An Effect of Gamification on Education under Online Lives Teaching

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Abstract—It is necessary for traditional offline teaching to be transformed into online teaching to continue education during emergencies. The technology is ready for the transition of teaching from traditional classes to online classes. However, it is difficult to achieve successful online live teaching due to several factors, including distraction, motivation, and self-directed learning of the learner. Therefore, gamification has been selected to apply to online live teaching. By applying the game mechanic including game and reward system, this motivates the learners and increases their participation. The result illustrates that gamification can help increase participation and motivate learners in online teaching compared to in-class teaching. Moreover, by extending the research to apply gamification to pure online lives teaching, the result shows that it is guaranteed to help motivate the learners to attend the classes, participate in activities, and make discussions, thus increasing the understanding of course materials reflected by the activities and quiz scores. This fact shows that gamification is necessary for online live teaching which can help support motivation and increase participation in online live class learning.

Index Terms—Gamification, Education, Online Teaching, Live Teaching, Participation

I. INTRODUCTION

Education is a key to future career success. Many academies have shifted offline or traditional learning on to online learning to meet the need of education for various type of people. In an online learning or e-learning, learner can study at any time and any place that the learner prefers at their own pace. This is the ideal education for people that seek higher or various knowledge such as people who are looking for reskill, skill upgrade, higher degree, etc. This can result in getting promoted to a higher position or receiving higher salary [1].

The success of online learning is based on the five dimensions including self-directed learning, motivation for learning, computer and Internet self-efficacy, online communication self-efficacy, and learner control [2]. The issue of learner motivation and responsibility is crucial which make it sometimes difficult to complete the course due to other attraction. Besides, many people including teachers, students, and parents still prefer the traditional method where learners attend the academy for learning and socializing.

However, in the year of 2020, due to pandemic outbreak, the Corona virus,many places have been requested to temporary shutdown to avoid virus spreading including the academy. Such action forcedmany of the academies to transform traditional teaching into online teachingand lives teaching online. The method of transformation might be simple however to accomplish the result might be difficult due to many factors including class attendance and participation. Since the learning takes place online, some learner might turn on the tool that used for teaching to make it look like attending the class while they somewhere else. Other factor, such as a class duration of up to three hours, can bore students if there is no activity or participation which can result in falling behind the class content and losing interest in the class. Online participation is needed for the lecturer to receive the feedback from learner whether he or she understand the course material. However due to online system where lecturer cannot see the whole learners, this might be difficult to get the feedback.

Therefore gamification can be used as a solution to increase participation and motivation of the learners to study in the live teaching online. By applying game mechanic of gamification to the lives teaching class, this can increase participation by making the class activities more entertaining. The purpose of this research study is to study the differencein live teaching online with and without gamification. Its aim to present how gamification can motivate and increase participation of learners in live teaching online.

II. LITERATURE REVIEW

Online learning or e-learning can be described as

the use of the Internet and other related technologies to deliver, support, enhance teaching, learning, and assessment [3]. There are various ways to construct an online course such as providing course material on the internet for the learner to download and study on their own. Some online courses are recorded while the lecturer is teaching the class and are provided online for better understanding. In some classes, the lecturers are using programs to setup virtual classrooms and live teaching learners online.

For online learning to become a successful, the learner also play an important role as well. The learners are required to have technical skills related to use of computers and the Internet [4]. Also, the learners are required to have five readiness as follows [2]:

- Self-directed learning is the learner takes responsibility to study and understand their learning. This is because, by shift to online learning, it has provided more flexibility which the learner is no longer bound to attend the class. So, the learners must be responsible to the task of completion. The responsible learner or learner with the high level of self-directed learning are more to be success in online learning.
- Motivation for learning is the urge to study with enjoyment which is very important in online learning system. This is because through online, learning can be distracted by multiple things such as game, movie, song, shopping, etc. These distractions can distract the learner's attention during online teaching.
- Computer and Internet self-efficacy is the skill of the learner on using computers and the Internet to complete a task. This is because the learning, work, assignments, and other course related material will be needed to accomplish online through the online learning system.
- Online communication self-efficacy is the ability of learner to communicate in online settings.
- Learner control is the degree that learners can control their learning experiences such as pace and content of studying.

