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Understanding How Gamification Influences Behaviour in Education

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ABSTRACT

The transformation of education developed with the gamification element bringing new trends in the era of disruption. Gamification is growing rapidly in the world of online education, with more and more educational institutions adopting elements of the game. With the game based education not only for students, but also for lecturers who are motivated because they get rewards. Even though gamification education plays an important role in online learning, there is no literature from the lecturer side that explains the benefits of applying gamification in the context of responsibility for giving student test scores and their impact on their attitude towards test scores. This study discusses the lecturer's negligence in providing test scores that are not timely using the viewboard method in the context of gamification. Viewboard and gamification are a combination that can provide solutions in the technology literature in the millennial era. With the viewboard, this research presents information visualization that examines the impact of gamification on the intention of lecturers to be involved in it and their attitude towards student test scores. Quantitative methodology is used which results in empirical support for the benefits obtained by increasing the motivation of lecturers. However, the paradigm of the system used is still found between the intentions of lecturers to be involved in the gamification process in granting student test scores not yet significant. Based on the results of the study, the findings of this study have theories and practical implications..

Key words: Gamification, education, behaviour intention.

1. INTRODUCTION

Education faces new challenges and must solve important problems related to the adaptation of learning processes based on the needs, preferences, and requirements of students [1]. The gamification element has been widely used in any field where people have difficulty adopting long-term views and motivational persistence such as education, health, work environment and crowdsourcing [2, 3, 4, 5]. In this case too, a lot of interest is increasing in terms of academics and practitioners to use game elements in the educational process for motivation and improvement in learning outcomes [6]. With the gamification elements, it is believed that it will lure lecturers to compete in completing their tasks so that they become the leader. The term informal gamification usually refers to the use of video game elements in non-gaming systems [7]. Using game-based mechanics, aesthetics and game thinking to engage people, motivate action, promote learning, and solve problems [8].

In the future, using a quantitative approach, descriptive method [28] it is hoped that gamification will take over traditional assessment methods that produce problems such as scalability, decreased motivation due to lack of information. Gamification primarily aims to increase the user's positive motivation for the activities provided in the use of technology, so as to increase the quantity and quality of outputs of the given activities. Gamification has no other purpose than to please the individual to play it. It seems that every game is fun because it appeals to certain Core Drives in us that motivates us to do certain activities. The results found in this research was students continued intention in the use of game learning (CI), which was directly influenced by student perceived usefulness (PU), student satisfaction (SAT) and student habitual (HAB) while student satisfaction (SAT) was influenced by student perceived usefulness (PU) and trialability (TRA) [29].

So this research explores a complete gamification framework to analyze and build strategies in the education system that makes the educational process enjoyable. This study seeks to overcome contradictions and understand the effects of gamification, using several game elements. This research looks at the different types of game techniques that drive us forward. Some ways that inspire and motivate, while some ways are manipulative and obsessive. And in this study sought to find out what distinguishes one type of motivation with another. For gamification research it moves more than focusing on the application of specific game elements towards testing the holistic motivational experience of the user. This study uses an examination grading system design which is run 2 (two) times each semester. In particular, this will increase understanding of the mechanism of the effects of gamification on behavior in the context of physical activity - a priority for education. Presented information about this technological progress that can be done anywhere and anytime [30].

2. LITERATURE REVIEW

2.1 Gamification for education

Over the last decade, gamification has been applied in several applications across diverse areas including web-

technology and information systems (IS). Gamification is defined as the use of game mechanics and game design techniques in non-game contexts to engage people [9]. There has been a tremendous increase in literature about gamification in a variety of sectors, principally in education [23-26]. Gamification in education is the use of game mechanics and elements in educational environment [9]. Gamification is not directly associated with knowledge and skills. Gamification affects students' behavior, commitment and motivation, which can lead to improvement of knowledge and skills [1].

Popularity of gamification in teaching is based on its potential to engage students, as it happens in the case of game users [11], features that make it challenging, fun, rewarding or any other emotion expected by game designers [12] and motivate them to participate in courses. The main problems in modern education are related to the lack of engagement and motivation of students to participate actively in the learning process. Because of that, teachers try to use new techniques and approaches to provoke students' activity and motivate them to participate in training. One possible solution is to reward the efforts and achieved results by awards, which leads to increased motivation for participation and activity. That decision is based on the use of game elements in the learning process. And gamification in this information systems to increase the level of employee engagement, improve business process and job performance.

The increase and popularity of the gamification element in teaching activities has attracted the attention of researchers and academics. Because of increased productivity and technological development, lecturers are becoming more and more selective in how and where they spend their time grading student examinations. thus, universities are pressured to find new ways of adjusting their teaching strategies to attract attention. and also keeping lecturers and students involved in the process. The teaching area is very innovative and sophisticated in spreading new developing knowledge, so many universities have used gamification in the academic service area to increase lecturer and student satisfaction. through playing games or joining competitive activities it is believed to have a long-term positive impact on universities. Therefore, an interesting, flexible, dynamic and sustainable gamification experience can be used to achieve various academic service goals, one of which is the teaching element. Gamification can be considered as a form of service packaging, where core services are enhanced by a rule-based service system that provides feedback and interaction mechanisms to users with the aim of facilitating and supporting users overall behavior or attitude changes. In this case, the core service can also be a game that can be further gamified[10]

It specifically highlights methodological problems that are common to many gamification studies such as studies that do not have validated comparison or measurement groups and consist of short treatments and single time-point measurements. [13] concluded that the current literature cannot ignore the possibility of novelty effects (short-term behavioral impact due to the novelty of exposure). On this basis, then:

H1. Gamification will significantly demonstrate pro-education performance over a short period of time.

