

A better understanding of how gamification can help improve digital lifestyles

Chee-Ken Wong
Faculty of Science and Technology
Sunway University, Malaysia.
14085609@imail.sunway.edu.my

Chien-Sing Lee
Faculty of Science and Technology
Sunway University, Malaysia.
chiensingl@sunway.edu.my

Abstract—There are many people without or have little programming knowledge who have many creative ideas but do not have a platform to share, discuss, co-design and showcase their creative ideas. Therefore, in this capstone project, we aim to create a gamify Website to serve as a platform for different users to interact, engage and showcase their creativity. Significance of the study are first, there have been several studies on gamification in e-commerce and e-learning literature but our study is in the Malaysian context, focused on the effects of gamification to learning Science, Technology, Mathematics and Engineering (STEM), through a gamification website. Also, by creating a community of potential designers/creators, to increase interest in the learning of STEM (technology).

Keywords: *gamification, digital creativity, digital lifestyles*

I. INTRODUCTION

Games and gaming technologies are increasingly transcending the traditional boundaries of various mediums, as evidenced by the growth of serious and pervasive games as an industry and research field. In the industry, the most recent popular trend along these lines is ‘gamification’, an umbrella term for the use of game elements (rather than full-fledged games) in non-game services and applications to improve user experience and user engagement [1]. An example is the success of location-based service Foursquare, which has gained popularity due to interaction design and digital marketing. Due to the success of this design approach, several vendors offer gamification as a service layer, transforming reputation systems with points, badges, levels and leader boards.

In research, several researchers have explored gamification in terms of adapting game-design elements and techniques to non-game contexts. For example, [1]’s survey in human-computer interaction uses game-derived elements for motivation and interface design. [2] connects gamification to socialist competition, and the American management trend of “fun at work”. Hence, there is much potential to gamification, both in industry and research.

A. Problem addressed

Digital lifestyles is ubiquitous as it involves both the formal and informal interaction spaces, encompassing every aspect of our lives. In view of the various enhancement of users’ digital experience with the aid of fun provided by gamification, there is a need to better understand how gamification can help motivate users to transform from being consumers to become designers and creators, such as within the Digital Malaysia [3] context.

B. Objectives

[4]’s Behavioural Model highlights the possibility for gamification to influence the motivational behaviours of the user. As such, in this user study research, we hope to find changes in the perception of users and possibly, positive and surprising/novel outcomes.

We are interested to investigate two aspects based on [4]’s model: whether gamification and technology can help to inculcate creativity and motivate the learning of technology among Malaysian students who are non-programmers. Subsequently, we apply gamification and augmented reality to the design and development of a Website to create a community of designers/creators. This website enables users to:

- socially interact, i.e., where creative ideas could be exchanged and discussed;
- cooperate with other users to deliver a joint work;
- share their creative works online.

C. Significance of the study

First, there are several studies on gamification in e-commerce and e-learning literature. However our study is in the Malaysian context. Second, this study is an extension from a prior work by [5] on developing creativity among youths, with the inclusion of gamification and extension to open co-design outside the classroom, and not aimed at social innovations but fun. Third, there is still a significant gap with regards to the effects of gamification to learning Science, Technology, Mathematics and Engineering (STEM), through a gamified experience website. Third, by creating a community of potential designers/creators, we hope to contribute to Digital Malaysia

and Science2Action, two initiatives by the Malaysian government to increase interest in the learning of STEM.

In the following section, we present the literature review, followed by presentation of two studies. The first study is on the users' perception towards a gamification Website, which enables non-programmers to share, create ideas and creative works. The second study builds on the first study and tests the outcome.

II. LITERATURE REVIEW

[6] discussed whether gamification could foster creativity in each individual. He found that although gamification is a new and controversial trend, it is gaining more attention and popularity from various parties especially the new generation who are digital natives.

Possible reasons are that creativity is related to self-determination theory [7] as well as to the theory of "flow" [8]. According to the latter theory, since gamification may result in higher engagement, it is likely that a person may gain additional knowledge about the domain, thus developing one of the most important attributes in creativity. Self-determination theory supports and makes possible "flow" to happen as any form of immersive experience will require making sense and self-regulation (evaluation and planning).

