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ADAPTION OF THE GAMIFICATION HEXAD PLAYER TYPES AND COGNITIVE AWARENESS IN AN ENGINEERING STUDENT

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Abstract

Purpose*:* Cognitive awareness involves problem-solving skills to perform appropriate actions. Information observes from the environment will help users to interpret information and select the best solution to perform actions. On the other hand, in learning, the gamified learning approach is one of the alternatives to enhance learners' cognitive awareness, where it requires learners to analyze information that they perceive from the gamified learning environment, analyze information into a meaningful decision and reflects of user's actions. The ultimate goal of this study is to identify criteria for cognitive awareness using hexad characteristics, which will be further in designing gamified learning interface design.

Methodology: In this study, sets of questionnaires were adapted from user hexad player type that consists of seventy questions will be distributed to 400 respondents. In this phase quantitative data is obtained through the questionnaire form provided. Targeted respondents were among engineering students in the Universiti of Tun Hussien Onn Malaysia. In this study, the researcher may choose respondents using purposive sampling from engineering students by giving through a class representative. The researcher also distributes this questionnaire to faculty and library. This study used 5-point Likert scales, with the range from one, "very disagree" and the scale of five represents a "very agreeable" statement.

Main findings: Findings showed a positive effect over players' characteristics in gamified learning used in cognitive awareness in hexad characteristic user comprises consumer, exploiter, self-seeker, socializer, philanthropist, free spirit, achiever and networker.

Applications: From this study, it will have a positive effect on student cognitive awareness as well as improving student achievement in using new methods. In conclusion, gamified learning approach help to enhance the students' understanding of learning and eventually will help the students to make a better decision in their learning process. Furthermore, knowing the characteristics of users in gamified learning will help the interface designer to design and interface or requirements that meet the needs of learners.

Novelty/Originality of this study: It is hoped that this study will contribute learners and their learning process through a gamified learning approach and at the same time to enhance their cognitive awareness while dealing with problems or issues that may arise around them.

Keywords: *Gamified Learning, Hexad User Type, Cognitive Awareness, Hexad characteristic, Gamified learning interface design.*

INTRODUCTION

Gamified learning which is integrating game mechanics into the process of learning has transformed Malaysia into mobile digital learning in Asian-region countries. Since the advancement of learning is taking place in the cla1ssroom, the learning approaches are affected by blending in the conventional and online teaching approach (Doman, 2017). One of the approaches that have been used in today's learning is gamified learning approach (Pramana, 2015).

The gamified learning approach is a learning concept that applies game mechanisms and game interface design techniques to motivate and attract the students to achieve learning goals (Prambayun, 2015). Gamified learning is defined as the use of games that are designed with interfaces without the gaming context (Khalid, 2015). In other words, the gamified learning is a learning method, which is applied to solve the problem through problem-solving thinking skills, through which learning becomes more attractive. The significance of this application of gamified learning in the learning environment is to enhance the cognitive awareness such as attentive skills, an increase of memory capacity, ability to store information in working memory, image manipulation, and fast time completion of task and decision-making (Tobias, Fletcher, & Wind, 2014). In other words, through the gamified learning process, the students can benefit from the positive effects on their cognitive awareness (Gilbert, 2016; Kapp, 2012).

This cognitive awareness was introduced by Endsley (1995). Cognitive complex thinking plays an important role in improving the performance of a particular task. For example, by solving the complicated problems the student can improve his cognitive skills. It is one of the ways to help teachers in identifying challenges in learning to create awareness that can attract students' involvement in learning. Gamified learning is a method used to solve a problem through thinking while playing and this is an effort to make learning to be more interesting (Prasetyo, Destya & Rizky, 2016). The use of this gamified learning is to help increase cognitive awareness such as paying attention, increasing memory capacity, working memory ability, manipulating images, and speeding up decisions and tasks (Tobias, Fletcher & Wind, 2014). Also, through this gamified learning process, it can give a positive impression to the student's cognitive awareness through the process in

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the gamified learning (Gilbert, 2016; Kapp, 2012). Cognitive awareness may affect the action of the student reaction and their characteristics.

