The Effect of Gamification on Elementary Students' Motivation in E-Learning

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Abstract— Gamification refers to the use of games' mechanics for engaging users, motivation, solving problems and developing learning. (Buckley & Doyle, 2014). The purpose of this study is to investigate the learners' and the teachers' impression of gamification in online classrooms, explain the effect of gamification on students' motivation and to limit the answers for a deeper further long-term study related to gamification in distance learning. This pilot study is based on the influence of gamifying learning on students' motivation in distance learning. It also explains some methods on how to apply gamification strategy in virtual classroom environment. Two surveys are used in this pilot study to collect data and evidence to answer the research questions.

Index Terms— gamification, motivation, distance learning, students' engagement.

INTRODUCTION

Motivation is a key factor for the students' behavior and performance. During the epidemic of covid-19 students' motivation has been a crucial factor that must be recognized in educational settings of online and distance learning (Bovermann & Bastiaens, 2020). Motivation is a powerful element in the classroom management area. I believe that motivation can determine the success of distance learning. If the students are motivated to learn, they will pay more attention to the class, will contribute to the process of learning, and will be encouraged to face more challenges. Many teachers are facing difficulties in motivating students in a virtual classroom environment especially with young learners. So that they should work hard to find best strategies and methods to apply in distance learning. There is no doubt that incorporating games system and standards to motivate the learner is an interesting approach. So that gamification is a great method to be investigated and, in this research, I will explore its effectiveness in relation with the topics of motivation and online learning.

First thing everyone need to know about gamification that it is different from games because, gamification refers to the use of game mechanics in the non-game context to change people's behavior (Wan Hamzah, Haji Ali, Mohd Saman, Yusoff & Yacob, 2015). It is used to contribute motivation and engagement based on the gaming concept into ordinary activities. Integrating gamification into learning is considered a technique to motivate students and to encourage unmotivated students to become more involved in the process of learning. Also, it will help the unmotivated learners to interact with their colleagues and this can be done by adding simple game features in learning.

Gamification in education means introducing game design elements. It can also support learning in different contexts and subject areas because the base of gamifying learning is all about adding elements, such as game elements to learning activities. And this will create engagements like what happens in games. This emphasizes the belief that integrating game elements in learning design can engage learners in productive learning experiences and will help in developing their behavior in a positive way. (Bovermann & Bastiaens, 2020)

People may misunderstand and think that gamification and Games are same. A Game is a form of a competitive play where the players learn rules to determine certain skills. Games has fun elements which can be applied to the real word through a productive experience for the users. Thus, Gamification takes the best parts of games to apply them to non-games to make them more enjoyable and to encourage us to continue specific behaviors. (What Is Gamification? Everything You Need To Know To Get Started, 2021)

Gamification is mostly used in business and marketing, but it is also being actively explored in the sector of education. This study aims to demonstrate gamification's effectiveness and its importance in education. Another goal is to help educators better understand gamification and deal with this phenomenon more effectively in their online classes. The research will provide educators with reliable information about the concept of gamification and how it should be applied in distance learning.

Although lots of research has been done on gamification, there is still lack of work reported on motivational methods provided by gamification of learning. Investigations of the impact of gamification on learners' motivation when using e-learning applications have not been broadly conducted. (Wan Hamzah, Haji Ali, Mohd Saman, Yusoff & Yacob, 2015). The purpose of this study is to reveal the importance of using gamification in education. It will show the effect of gamifying learning on the young learners' motivation during online distance learning. It will demonstrate some evidence and findings based on applying gamification during online classes for grade three students. Thus, this paper intends to reveal the answers to the following questions:

- What is the effect of educational gamification on grade 3 students' motivation in distance learning?
- How can elementary teachers apply gamification effectively in online classroom environment?

LITERATURE REVIEW

Definition of Gamification

Gamification is a recent topic which aims to turn useful activities into games such as educational activities. It means utilizing the elements of games for non-game applications to encourage people to engage and connect with these applications. In addition, it relies on combining everyday activities with simple games to create an effective way for motivating people (Muntean, 2011). In game design theory the MDA framework has three components which gamification is driven from. The components are mechanics, dynamics, and aesthetics. (Wan Hamzah, Haji Ali, Mohd Saman, Yusoff & Yacob, 2015). First, mechanics refers to games' components, the representation of data and the algorithms. Next is the dynamics which refers to the actions by mechanic's behavior over time on the inputs of players and the other outputs. Last is the aesthetics which means the desired emotional response by the players when interacting with the system of games.