III. STUDY 1: USERS' PERCEPTION

A. Sample

The number of respondents for this survey was 30 people. This was just an alpha testing to gather respondents' perception towards such website. All the respondents were between 19 to 23 years old. Most of the respondents have gaming experience while only a few of them have low gaming experience.

B. Procedure

In order to get a better understanding of how gamification can help improve digital lifestyles, a literature review was conducted. Several research notes and journals related to gamification were searched from Google. In addition, some available websites were used as reference on how gamification could create an impact in open co-design.

The methodology used throughout the project was the agile methodology within the systems development life cycle (SDLC). The system requirements were first identified, then planning, the design and implementation, followed by verification and feedback before deployment.

In this first study, an image-sharing gamification website was designed for the users to share and discuss. Subsequently, a survey was carried out to gather users' perception towards the system. Two screenshots of the website for the first study are illustrated in Figs. 1 and 2.



Fig. 1. Homepage of website

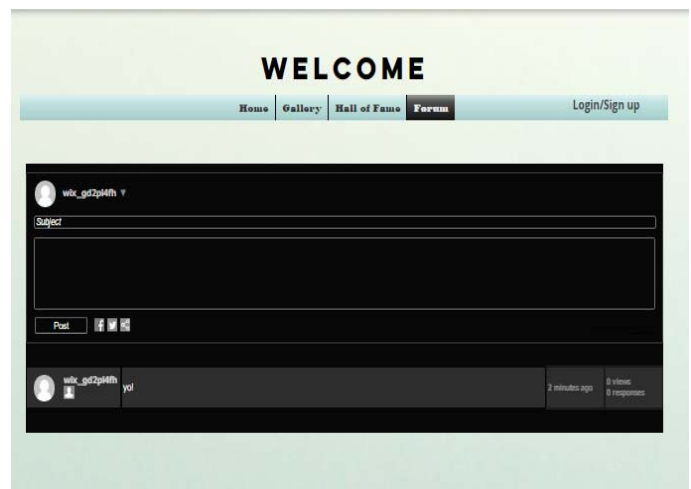


Fig. 2. Forum

Screenshots of the 10 survey questions are illustrated in Fig. 4 and Fig. 5. The survey questions were on a scale of 1-5.

Final Year Project Survey

This is a simple 10 questions survey use to collect user's opinion on a website that would incorporate gamification as a base to enhances user engagement and creativity. Please answer all the questions. Thank you.

1. Do you have experience in gaming
Mark only one oval.

1 2 3 4 5

No experience Expert

2. Do you think a website that that incorporate gamification could boosts user interaction, engagement and creativity?
Mark only one oval.

1 2 3 4 5

Not at all Yes

3. Would you like to interact or engage in a conversation with other people through online?
Mark only one oval.

1 2 3 4 5

Not at all Yes

4. Do you like to exchange ideas on a particular topic or ideas with other people through online?
Mark only one oval.

1 2 3 4 5

Not at all Yes

5. Would you like to be able to showcase your creative work on a website?
Mark only one oval.

1 2 3 4 5

Not at all Yes

Fig. 3. Survey questions 1 – 5.

6. Would you cooperate with other people to deliver a joint work?
Mark only one oval.

1 2 3 4 5

Not at all Yes

7. Do you think having the function to display a 3D model of your completed work is fun?
Mark only one oval.

1 2 3 4 5

Not at all Yes

8. Do you think that having a leaderboard could stir up competitiveness, user engagement/interaction and interest on continual usage on a user?
Mark only one oval.

1 2 3 4 5

Not at all Yes

9. Do you think that this website should be did on other platforms (phones and ect.)?
Mark only one oval.

1 2 3 4 5

Not at all Yes

10. How much would you use such website?
Mark only one oval.

1 2 3 4 5

Not at all Yes

Fig. 4. Survey questions 6 – 10.

C. Findings

User perceptions towards our system indicated a positive outlook. The survey showed that about 76% of the respondents have a considerable amount of experience in gaming while the rest have minimal experience in gaming. This showed that most of them would be more likely to accept gamification as part of their digital lifestyle. In addition, 73% of the respondents thought that gamification could enhance user interactivity, engagement and creativity while 13% of them were neutral about it. This showed that the respondents agreed that gamification has the ability to enhance user interaction, engagement and creativity overall.