Marczewki introduced the hexad player type gaming approach to learn about the features that can describe the motivation and practical designing experience. He also introduced the gamified learning design that can support different player's characteristics. The Hexad framework, research on player types, human motivation and practical design experience, and with gameful systems of a more varied and generalized setting, and the types that are identified in this are based on the personification of the intrinsic and extrinsic motivations of people, derived from the Self Determination Theory (Tondello, et al., 2016). Therefore, the use of this framework is in line with the objective of the researcher by assessing player characteristics that can increase cognitive awareness through elements contained in the player's characteristics

However, there are still lacks on the standard evaluation of the design on the user's priority based on the Hexad framework. Also, there is no empirical verification that describes the relationship between the Hexad user type and the game design and also other elements. Thus, the use of the Hexad Player Type that was invented by Marczewski (2015) can help the researcher to gain the player's characteristics which can help to enhance students' cognitive awareness.

LITERATURE REVIEW

Cognitive Awareness

Cognitive awareness can be defined as a process that occurs when a person tries to do something that reflects the awareness related to the human conditions, for example, the user can manage and develop the understanding towards what is happening when a user pays attention to a certain (Endsley, 1995). Cognitive awareness can also be explained by a certain perception that involves the environment such as cognitive skill, to recognize the understanding and expectation of the recent human condition. Also, cognitive awareness helps a person to be aware of the surroundings and it is a process of understanding how the information, can help the user to make appropriate decisions or actions.

Concerning that, cognitive awareness also refers to a cognitive load that exists in a certain amount of analyzed information by the brain, using working memory. The brain can be used effectively when information or skills are learned. The development of working memory can provide a huge impact on thinking skills, problem-solving skills, and information processing skills (Kirschner, 2002). Working memory in cognitive awareness is an important concept in cognitive psychology which focuses on the ability of the brain system in processing, integrating, manipulating, and gathering information within a shorter time. Hence, the stress on cognitive awareness in learning is necessary to allow the enhancement of cognitive skills among students.

Cognitive skills in teaching and learning can help the students to be more interested in their learning process (Yamin, 2008). It is important to shape the personality and individual training in the classroom. Malaysia is looking forward to prioritizing the needs of technical and vocational fields for the economic growth of this country (Padzil, Hamzah, & Udin, 2011). As one of the alternatives in helping to improve cognitive skills, especially in problem-solving and decision-making in line with the transformation in TVET field produce critical and creative-minded generations. This will be aligned with the fourth National Education Blueprint which is to improve those graduates in technical and vocational.

Hexad User Type

Research on gameplay motivations has shown that players have diverse personal preferences regarding how and what they play (Hamari & Tuunanen, 2014; Yee, Ducheneaut & Nelson, 2012). Researchers have developed player type models (Nacke, Bateman, & Mandryk, 2014) or gamer motivation scales (Yee, Ducheneaut & Nelson, 2012) to capture the diverse styles of play exhibited by different players. This information has been increasingly used in gamified learning to model user behavior and to design more engaging gameful systems. Nevertheless, there are limited studies that focus on elements used specifically in gameful design. At the same time, the applicability for this model in gamified learning has less supported by empirical evidence yet.

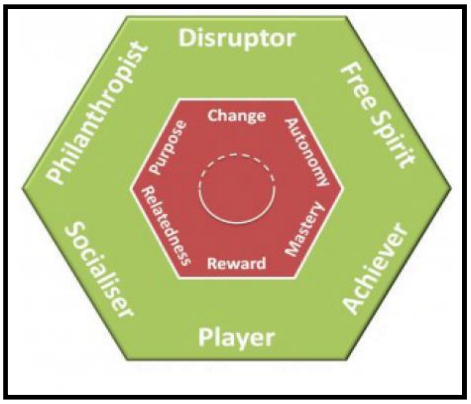

Figure 1: Hexad User Player Type

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Hexad user type by Marczewski (2015) involves eight different game features that can help to build intrinsic or extrinsic motivation.