Gamification has many benefits which will be mentioned in this research. For instance, In the field of teaching, gamification takes the games elements such as prizes, the challenges, rewards and opening to apply them to teaching approaches for a higher critical association (Samson & Karthiga, 2020). I believe it is crucial to understand the meaning of this new concept before applying it in teaching. That is because people may tend to confuse the two concepts: games and gamification or might think that these two concepts share the same meaning and characteristics.

In fact, games and gamification are two concepts with a clear difference between them. Games refers to applications with certain goals such as social goals, learning goals or just to have fun. In addition, when you play a game you might win or lose within a system and rules. On the other hand, gamification refer to adding games components and integrate them to non-game process and environment (Yaşar, Kıyıcı & Karataş, 2020).

Gamification is classified according to several methods. Some researchers classify it as internal and external gamification and behavior modifying gamification. Others claims that it is classified as structural and content gamification (Yaşar, Kıyıcı & Karataş, 2020). I think the reason behind these multiple unapproved classifications, is that gamification is a new concept and there is still not enough research on it, especially in the educational field.

Gamification in online education

The main objective of gamification is implementing the positive side and the best part of games to non-game environment such as education. (Yaşar, Kıyıcı & Karataş, 2020). It has become essential to use the technology in the educational field to develop knowledge acquisition in the 21st century era. Today most students are learning differently because they are digital natives (Samson & Karthiga, 2020). Thus, the utility of gamifying learning is seen more in e-learning than in actual classrooms.

The use of gamification in learning and instruction is increasing. Despite that there are few works related to the benefits of gamification in education, gamification has essential advantages when applying it correctly. We can use the elements and the framework of gamification to improve positive desired behaviors. Also, it can be used to determine or correct some behaviors (Muntean, 2011). Moreover, It aims to bring the of power of games to non-game environment to solve real problems situations (Yaşar, Kıyıcı & Karataş, 2020). I believe gamifying learning can make education more engaging and more fun for both the student and the teacher.

On the other hand, there might be some disadvantages of misusing gamification. There might be negative consequences if designing gamification is not supporting teachers or is not suitable to the purpose of engaging and motivating the students. In addition, uncareful gamification design might teach the learners to learn only when they are provided with extrinsic motivation (Muntean,2011). So that, I think teachers should be aware of their students' needs, academic level and interest before planning the lessons and applying gamification. Their lesson plans should be carefully designed, and the lesson objectives and outcomes should be specific, clear, and linked to the activities which are based on gamification method.

Gamification and Students' motivation

The approach of gamification is not neglecting the extrinsic motivation. Indeed, it aims to combine the intrinsic motivation and the extrinsic motivation to increase students' engagement and motivation. Badges, points, and awards are examples of extrinsic motivation because they occur when the user makes actions determined by someone. On the other hand, the intrinsic motivation occurs when the user decides whether to make actions or not. For instance, competing, cooperating, loving and sense of belonging. (Muntean, 2011).

Like in many other fields, gamification is being used in education in every grade. It is actively used in primary education. For example, rewarding the students with badges such as "the star of the week" (Yaşar, Kıyıcı & Karataş, 2020). I think this can motivate the students towards studying and stimulate them to learn because it relies on positive feedback which can move the students forward in the process of learning.

In education, gamification looks at the learners' motivation, their behavior and engagement in the activities (Bovermann & Bastiaens, 2020). So that, engagement is

essential, and the major success of gamification is measured by student's engagement. The system of measurement relies on page views, visitors and how frequent they visit the site, their time spent on the site and their participation. (Muntean, 2011).