The learner with high level of these five-readiness dimension can perform much better in the online learning setting. However, in the world today where everyone has a smart device and the internet in the palm of their hand. It can be difficult for the learner to be concentrate on the online learning for an hour or more. The smart device grants the access to various entertainment including game, movie music, chat, social, shopping and many more. So, with these distractions it can be hard for learner to keep their concentration and participation in the online teaching classroom.

Thus, the gamification was choosing as a solution to apply to online learning or lives teaching online to motivate and keep students participating in the online setting. Gamification is to apply the game mechanic to the processes or activities which aim to increase participation [5]. By using game mechanics to make the activities become a game, which will make the participant participate and enjoy. The concept of gamification can be applied in various ways such as applied in education [6], social media marketing [7], corporate social response [8], etc. The concept of gamification are:

A. Game Mechanics

Use of game mechanic such as level, point, reward, etc. in the activity or process. By applying the game mechanic to the activity, this helps stimulate the participant to participate in the activity and result in increasing engagement and involvement of the participants toward activity. For example, by applying the prize or reward system to an activity, it will attract the participants to participate to achieve the reward by completing the achievement.

B. Experience Design

Design the activity or process into a game that participant will feel like playing a game while doing the activity or process. For example, design a story and applied to activity, format of game and activity, how to play or how to complete and earn achievement. A well experience design will help the participant feel like he is a part of the activity or playing a game rather than doing a regular activity.

C. Digital Engage

Developing the attachment mechanism to the activity or process to attach the participant with the activity or process to complete the goal. This is because the time requirement for game completion varies on each task. Some of tasks might take less time while other might take longer for completion. In the case of the long task, participants might get bored and lose interest in the task and activity. So digital engage is needed to keep participants to keep on going to complete the task or activity. Also, it should not be too complicated for participants to follow or understand otherwise participants might feel it is hard and will be uncomfortable to go on with it.

D. Motivate People

A regular work or task might not be interest for participant to complete. However, through the game mechanic participant will be motivated to complete the activity or task. The game design and reward system will the motivate participant to complete to gain the achievement. Also, the game system can be developed into a competition, where participant will be motivated to complete with others for high rank or reward. For example, the participant is motivated to develop new ideas or innovations to complete the task to gain bonus.

E. Goals Achievement

Create a goal for task completion as an achievement. The game mechanic should be able to support and guide participants to complete the goal. The reason that the guideline or support is needed because some part of the task or activity might be complicated which the participant might not be able to complete it.

By applying gamification concept to task or activity, this will make the task or activity more challenging and entertaining. This method can gain attention of the participants and increase in participation. The participant will be willing to complete the task for their own enjoyment. It will motivate participants to complete the task and achieve the goal.

III. METHODOLOGY

An online learning such as live teaching, which lecturer gives lecture by live lecture online through program or software. This can be the answer for learner that have difficulty to travel or attend the class. The success of online teaching is not relied on how well the lecturer giving a lecture, but it is also based on how the learner learns as well. The learner with high level of self-directed learning, motivation for learning, computer and Internet self-efficacy, online communication self-efficacy, and learner control are certain to complete the online course. However not all the learners are the same. Some of the learners might be lack of self-directed and got attract to other activity and become less participate in the course. This can make an online course a negative experience for the learner.

To solve the issue, gamification has been applied to the course. The purpose is to make learning as fun as playing a game. This will make online live teaching course become more interesting with the aim to increase participation of learners in online class. The component of gamification has been adapted and applied to the course are as follows:

A. Game Mechanics

Applied the reward system to online class's activities. The rewards are divided into each activity in class such as class participation, class exercise, etc. Reward including present such as doll or pen, extra points, extra time on the exam. The reward system will motivate the learners to participate because they will receive something back in return which aims to increase participation in online course. The game mechanic will help support the learners which low level of self-directed learning to have a focused on the course and support motivation for learning. It might not train the learner to be more responsible however it will help the learner to participate to be able to get the reward.