According to the response for questions 3 and 4, more than 60% of the respondents were willing to interact or engage in a conversation with other people online as well as share or exchange their creative ideas with other people through the Internet. There was also a small group of people who disliked sharing or interacting online. This group could be those who preferred to engage in a healthy face-to-face-conversation kind of people.

From the response to question 5, we found that that more than 50% of the respondents were willing to share their creative works on the Internet, 33% of them provided a neutral response while a small group is unwilling to do so. From this, we inferred that we needed to provide a means of motivation to encourage more meaningful sharing (if necessary).

The following question is with regards to whether people were willing to cooperate or not. From the response collected, we found that more than 60% of them were willing to cooperate with others to deliver a joint work while about 23% of them were indifferent to the idea of cooperating. According to the response to question 7, we found that more than 80% of the respondents thought that the display of their completed 3D model would be fun. Three respondents (10%) were indifferent about it. From this, most respondents were more prone to accept and use the augmented reality tool to display their work.

The following questions revealed that most people thought that a leader board could be a tool to stir up competitiveness among people. From the responses, more than 70% of the respondents thought that it was possible to stir up competitiveness among people when a leader board is introduced. While a total of 23% of them were indifferent and disagreed that it could do so.

This website was mainly targeted for Web-based usage. From the response, we found that most people (80%) hoped that a website of such could be done on other platforms such as mobile phones and tablets. Lastly, more than 80% of them would like to have such website developed. These responses showed a positive attitude and perception towards the website and therefore served as the basis and support to develop the project. We do however, note that a small group were apprehensive about gamification, possibly due to their lack of gaming experience.

IV. STUDY 2: AUGMENTED REALITY

In Study 2, user guides to teach students how to produce their own augmented reality mobile images were included to the website. Furthermore, we redesigned gamification to be more user-friendly. Screenshots of the revised Website are illustrated in Figs. 5 and 6.

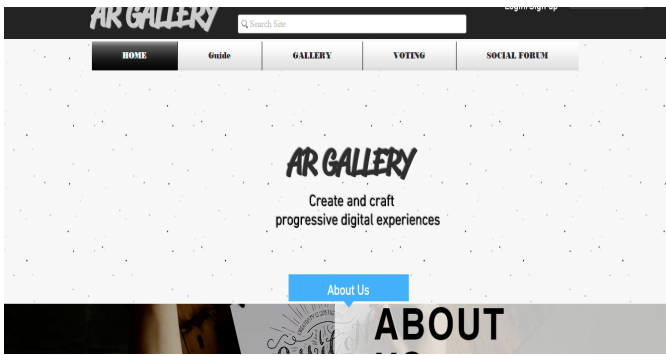


Fig. 5. Homepage of revised website

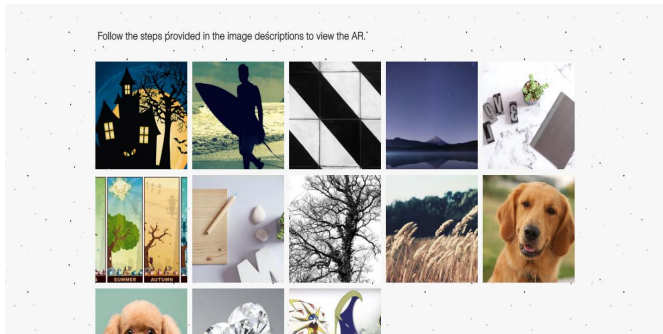


Fig. 6. Augmented Gallery

After the system was developed, 30 users were gathered and were asked to test the system. Then a survey was distributed online for them to fill up. The survey (Fig. 7) was designed based on [4]'s model using Google Forms and distributed through social media. Users were similar those in Study 1. The results are illustrated by the following figures.