The self-determination theory (SDT) is a famous theory of human motivation. It studies three important needs of human motivation: autonomy, competence, and relatedness. Autonomy refers to the need for freedom and taking meaningful decisions. Secondly, competence is the desire to master and achieve. Finally, relatedness is the need for interactions and connecting with others. (Bovermann & Bastiaens, 2020)

Intrinsic motivation is considered the most helpful and effective type of motivation because it fulfills the three psychological needs; autonomy, competence, and relatedness and because it achieves high-quality of learning. According to the self-determination theory (SDT) the intrinsic motivation itself considers three main needs: autonomy, mastery, and purpose. (Bovermann & Bastiaens, 2020).

So, in the light of the above, this study demonstrates the powerful effect of gamification on the primary students'

motivation because it focuses on both the extrinsic and the intrinsic motivation. In addition, this paper examines the effect of applying gamification on designing a motivational online learning environment. Also, it highlights the impact of gamification on the students' behaviors and the possibility of supporting their needs.

RESEARCH DESIGN (METHODOLOGY)

The research methodology will be based on quantitative research method. To accomplish the research goals and to answer its questions, two surveys will be conducted to collect data and evidence. The first survey will be designed for grade three students in a local emirati school. The second survey will be created to question teachers who work in the United Arab Emirates. Randomly and among different schools around the country, they will be asked to participate. The reason of making two surveys is the desire to look at the topic from different perspectives, in the eye of both the learner and the teacher.

Research Timeline:

Research phase	Objectives	Deadline
1-Background and literature review	Meeting with Supervisor Conduct extensive literature review. Refine research questions. Develop a theoretical framework	1st September
2- Research Design Plan	Redesign the research questionnaire. Select final data analysis methods	21st September
3- Data collection	Sending questionnaire to the participants. Interviewing some participants. Coding and cleaning survey data.	11th October
4- Data analysis	Analyzing data statically and transcripts.	15th November
5-Writing	Completing the first draft. Meeting with supervisor for revision.	15th January
6-Revision	Writing final draft based on the supervisor feedback. Proofreading and submitting	1st March

This research proposal aims to deliver an overview of the research which will be conducted on the topic of the effect of gamification on students' motivation during distance learning. It explains the importance of my research for teachers and educational organizations especially those focusing on primary schools. The study will demonstrate the significance of gamification in education and its influence on students' engagement in the online classroom environment. Teachers and educators will benefit from this research because it will demonstrate effective methods on how to apply the gamification strategy in teaching and learning.

METHODOLOGY

Design: This study design is based on using quantitative research strategy. The method used to collect the quantitative data is the online survey. Two surveys are used for data

collection purposes. The first survey is used to collect information on the students' motivation related to the study. The second survey is designed to ask for information about gamified educational system from classroom teachers.

This method is selected and used because the data can be gained directly from the survey. In addition, the short time taken to response simplifies and enables participants to answer.

Population: It is students at a local government school. The target is grade three students. The survey is conducted online using google forms. The electronic survey is sent to 132 students in grade 3 and the responses collected are from 116 symbols.

For the second survey, the participants are classroom teachers employed in different emirati schools. Data is collected from 58 symbols. The study aims to improve the

diversity of the data collected about the phenomenon.

Instrument: online gamification questionnaire is used to measure students' motivation towards gamified learning. The goal of instruments is to find out how students were motivated to learning with gamification system. There were 10 questions in this questionnaire. Each question has a relationship to the topic of gamified learning and motivation.

The second questionnaire is used to measure teachers' use of gamification in learning and their opinions toward the effect of gamification in education. This questionnaire has 6 questions, and the questions are focusing on same points of

the first questionnaire.

Both surveys use a Likert-type scale with five possible choices: *(1) Strongly agree, (2) agree, (3) Neutral, (4) disagree and (5) Strongly disagree.*

Procedure: After creating the questions in the online questionnaire using google form, they were sent using emails to the students. Then the results were analyzed, written, and presented in the tables below. *(see figure1: Students' survey results, figure 2: teachers' survey results)*

Question /Statement	Response
Gender	59% Girls (69 students) 41% Boys (48 students)
1- Which gamification example do you use and prefer?	Quizizz 83.8% (98 students) Nahla Wa Nahel 59.8% (70 students) Matific 54.7% (64 students) Leaderboard on LMs 35.9% (42 students) Kahoot 17.1% (20 students) Classdojo 7.7% (9 students) WordWall 1.8% (2 students)

