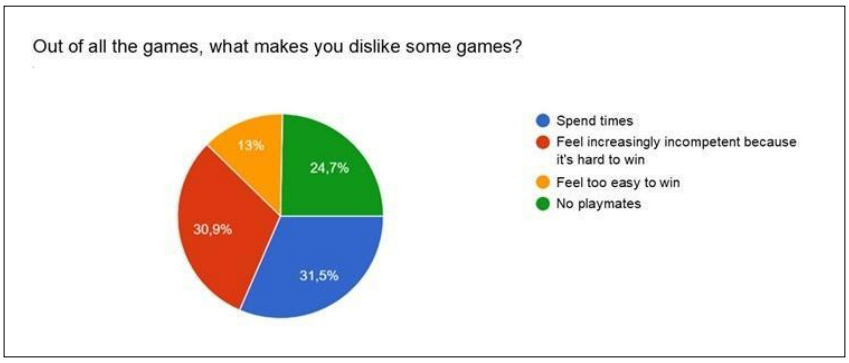

Figure 4 Disliked elements in game

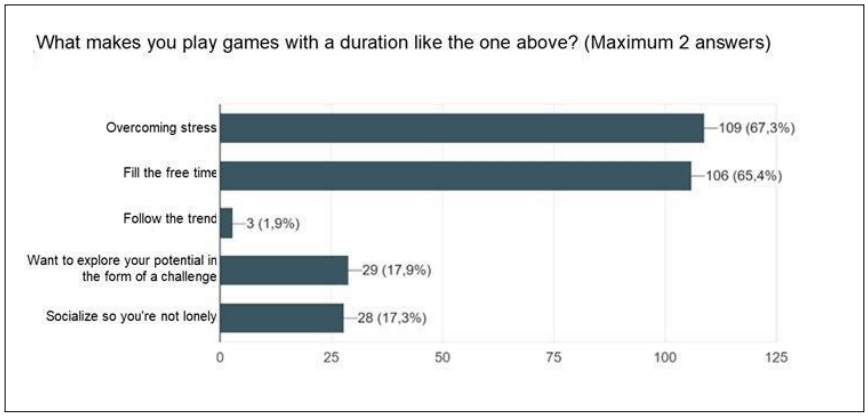

Figure 5 Element that keeps respondent in game

From the diagram above it can be concluded that as much as 33.3% spent playing games for about 30 minutes to 1 hour, then followed by a playing duration of 1 hour to 2 hours as much as 27.8% so that the in-game duration in the game will have a duration of 1 hour to 2 hours. which is quite short in each phase of the game. Respondents played games with a duration as shown in the chart diagram by choosing reasons to relieve stress as much as 67.3% then as many as 65.4% chose to fill their spare time, on the aspect that respondents did not like to play games they chose that games spend as much as 31.5 % followed by a difficult game level of 30.9%, so the gamification design for financial education should have a light content delivery without a difficult level.

In variable 2, respondents are asked to choose the aspects and elements they want to be in the game.

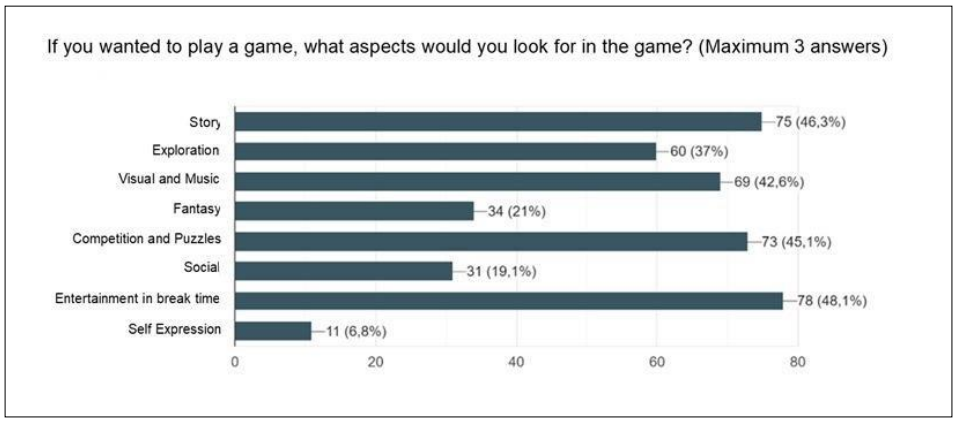

Figure 6 Aspect that respondent look for in the game

From the bar chart above, respondents choose entertainment between time as much as 48.1%, followed by stories as much as 46.3% and as much as 45.1% for aspects of competition and puzzles, so game content to educate financially should have a simple story but keep up with the puzzles and the competition.