B. Experience Design

The content of course is modified into a story and the activity becomes a challenge or task that leaners must complete to continue the story. Like game that can be multiple routes in the story, the result of task completion will also be different so the learner can get the experience while learning. This can help support motivation for learning and learner control.

C. Digital Engage

Gaming is fun, however it might not be fun when done for a long period of time. Digital engagement is needed to keep the learner's retention on online course or during the lives teaching. In this case, the platform for online lives teaching play less important row due to limitation in teaching online. So, the reward system will have to be involved to create digital engagement. For example, in order to get the reward, the learners will have to attend several classes to earn a token. Once they collected curtain number of tokens then they can exchange for the reward.

D. Motivate People

Motivation is also crucial for online learning in the present where there are so many attractions. The challenge has been applied to the online course where the learner can complete it individually and be competitive with others. The reward system is also applied to support motivation of the learners. There are multiple methods to motivate learner in this research including give away small presents to the most participate in that class period. Extra point for group where all members present online. Presentation competition which the top three groups that get the most score will receive extra time add on to the final exam and many more.

E. Goals Achievement

Each task or activity has a clear goal and achievement. The lecturer acts as a guideline or support system. In some activities, the learner can spend the point that earned to exchange for extra guideline from the lecturer.

The game mechanic applied to all course activities during the online lives teaching as shown in Fig. 1. The mechanism covers the activities prior, during, and after class to keep the learner involvement and motivate by all that present in the class will gain a token. Over the course period from week 1 to week 10, the learner will collect the token which can be exchanged based on learner preference. This is to keep learner participating in order to receive the reward.
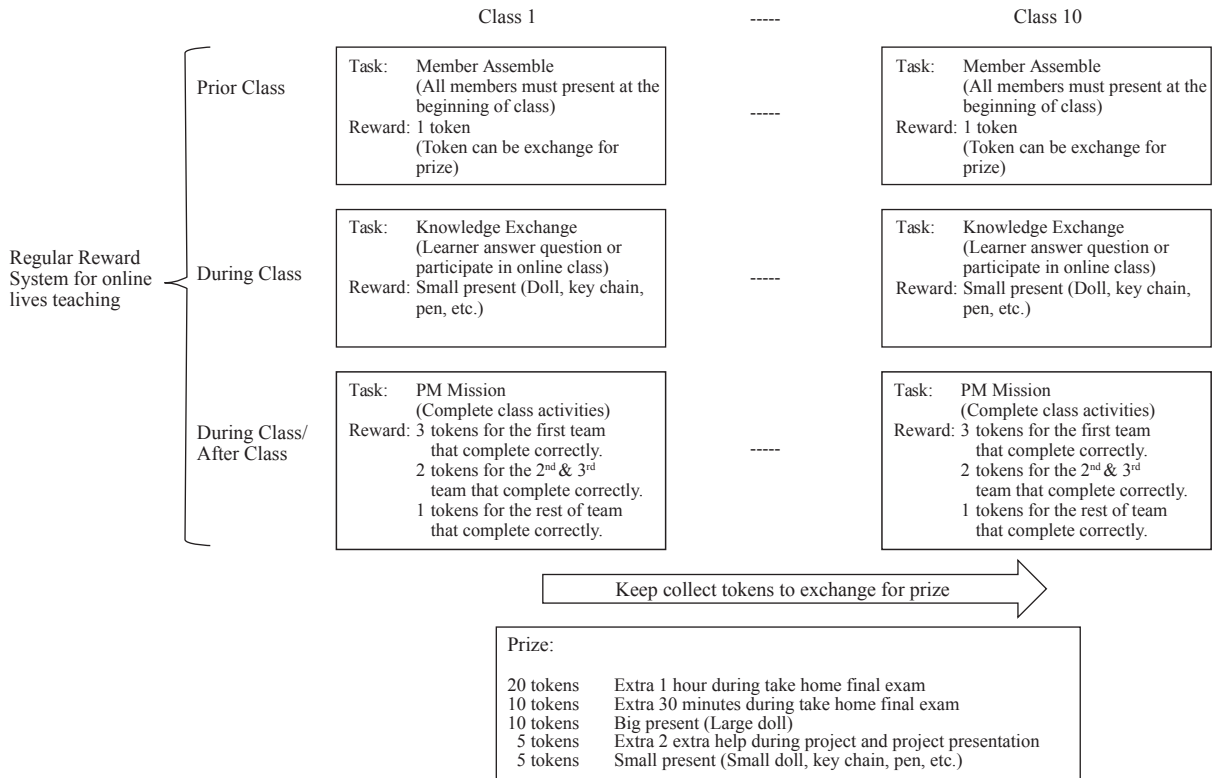
Fig. 1. Regular game reward system mechanism