2.2 Gamification and Intrinsic Motivation

Two important issues in technology acceptance research are related to the concept of actual use behavior. First of all, the acceptance model based on behavioral assumptions that intention is a valid predictor of actual use behavior; this leads to many empirical studies that only focus on explaining intention behavior because they take the relationship between intention and the use of given behavior; but the latest literature [22] have begun to question the validity of traditional income models, and especially the causal relationships of these relationships.

The era of disruption of the digital context friendly game, competence and the need for autonomy of satisfaction have been positively associated with intrinsic motivation [14, 15]. thus, conceptually, the effect of gamification behavior [6]. According to [17] shows the potential for gamification to increase intrinsic motivation through satisfying needs through the use of various game features that support autonomy, such as avatar customization, features that support competence, such as varying difficulties and performance indicators. On this basis, it was hypothesized that for mechanically rich gamification products:
H2. Gamification will significantly increase intrinsic motivation to perform a behavior.

2.3 Gamification and Behaviour Maintenance

Changes in behavior that have been sustained so far, or sustain changes earlier than one-time behavioral events, are important in many education domains. Importantly, however, [13] highlights the limited focus on longitudinal data in previous gamification studies as a conclusion about the impact of gamification on behavioral maintenance. Indeed, a recent study by [18] on the impact of gamification behavior on behavior in a classroom context found that gamification can even reduce maintenance over time when limited and competition-focused mechanisms are used. Given the importance of maintaining behavior for education, testing the impact of interventions mechanically on changing behavior over time must be carried out. look at the arguments above proposed H3:

H3. Gamification will support behavior that has been updated over the medium term period.

In addition, given the theoretical support for H2 and the positive role that has been demonstrated by intrinsic motivation towards the maintenance of behavior [19] it is also proposed that:

H4. The impact of gamification on maintenance of behavior will be mediated by changes in intrinsic motivation.

3. METHODOLOGY

3.1 Context

The questionnaire in this study was divided into two parts [32] or surveys with closed question type questionnaire instruments. Respondents' closed questionnaires can easily answer questions and data from the questionnaire can be quickly analyzed statistically, and the same statement can be repeated easily.

Sampling using "Simple Random Sampling". Calculation of the number of samples from populations that are normally distributed can be done by selecting the sample method with the Slovin formula. and analysis techniques using SPSS. Then the system testing is only done on the use of features that can increase the speed and timeliness of lecturers in providing test scores so as to create student satisfaction with the information obtained.

3.2 Study Design

To get primary data using surveys [27], to test hypotheses, groups are performed, repeated actions, experimental designs. Specifically, a self-managed online survey was conducted at three time points over two weeks. All participants are directed to use the system each time they give their test scores in a timely manner according to the duration ie H + 3 when the test is finished, as much as each class is supported by participants.

3.3 Measurement

Behavior is measured by the hours generated from the participant's login history into the system during the exam period which lasts for 2 weeks. Intrinsic motivation is measured by the pre-validation Intrinsic Contextual Motivation Inventory (IMI) [20]. This scale is a measure of established and validated intrinsic motivation in experimental studies (eg, Ryan et al., 1991). IMI items are ranked on a 7-point Likert scale, ranging from 1 (strongly disagree) to 7 (strongly agree), with a midpoint response that has not yet been decided. This scale is used to measure intrinsic motivation for the use of gamification applications. These measurements are taken at the time point of initial pre-exposure, as well as short-term time points (one week after exposure) and mid-term time points (three weeks after exposure).

3.4 Sample

In this study, we use [33] Sampling using "Simple Random Sampling". Calculation of the number of samples from populations that are normally distributed can be done by selecting the sample method with the Slovin formula, as follows:

$$n = \frac{N}{\left(1 + N.e^2\right)}$$

$$n = \frac{1737}{\left(1 + 1737.(0.1)^2\right)}$$

$$n = \frac{1737}{(1 + 17.37)}$$

$$n = \frac{1737}{18.37}$$

$$n = 94.556\% \quad \text{(rounded up to 95 students)}$$

The number of samples if you follow the Slovin formula of the total population (N = 1737 people) will produce a minimum sample of 95 people.