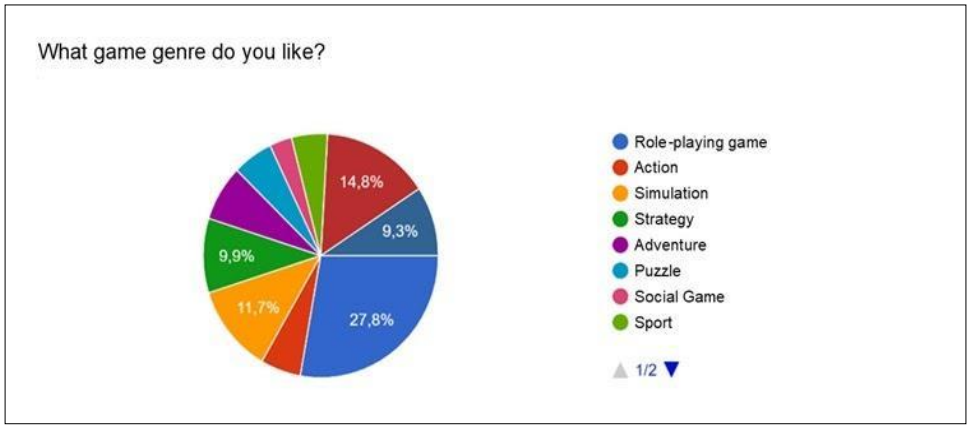

Figure 7 Genre preference

From the diagram above, respondents prefer Role-Playing Game as a game preference as much as 27.8% so that this educational game has an element of roleplay where players will play a character and work on missions that will be presented in the story narrative.