Question	Strongly agree	Agree	Neutral	Disagree	Totally Disagree
Online gamification improves my learning	57.3%	37.6%	3.4%	0.9%	0
Online gamification is useful in my learning	53%	41%	6%	0	0
Gamification system is flexible and easy to use	44.4%	45.3%	10.3%	0	0
Gamification system is clear and understandable	43.6%	44.4%	12%	0	0
Applying gamification in online classes is a good idea	60.7%	37.6%	1.7%	0	0
I like learning with gamification system	59%	35%	6%	0	0
Gamification is fun in the online classes	63.2%	34.2%	2.6%	0	0
I like points and leaderboards on LMS	67.5%	29.9%	0.9%	0.9%	0.9%
Completing tasks in gamification system improves my skills	59%	38.5%	2.6%	0	0

Figure 1: Students' survey results' table

Question /Statement	Response				
Which stage do you teach?	Kindergarten 13.8% Primary 65.5% Secondary 20.7%				
1- Which gamification examples do you prefer and think that it can motivate your students?	Quizizz 75.9% (44 teachers) Nahla Wa Nahel 36.2% (21 teachers) Matific 24.1% (14 teachers) Leaderboard on LMs 60.3% (35 teachers) Kahoot 34.5% (20 teachers) Classdojo 17.2% (10 teachers)				
Question	Strongly agree	Agree	Neutral	Disagree	Totally Disagree
Using gamification in online learning increased my students' motivation	41.4%	50%	3.4%	5.2%	0
Using gamification in online learning drew my students' attention to the various parts of the learning course.	44.8%	44.8%	2.4%	6.9%	0
Earning points and leaderboard on LMS motivated my students to do more than they required to do in the course.	37.9%	36.2%	15.5%	10.3%	0
Gamification increased my students' feeling of competence and challenged their abilities and skills.	39.7%	37.9%%	13.8%	8.6%	0
My students were more careful not to make mistakes in the tasks and tests so they don't lose points.	32.8%	41.1%	21.1%	21.1%	1.7%

Figure 2: Teachers' survey results' table

FINDINGS

Based on the data collected from the first survey which was directed to the students, it seems that most of the students think that gamification is useful and can improve their learning. Almost a percentage of 90% of the students sees that gamification is easy to use, flexible, clear, and understandable. Most students like learning with the gamification system and believe that it is a good idea to be applied in learning. In addition, 112 students like the points and being rewarded in the leaderboard on LMS. Finally, 97 students chose Quizizz as the most favorite gamification example. Then comes Nahla wa Nahel which was chosen by 69 students, Matific which is chosen by 62 students and leaderboard on LMS which is selected by 41 students.

Moving to the second survey which aimed to question random teachers, 38 out of 58 participants were primary schools' teachers and since the research is focusing on applying gamification on grade three students this was a great result. Like the students' choice, Quizizz is being the most favorite gamification example for teachers too. However, teachers picked leaderboard on LMS and Nahla wa Nahel as second and third most favorite and most used gamification example. Moreover, 53 teachers think that using gamification in online learning increased their students' motivation and drew their students' attention to the various parts of the learning course. However, 43 teachers believe that

Leaderboard on LMS and earning points motivated their students to do more than they required to do on the course. Finally, most of the teachers think that gamification increased their students' feeling of competence and challenged their abilities and skills. Also, most of them agreed that their students were more careful not to make mistakes in the task and tests so that they do not lose points.

DISCUSSION

Research Question 1:

What is the effect of educational gamification on grade 3 students' motivation in distance learning?

Taking into consideration the data collected and the findings above, students (94%) in grade 3 during distance learning believe that gamification in learning is useful and improves their learning. Indeed, gamification is useful, and it has many benefits in learning. For example, it provides learners with opportunity to engage effectively with content in an informal learning environment, and that drives students to be more excited about the learning which would make them more likely to recall information. (Mulkeen, 2018).

Learning with gamification is fun for grade 3 students (97.4%) and they like this system. Gamification in education creates fun and entertaining educational content. It does not mean that gamification turns teachers work into a game, but it can play on the psychology which drives individuals to be

engaged and motivated. (Mulkeen, 2018). Gamification in education is easy, flexible, and clear for grade 3 students (89.7%).