- Motivation
1. Did this website that encourages you to showcase your creative work?
 2. How do you feel about having your creative works display?
 3. Did the implementation of the leader board could stir up competitiveness, user engagement/interaction and interest?
 4. Do you think that it is a good idea to have a healthy competition among users? Why?
- Ability
5. Did the social forum of the website to interact with other users?
 6. What do you think about the social media sharing functions provided by the website?
 7. Does this website helps encourages you to interact with others and shares works?
 8. Did you learn something on the technology aspect from this website?
- Trigger
9. What do you think about gamification? Do you think it is a good idea to implement it on such website?
 10. Did gamification enhances your motivation, creativity and user interaction?
 11. Is the Augmented Reality fun?
 12. Do you think that Augmented Reality could be apply on other fields? For example and why?
- Others
13. In your opinion, what is the strength of this website? Why?
 14. In your opinion, what weakness could you think of from the website? Why?
 15. Do you have any suggestions that could help this website to develop further?
 16. On a scale of 10, how much would you rate this website?

Fig. 7. Survey questions for Study 2.

For question 1 (Fig. 8), 63.3% of the respondents stated that the website did encourage them to showcase their work. So the website did attract them to share their works while 33.3% of the

respondents remained indifferent. Meanwhile, 3.3% or one respondent stated that the website did not encourage him/her to showcase his/her work. Overall, this showed that this website had a decent potential in attracting users to share their work.

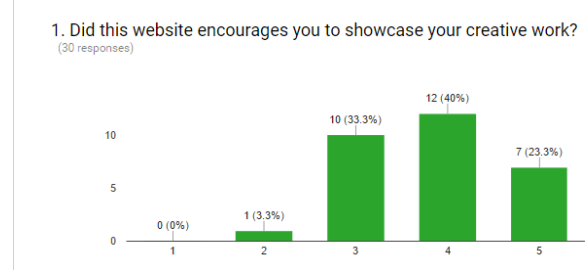


Fig. 8. Response for question 1.

From the responses to question 2, 27 of the users were positive towards the idea of having their works displayed. This showed that they were willing and wanted their work to be displayed on a website so that their work could be viewed by all. Meanwhile, 1 user stated that he/she did not know and another stated that he/she was not sure about having the work displayed. This showed that these respondents were not sure about having their works displayed. This might be due to shyness. Lastly, one user stated that he/she did not feel much about having their work being published unless the work was showcased in AR form. This website did provide such features towards the later stages of the study.

From the results to question 3 (Fig. 9), it was found that 70% of the respondents agreed that the implementation of leader board could stir up competitiveness, user engagement/interaction and interest. This might be due to these respondents being aggressive competitors willing to compete with each other to dominate the leaderboard and engage with other people. Meanwhile, 30% of the users were indifferent about it. This might be due to these respondents not being aggressive competitors, wanting only to be bystanders.

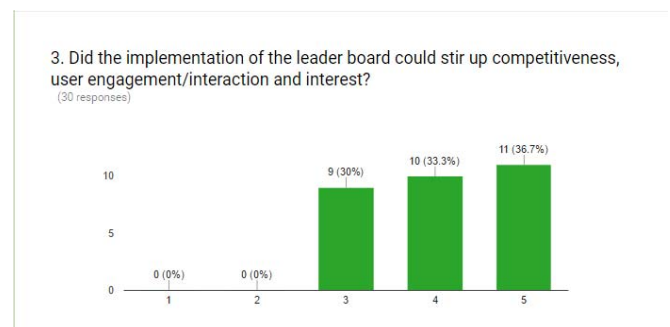


Fig. 9. Response for question 3.

From the results to question 4, 28 of the responses indicated positive results - that a healthy competition among users should be encouraged. Several reasons were stated, and majority of them revolved around the improvement in users internally and engagement with other users. This indicated that healthy competition should be encouraged. But, there was also one

response that thought competition should be discouraged and another that stated that he/she was not sure. The reasons for the responses might be due to these respondents being non-aggressive users who only wanted to enjoy their digital experience.

From the results to question 5 (Fig. 10), 66.7% of the respondents agreed that the social forum feature provided by the website had encouraged them to interact with other users. This means that the respondents were willing to interact with each other to improve user relationship. Meanwhile 33.3% of the respondents remained indifferent about it. This showed that this cluster of respondents were passive respondents and required some 'push' in order for them to interact with other users.