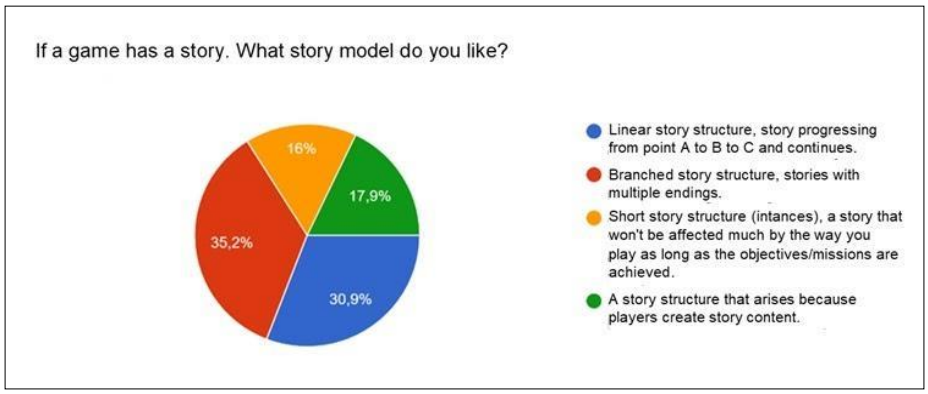

Figure 8 Story model preference

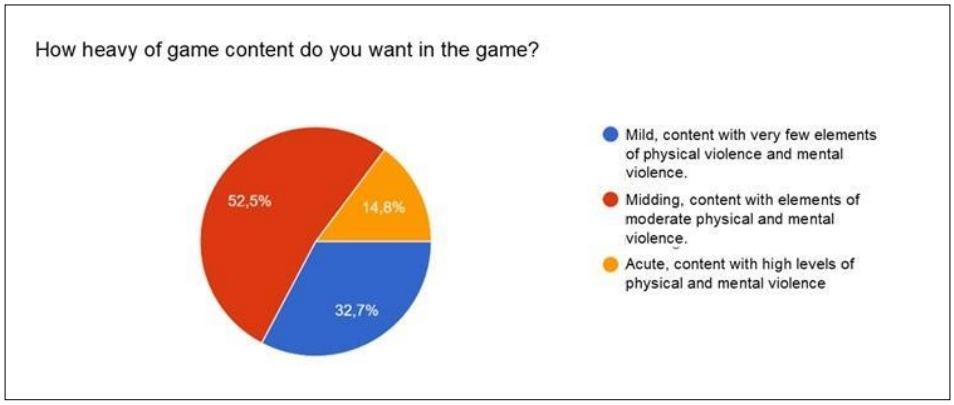

Figure 9 Game content preference

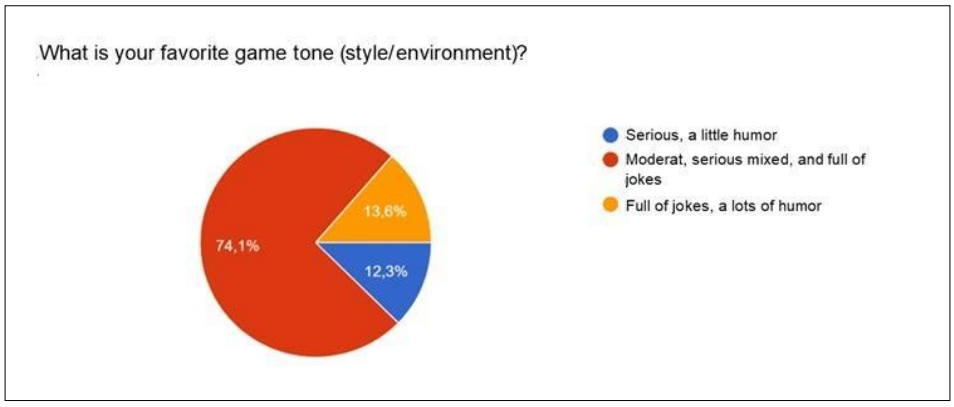

Figure 10 Game tone preference

With the story narrative as one of the supporters of the role-playing game genre, respondents were asked to choose which story model they prefer, 35.2% chose a branching story structure, this story structure has various alternative endings. For the weight of in-game content on the delivery of visual narratives and stories, respondents chose middling as content with moderate elements of violence as much as 52.5% and moderate game tone with the definition of delivering a narrative that has humor and seriousness with a percentage of 74.1%. Thus, the story that is presented even though it is simple and does not take much time to complete the game missions still has medium content in terms of content violence and several alternative endings for each player's decision.

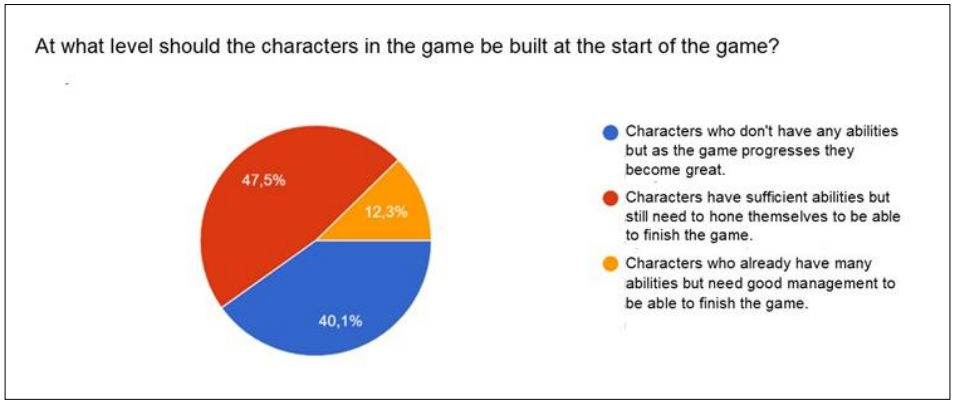

Figure 11 Character building preference

In role-playing games, characters greatly affect the storyline so that respondents are asked to choose how the characters in the game are formed, 47.5% choose characters who develop from ordinary abilities to become competent in their abilities, so the characters designed will not be built from 0 abilities to develop but rather develop their existing abilities to become better as the story progresses.

In variable 3, respondents were asked to choose expectations, motivations, and what should be in the system in a game.