Grade 3 students (97.4%) like points in leaderboard on LMS. Leaderboard on LMS is the third favorite gamification examples for grade 3 students (35.9%). Points and leaderboard are the most common game elements used in gamification strategies. Points can be collected by the users and can be used as status indicators or spent on virtual goods or gifts. In addition, points stimulate learners to take more tasks which are challenging. Leaderboard develops a sense of relatedness and provides learner with an access to compare progress with their peers. Leaderboards are useful for learners because the learners with great sense of autonomy are more willing to show a higher level of engagement. (Huang & Khe, 2015). Being close to overtake an opponent on the leaderboard may make an individual very motivated to do the necessary activities for gaining rank. On the other hand, being low on the leaderboard may make an individual want to give up. (PHILPOTT, 2015). So that, leaderboard is an essential method to motivate students to do the required tasks and to push them to do more.

Quizizz is the most favorite example of gamification applied in online learning for grade 3 students (83.8%). It is an attractive gamification examples because of many features such as: the meme-style feedback, the students' avatars, leaderboard, question timer and the music. The most special feature which may attract the students is the added humor because at the end of the quiz the memes is providing cheerful reinforcement and feedback for the students. In addition, the teachers can show the students the results or retake the quiz. Also, detailed reports can be emailed to the parents so that they can check their kids' performance. All these options mentioned contribute to making Quizizz the most favorite gamification example in learning for the participants. (Bindel, 2018)

Research question 2:

How can elementary teachers apply gamification effectively in online classroom environment?

In consideration of the survey results, teachers should rely on and apply gamification in their online classroom environment. Students' survey results show the positive reaction toward gamifying learning so that it is recommended for teachers to work on applying this method effectively.

Since Quizizz is the most favorite example of gamification for both teachers (75.9%) and students (83.8%), teachers should learn more tips on how to use Quizizz in the most effective way. Quizizz is based on multiple-choice quizzes so that it can be helpful for the students to recall information and prepare for tests. It can be assigned as homework or as a game during class. Teachers can benefit from the results to inform the students with instructions because they can see the students' performance in on each question. Creating a quiz is very easy and it is recommended that teachers ask different students each week to create a review quiz for their friends. (Bindel, 2018)

Nahla wa Nahel is the second most favorite example of gamification for the students (59.8%) and is the third favorite example for the teachers (36.2%) based on the survey results. It is a platform launched by the Ministry of education and specially designed for the Arabic subject. It includes games elements such as points presented as stars, activities after listening and reading stories, leaderboard, and sequencing. In addition, it is attracted for the students because of the cartoon characters who are guiding them along their whole experience in this platform. Thus, Arabic teachers are recommended to use this gamified method during and after their online lessons by tracking their students' performance, encouraging them to read more stories and accomplish activities related to the stories and praise the students who have places in the leaderboard especially while the students cannot know their opponents. ("Nahla wa Nahil", 2021)

Moving to Matific which is the third favorite example by the students (54.7%), it is a common platform for Math subject. Like Nahla wa Nahel it has game elements such as: points and badges which are attractive to learners because it has cartoon characters (monsters). Students collect new monsters in each level they accomplish after playing education flash games, puzzles, and activities. So, math teachers are advised to apply this useful attractive platform during distance learning. Monitoring students with different academic levels in online learning is a challenge so that teachers can assign tasks in motific after lessons as homework for students and benefit from the detailed report and send it regularly to the parents. ("Curriculum aligned online mathematics activities", 2021)

CONCLUSION

In conclusion, this research examines the effectiveness of gamification in education on the motivation of the students in online classroom environment. Based on two surveys results the study proves that gamification has a great role in rising the students' engagements during online classes and it leads teachers with some ideas and recommendations on how to apply gamification in more effective methods.

This study tested student's motivation toward learning with gamification in general, further research is in demand to examine gamification effect before, during and after online lessons. Research should evaluate the long-term effect of gamification and examine the motivation in pre-course and post-course in consideration to the different gamification platforms regarding the subjects focus. In addition, this research is not giving reasons why most students are motivated by gamification and some students are not motivated. In further research, I may consider the effect of gamification on different learners' styles.

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