3.5 Analysis

In this study using a closed question type questionnaire. By using a closed questionnaire respondents can easily answer questions and data from the questionnaire can be quickly analyzed statistically, and the same statement can be repeated easily. The questionnaire that will be designed in this survey research will use a Likert scale type, then the variables to be measured are translated into dimensions, dimensions are translated into sub-variables and then sub-variables are translated again into measurable indicators. Data needed in this study will be taken through a questionnaire given to selected respondents. The questionnaire grid will be presented in Table 1 below:

Table 1: Research instrument

No.	Variable	Dimension	Indicator
1	Quality of Assessment	Accurate	Assist
			Convenient
			Properly
		Readiness	Assist
			Convenient
			Performance
			Properly
		Timeliness	Communication
			Convenient
		(1)	Performance
2	Efficiency	Accurate	Performance

|		Properly
	Readiness	Assist
		Convenient
		Performance
		Properly
	Timeliness	Communication
		Communication
		Convenient
		Performance

In this study the answer instruments for each statement on the questionnaire were conducted with a Likert Scale with the weighting of values in Table 2 as follows:

Table 2: Varible research intrument

Variables	Skor
Very Satisfied (VS)	5
Satisfied (P)	4
Quite Satisfied (QS)	3
Not Satisfied (KPNS	2
Dissatisfied (D)	1

4. RESULT AND ANALYSIS

In this section, we discuss [31] the validity is related to instrument problems that are intended to measure an object, the instrument is expected to measure precisely the object to be measured. In short, it can be said that the validity of a research tool concerns whether the measuring instrument can measure what will or actually should be measured. There are a number of ways to consider the level of validity of an instrument. Validity test is used to measure the validity of an instrument in the form of a questionnaire. Reliability refers to understanding whether an instrument used to retrieve data in the field can be used to measure consistently on an object over time. So it can be said that the value of consistency is important in the instrument used as a measurement tool. In this study, using SPSS which has facilities to calculate the reliability of instruments using Cronbach's Alpha, which is conceptually said to be a reliable instrument if Cronbach's Alpha> 0.6. Based on the data distribution of respondents answers according to the Assessment Quality and Learning Effectiveness variables of the questionnaire instruments that have been collected, the following are the results of these data. Can be explained in detail with 36 Frequency Tables of the SPSS program in order from item 1-36 with the histogram data display in Figure 1 below:
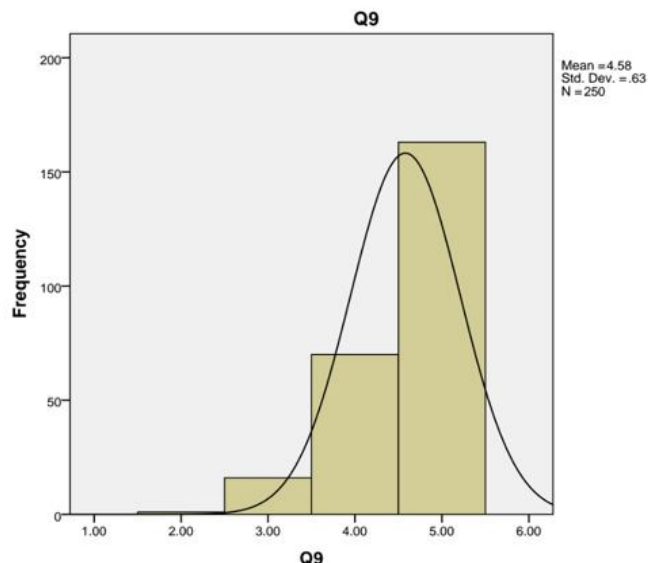
Figure 1: Histogram

Based on Figure 1 above about one of the Histogram graphs from Q9 has a mean of 4.58 with a standard deviation of 0.63 out of 250 respondents. The output display above the histogram graph that illustrates the data normally distributed. Case Processing Summary is explained in the following table:

Table 3: Case Processing Summary

		N	%
Cases Valid		250	100.0
	Excluded[a]	0	0
	Total	250	100.0

Tabel 4: Reliability Statistic

Cronbach's Alpha	N of Item
.963	36

5. DISCUSSION & CONCLUSION

This study concludes that gamification can contribute by significantly influencing the growth of literature exploring educational Outcomes and mechanisms. Proven by the existence of gamification can provide excellent service to students in terms of lecturing assessment information by lecturers' thereby increasing student satisfaction results of the calculation of 250 respondents. In the reliability test output X it is known that, Cronbach's Alpha is 0.963> 0.6, the research instrument is declared reliable. This shows that the method of gamification of education on assessment can significantly improve motivated behavior. It is proven that the mechanism of educational gamification involves different factors outside of intrinsic motivation through the applied gameplay and provides important references for future research.

Based on the results of this study, the next researcher provides 3 (three) suggestions in the form of input addressed to the object of research and for further research so that this system develops even better, including:

1. In the next process a team is needed to carry out the development process in terms of the features of the Pen + system to be more informative but still user friendly.
2. Socialization and training are also needed to improve competency, especially lecturers in the use of the system so that the process of collecting values based on H + 3 can be achieved.
3. Making student satisfaction a fundamental target in the lecture process, especially assessment information by lecturers.
4. Outcomes and mechanisms. Proven by the existence of gamification can provide excellent service to students in terms of lecturing assessment information by lecturers'

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