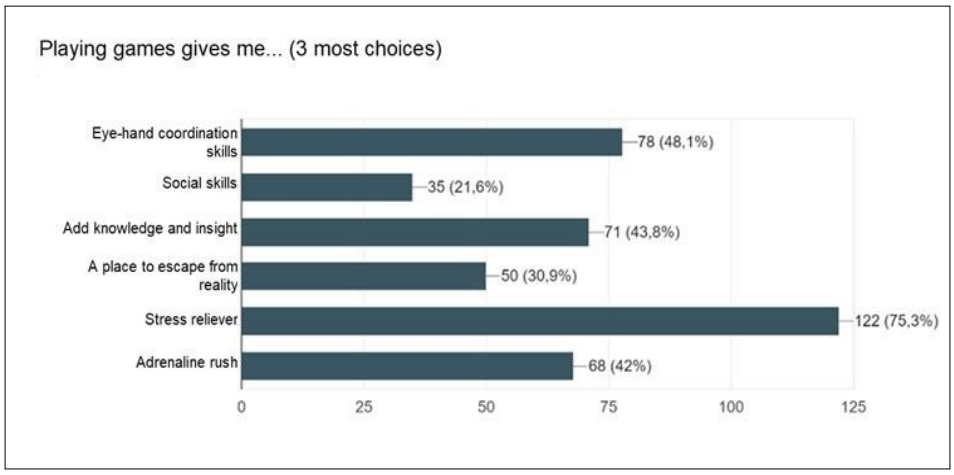

Figure 12 Expectation in playing game

From the diagram above, respondents choose games with the hope of relieving stress by 75.3% of respondents, so that the games designed will not have difficult and prolonged levels.

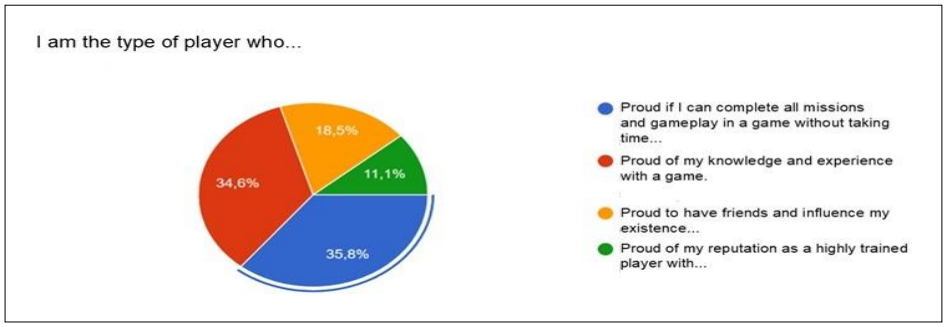

Figure 13 Prospect in playing style

In the diagram above, 35.8% of respondents choose to play by completing the game without taking much time, according to the data above, respondents are happier with the game flow that is not prolonged. Then for motivation, respondents choose fun-orientation by creating interest, excitement, and curiosity, this type refers to the theory of CIG-SCARF principles of gamification [14]. This Fun-Orientation has elements including quests, rewards/bonuses, avatars, storylines, roleplay, and customization/personalization, so the games designed will have these elements.

In variable 4, respondents were asked to choose a visual preference for the game to be designed.