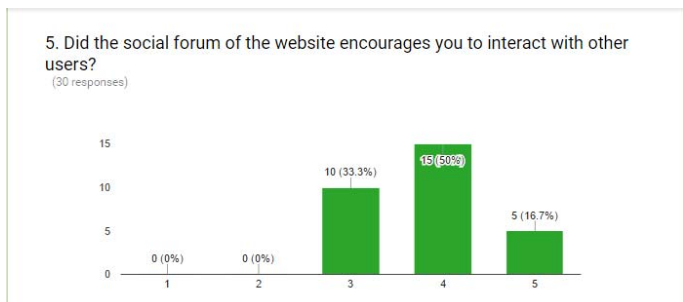


Fig. 10. Response for question 5.

Based on the responses to question 6, comments were positive for the social sharing feature except for 2 respondents who gave no comments. From the result, it can be deduced that the users liked the idea of having the ability to share their work on social media to let their friends see their work. It could also serve as a platform for these users to promote their work in an attempt to gain votes for their work in order to top the leaderboard.

According to the results to question 7 (Fig. 11), 90% of the respondents stated that this website did indeed encourage them to interact with others and share their works. This means that majority of the users were willing and wanted to have their work displayed and shared on this website. In addition, it also means that through this website, they were willing to interact with other people. However, 10% of the respondents stated that this website did not encourage them to interact or share their work with others. The reason could be due to this website's simplicity.

7. Does this website helps encourages you to interact with others and shares works? (30 responses)

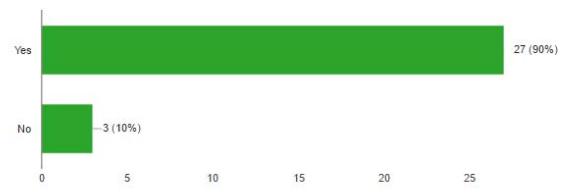


Fig. 11. Response for question 7.

As mentioned before, this website aimed to improve the digital lifestyles of the users and to encourage them to learn technology as part of Science, Technology, Mathematics and Engineering (STEM). According to the results to question 8 (Fig. 12), 76.7% of the users stated that they learnt something technological from this website. Half of the users did follow the guides provided at the website and made their own augmented app using Blippar. However, 23.3% of them stated that they did not learn anything technological from this website.

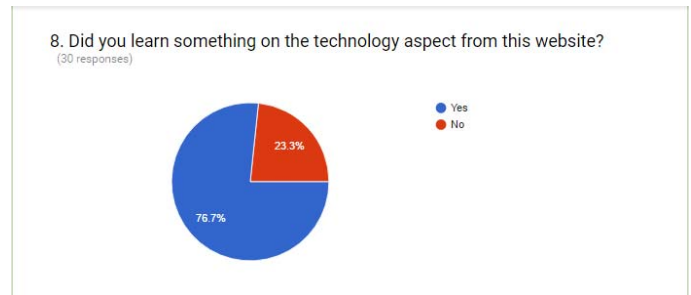


Fig. 12. Response for question 8.

According to the results to question 9, 25 of the users agreed that gamification did provide beneficial effects towards the website. This was because of their perception towards gamification as gamification fun and entertaining, interesting, creative, interaction inducing, and trending. This indicated that a majority of them could accept gamification as part of their digital lifestyle. However, 4 of the users were still confused about the idea of gamification on this website as they stated answers such as 'no idea' and 'perhaps'. This might be due to such users still not being familiar with the idea of gamification. Then again, there was improvement compared to the survey carried out at the beginning of this project. Last but not least, one respondent stated 'nope' for an answer and he/she did not further elaborate on the matter.

According to the results to question 10 (Fig. 13), 83.3% of the respondents agreed that gamification could enhance one's motivation, creativity and interactivity. This showed that the respondents agreed that gamification has the ability to enhance user interaction, engagement and creativity overall.

The results showed an improvement compared to the previous survey as well. There was also a slight drop in the

number of indifferences towards gamification as compared to the first survey. This could mean that through this website, the respondents were getting a better grasp towards the idea of gamification as compared to before.

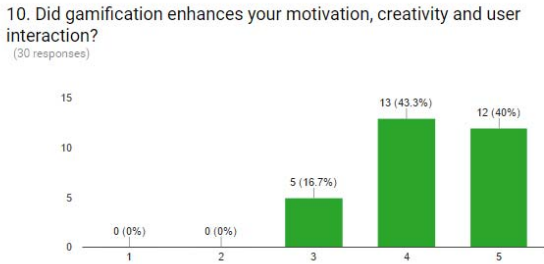


Fig. 13. Response for question 10.