Furthermore, special event is held for reward give away as best presentation award, popular vote, Q&A give away. This is an add-on activity from the regular task which aims to motivate the leaner to participate and entertain during the class. The learners that participate will get the prize right away without the need of collecting to get the achievement. The group with high performance for presentation will be judged by the group of lecturers and will be announced for the prize. During the online live teaching, there will be a critical or key question that is related to the course material, the learner that gets the right answer first will be rewarded the prize or in some cases many learners will participate in the question discussion, learners can wage their token in the choice that they believe that it is correct. The correct answer will double the tokens that learner wages. However, the wrong answer will cost them to lose the token. This mechanism adapted later to get the learner to prepare before class. The add-on reward system mechanism is shown in Fig. 2.
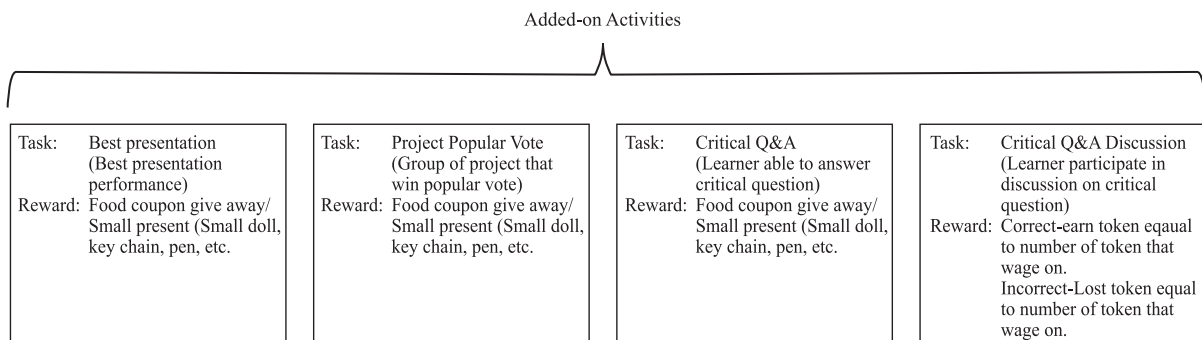

Fig. 2. Added-On game reward system mechanism

IV. Experiment: A Case Study of Lives Teaching on Project Management

Panyapiwat Institute of Management provided education from undergraduate to graduate level. The institute has an e-learning to support teaching and start to move on to massive open online course which aims to provide knowledge online for student. However, in the year of 2020, the pandemic covid-19 virus outbreak that causes the country to shut down. All businesses and corporations have been ordered to temporary suspend their business and close to prevent virus from spreading. All the academies and institutes also must close the campus to prevent virus spreading. However, the education must continue because it is in the middle of semester. As a result, the courses have to be transformed form traditional offline course into online course which learner can study from their place to prevent spreading of virus.