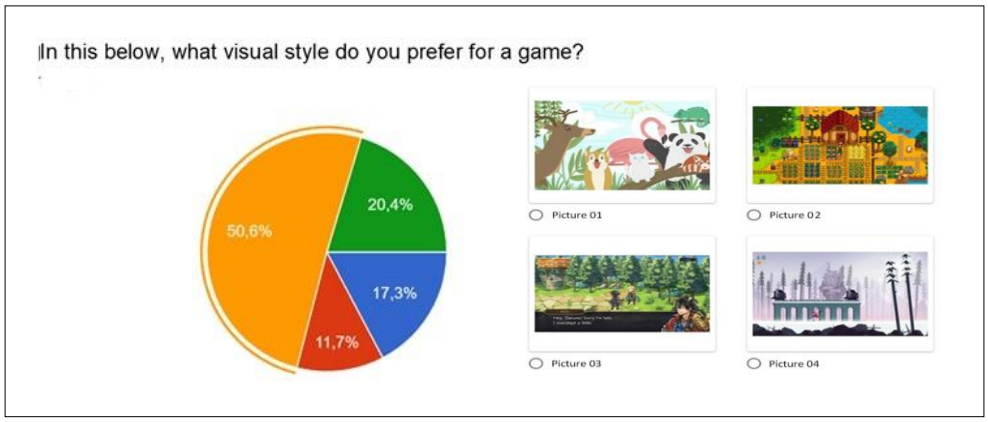

Figure 14 Visual style preference

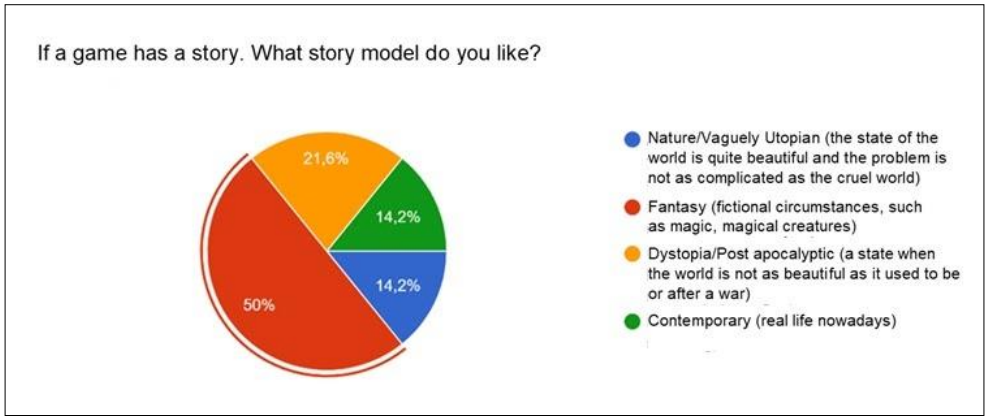

Figure 15 Game theme preference

In the diagram above, respondents chose visual style number 3 with digital image style as in the RPG Game on mobile phones with vibrant colors as much as 50.6% and as many as 50% of respondents chose story settings in games with fantasy themes. Therefore, the game design will use visual elements that match the fantasy theme so that the financial elements and terms will be transformed into fantasy elements and terms.

4 Conclusion

In emerging adulthood, it can be concluded that respondents for the Basic Financial Literacy Index are 57.50 in the low category, in the Advanced Financial

Literacy Index are 43.68 in the low category. The overall value of the Financial Literacy Index is 50.59 with a low category, as in the standard of assessment in the Financial Literacy Index there are three assessments of literacy levels according to DEFINIT, namely: 1. Low category if financial literacy index (0 FLI 60), 2. Moderate category if financial literacy index (60 < FLI 80), 3. High category if financial literacy index (FLI > 80). Therefore, there is a need for education regarding financial literacy for these respondents.

Recommendations for designing educational games for Emerging Adulthood include the Role-Playing Game genre because it has an immersive impression with the story in it, RPGs have therapeutic properties for some players due to the plot built on this game genre, the balance of challenges is maintained besides that it has facilities as an escape from This momentary real world is evident from players who choose that playing games relieves their stress. [15] The recommended storyline is a branching story where the story has more than one ending so that players can feel the challenge of the decisions that players choose in the game. For emerging adulthood, the selected story content is a story that is balanced between seriousness and humor with characters that can be developed over time as well as the psychological state of those who want to develop their ability to get out of the Quarter-Life Crisis. In the duration of the game, the time spent is not much, the game range is about 30 minutes to 1 hour, this is influenced by the activities of those who have started work or are preparing to work. The platforms that are often used by emerging adults are smartphones so that games are designed in Android or iOS firmware because they have a high level of mobility compared to other gadgets. The recommended levels in the game have challenges that are not complicated but still challenging, such as puzzles, then for the emerging adulthood reward system, they prefer the fun-orientation category, which includes quest elements, rewards/bonuses, avatars, storylines, roleplay, and customization/personalization. The recommended visual preference is a game that has a dialogue between characters and vibrant colors with a fantasy theme. For future work, further research and development activities will be implementation and product tests in order to see whether the recommendation is valid and effective.

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