From the results to question 11 (Fig. 14), it was found that 83.4% of the respondents thought that augmented reality is fun. From this, it can be deduced that most respondents are more prone to accept and use the augmented reality tool to display their work. Meanwhile, 16.7% of the respondents were indifferent or neutral about this question.



Fig. 14. Response for question 11.

From the results to question 12, 25 of the respondents agreed that augmented reality could be applied to other fields. Several reasons were provided and most of them revolved around the concept of fun and interesting. The respondents also provided a lot of idea on what other fields AR could be implemented on. From the responses, it indicated that augmented reality could be applied to various fields. Although 5 answered “no”, this could be due to the respondents not having a clear idea on augmented reality and not sure where it could be implemented.

Question 13 revolved around getting feedback regarding the strength of the website from the respondents. From all the responses collected, it was found that 27 of the respondents praised the idea of gamification. However, 3 respondents were not sure of the strength of this website.

Question 14 revolved around getting feedback regarding the weaknesses of the website from the respondents. From the results collected, it was found that most weaknesses that the respondents provided revolved around the design of the website. The reasons were due to the website design layout being too simple and not feeling like a gallery.

Question 15 aimed to collect viable suggestions from the respondents to further enhance the website. From the collected result, 20 wise and functional suggestions were collected. However, 10 of them provided no comment sort of response.

Question 16 (Fig. 15) was structured on a scale of 5, where 1 was the lowest point while 5 highest point. From the collected results, 66.7% of the respondents rated this website a point of 4, 20% of them rated a point of 3, 10% of them rated a point of 5 and 3.3% rated a point of 2. Overall, this website received positive ratings.

16. On a scale of 5, how much would you rate this website? (30 responses)

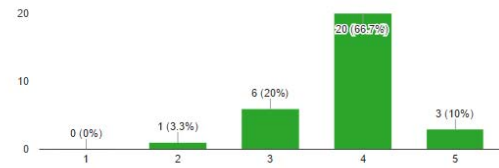


Fig. 15. Response for question 16.

V. CONCLUSION

In conclusion, gamification is a very powerful tool that can influence users. It can increase their engagement with other users by interacting and competing with each other. In addition, it can also enhance users’ creativity by allowing users to think creatively to approach their goals.

It was found that gamification influenced the users. They were able to understand gamification more as most of them were able to identify the benefits of gamification. Furthermore, with the use of augmented reality features, the users had fun and interacted more closely with their creative works.

Half of the respondents created their own augmented reality application for upload and voted for others’ images and augmented reality outcomes. This is encouraging. We also noted valid reservations to gamification.

ACKNOWLEDGEMENT

This capstone project was funded by Sunway University’s internal grant. Dr. Juan Carlos provided advice on technological feasibility.

REFERENCES

- [1] S. Deterding, "From game design elements to gamefulness: Defining "gamification"," in Proceedings of the 15th International Academic MindTrek Conference, 2011.
- [2] M. J. Nelson, "Soviet and American precursors to the gamification of work," in Proceedings of the 16th International Academic MindTrek Conference, 2012.
- [3] Digital Malaysia. <https://www.digitalnewsasia.com/digital-economy/pm-najib-announces-more-digital-malaysia-initiatives>

- [4] B. J. Fogg, "What causes behaviour change?" Available: <http://www.behaviormodel.org/index.html>, 2015.
- [5] C. S. Lee and K. D. Wong, "Developing a disposition for social innovations: An affective-socio-cognitive co-design model", In Proceedings of the International Conference on Cognitive and Digital Age, October 24-26, 2015, Ireland.
- [6] M. Kalinauskas, Gamification in Fostering Creativity, 2014.
- [7] E. L. Deci, & Ryan, R. M. The "what" and "why" of goal pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry*, vol. 11, 2000, pp. 227-268.
- [8] Csikszentmihalyi, M.: Creativity: Flow and the Psychology of Discovery and Invention, Harper Perennial, NY. 1996.