The course transformation from traditional to online course is not difficult. The Institute has provided the online conference program which lecturer and students can you their account to log in and access the program. This program is a tool for online learning course where teacher can give a lives lecture online with aims to make students feel like they are learning in the class as usual. This is also true for Information Technology Project Management course. The course was starting as traditional offline course where lecturer gives a lecture in the classroom. However, after the virus outbreak, the course has to be transformed to online live teaching course. The problem that arises is that not all the students/ leaners have high level of self-directed learning. Self-directed learning and motivation for learning are two of the most crucial points in online learning in the present time where student can be distracted by several of things such as online game, movie, or shopping. Computer and Internet self-efficacy is however not very crucial because all of the students are in the information technology major and are familiar with the technology and the use of Internet. After the course was transformed to online lives teaching, the participation and the average class score decreased as presented in Table 1.

TABLE I
INFORMATION TECHNOLOGY PROJECT MANAGEMENT COURSE
PARTICIPATION AFTER TRANSFORMING TO LIVES TEACHING

Criteria	Traditional Offline Course			Online Live Teaching		
	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6
Number of student absent (total 36 Students)	3	1	0	7	10	12
Class Participation on discussion (Question and answer)	100%	100%	100%	80%	80%	60%
Class participation on group activity (All members participate on activity)	100%	100%	100%	80% (1 group missing 2 members)	60% (2 group missing members)	40% (2 group missing members, 1 group has 1 student)
Average activities score	82	88	87	80	71	59
Average quiz score			88			63

From collected data it can be seen that after course transformation due to pandemic outbreak, the number of absent students increased to one third of the total class number. The reason is that student who absent including due to lecturer cannot see all the student then they have no pressure to be in class, they can sleep, watching movie, play game, etc. The effect of student absence also impacts the class participation. The students with high level of self-directed participate in each of the question and activities however some student just turn on the online live teaching to make it look like they are participating in class but do other things. As for group activity which in traditional offline class all student participates in activities however in online lives teaching due to above reason, some of the group has only a single member. This is also effects the class activities and quiz score to drop down. As a result, to keep continue online lives teaching alone might not attract or interest student. It must attract and keep the student entertained to make them enjoy what they are learning. Therefore, gamification has been applied to the course.

V. EVALUATION

The evaluation of the research on effect of gamification in online lives teaching was collected by monitoring the class after applying gamification.The concept and game mechanic of gamification that is described in the method has been applied to the course online live teaching. The students are interested in the story on how to evolve to become a project manager. The reward system encourages the learners eager to attend class online session and participate. The number of students attend the class goes up as well as the number of students participating in class as shown in Table II.

TABLE II
RESULT AFTER APPLING GAMIFICATION
TO THE ONLINE LIVES TEACHING

Criteria	Traditional Offline Course			Online Live Teaching			Online Live Teaching with Gamification			
	W1	W2	W3	W4	W5	W6	W7	W8	W9	W10
Number of student absent (total 36 Students)	3	1	0	7	10	12	10	6	2	1
Class Participation on discussion (Question and answer)	100%	100%	100%	80%	80%	60%	60%	70%	80%	100%
Class participation on group activity (All members participate on activity)	80%	80% (1 group missing 2 members)	100%	80% (1 group missing 2 members)	60%	40% (1 group has 1 student)	60%	60%	80%	80%
Average activities score	79	85	84	77	69	56	64	71	82	84
Average quiz score			88			63			77	

From collected data in Table II, after applying gamification, the number of students that are absent is reduced due to teammates are encouraging the team member to attend the class to get the reward. By getting the learners attending the online class, it is also helping increase participation. More students eager to share and answer question to get a reward thus this also enable online discussion between the learners that lead to research the information to back up their answer. More learners are attending the activities and sharing creative ideas which lead to increasing in class average activities score and class average on quiz score. Through reward system, the learner with low level of self-directed learning will be encourage by teammate to join the class and participate in activities at first. After reward was granted and learner saw that their classmates got the prize, more of them have been motivated and tried to do the same.

However, this research is based on the traditional offline course that is transformed into online live teaching and applied gamification only one-third of the course. To recheck the effect, the gamification was applied to another Information Technology Project Management course in the following semester. This time the students will be learning by online live teaching from the first week. This means that student will never meet teacher in person before. So, the course content haves to attract the students to attend and participate in class from the beginning. The gamification has been applied to the course from the beginning to get the learner attention and motivate them to participate in class the result is shown in Table III.

TABLE III
APPLYING GAMIFICATION TO ANOTHER SECTION
OF ONLINE LIVES TEACHING FROM THE BEGINNING

Criteria	Traditional Offline Course			Online Live Teaching			Online Live Teaching with Gamification			
	W1	W2	W3	W4	W5	W6	W7	W8	W9	W10
Number of student absent (total 45 Students)	9	7	2	0	0	1	2	1	0	0
Class Participation on discussion (Question and answer)	60%	80%	100%	90%	100%	90%	90%	100%	100%	100%
Class participation on group activity (All members participate on activity)	60%	80%	100%	100%	100%	100%	90%	100%	100%	100%
Average activities score	69	73	78	80	79	82	87	88	92	90
Average quiz score			74			84			89	

From the data collected, the gamification can support in online learning by attracting the learner using concept of game and helps student s with low self-directed learning to attend and participate in class. By explain the game mechanic and system in the beginning of class, the learner is interested and eager to participate and follows the activities. At the beginning there are 9 students that missing from the class. By applied reward system, the second week the number of students absent is reduced and by the fourth week there are no students absent. Thus, class participation and group activities participation is keep going up. The students answer all the questions and participate in all discussions. This results in increasing the class average score on activities and quizzes. Then the research is extended further by removing reward on task the member assemble after the 6th week. This is to see the student behavior toward the class attendance without the reward. There are few students absent in the 7th week and 8th week to family matter and then there are no students absent in the last two weeks of the class. After discussion with all students in the class on the matter, the reason for participation including: at first when students heard that they have to study online, they feel that it is going to be complicated to use program to study. Another reason is that some of the students want to use class time for other activities such as playing game. The students confirmed that the reward system help draws their attention to attend the class. So, at first, they attend the class and gather member to get the reward. However, as the class progress and they are enjoying the class activities, they feel that the content is not complicated if they are attending the class and participating. So, after they realize that the reward is not necessary because they believe that by keeping attendance and participation, they can learn and do well on final exam. By linking the story with course content, this also motivates students to attend the class to see how the story goes and how to become successful project managers.

VI. Conclusion

From this research study gamification can help increase the level of self-directed learning by giving them the purpose that they will receive something in return. The reward system is motivating the students to attend the class, discussion, participation, etc. At the beginning the reward system is a must which acts as a digital engagement strategy to draw students to attend class. After they have attended the class several times, the barrier such as difficulty to study in live teaching online, communication, and knowledge sharing have been reduced. They feel like it is a common thing similar to traditional offline class and not afraid to attend or participate anymore. So, after that they feel the reward system is not necessary, it is good to have but not a must anymore. The students would like to participate and complete with other group in class activities to become successful project managersthrough gamification's experience design and goal achievement.

VII. Future Work

This research study focused mainly on applied gamification to support online live teachings. It can draw the attention and motivate the learner to attend and participate in class. Further development can be implemented on developing the course which currently the teacher gives live lecture online to become pure e-Learning that the learner can study by themselves. With the game mechanic applied to the course content to make learning by playing a game. The learner can learn on their own or as a group which can be supported and completed with each other based on game task. The teacher will become the moderator which can support, give a guideline for the student to complete the task. Moreover, the game mechanic should also applied on the quiz and final exam in order to utilize game mechanic thoroughly.

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