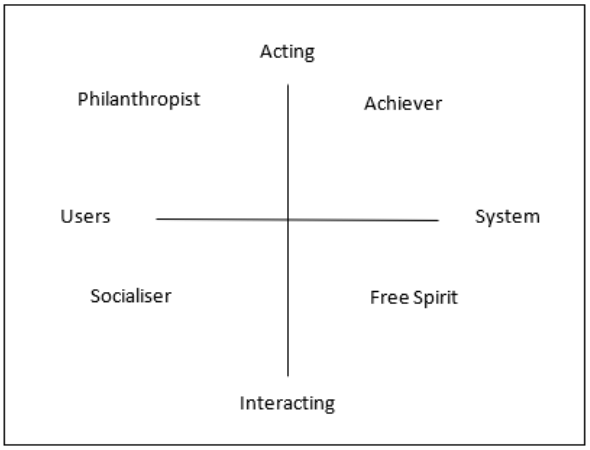

Figure 2: The intrinsic user types Marczewski (2015)

For intrinsic motivation, there are four types of players which are the philanthropists, achievers, socializers and free spirits. Philanthropists look for a sense of purpose and meaning. For some, this may be altruism, for others, it may be more of a feeling that what they are doing serves some higher purpose. For example, users who contribute to Wikipedia often do so with no expectation of reward and they just want to contribute to the collective knowledge of society.

Meanwhile, achievers typically motivated by mastery, you can expect achievers to complete every challenge in the system has and they will try to be the best. Whilst tokens of completion such as certificates and badges may be gratefully received, they are not going to be the sole reasons why achievers engage with the system. In the same way, they may enjoy having other people within the system, but rather than looking for social connections, they will be viewed as new challenges to the master.

Socializers are the players within a gamified system who are looking to create social connections. They would typically be motivated by systems that promote relatedness, for example, social networking. Free Spirits are primarily motivated by autonomy. Autonomy, in the context of the User Types, refers to the freedom from external control. Depending on their preferences, they would welcome systems that will allow them for exploration or creativity.

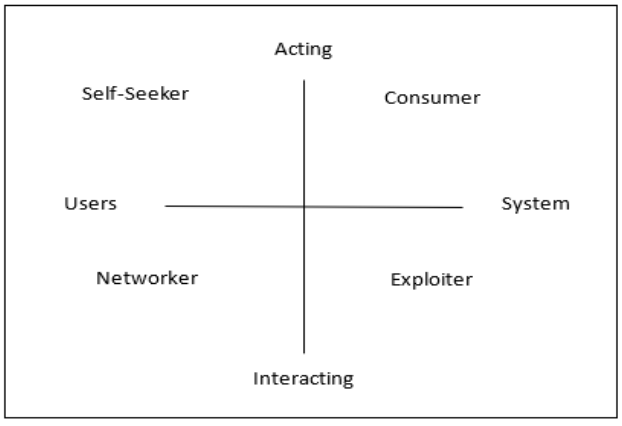

Figure 3: The extrinsic user types Marczewski (2015)

Whilst for extrinsic users, they are the user that will respond well to systems that offer points and badges as their core "game" elements. Within this type, several subtypes behave in a similar way to the intrinsic user types to obtain the rewards on offer. There are four features of extrinsic-motivated players which are self-seeker, consumer, networker and exploiter.

Self-Seeker will act in a similar way to Philanthropist. They will answer people's questions, share knowledge and be helpful but they demand the reward. If there is no reward, they will not involve in the game. This type of player can be useful when quantity is more important than quality.

As for the consumer, they will modify their behavior to get rewards. If that requires them to learn new skills or take on challenges, then they will perform the tasks. However, if they were offered some rewards, they will perform the task well.

In other words, consumers are the ones who will enter competitions just for the prize or who shop at one store just for the loyalty program.

Networker users, also a Socialiser, connect to others because they are looking for relatedness and other networkers that are looking for useful contacts from whom to gain something. They follow the big influencers on social networks, not because they are interested in them but because they hope it will get them noticed, but to increase their influence which will lead to rewarding.

Exploiter like Free Spirits, these people are looking for the boundaries of the system, where they can go and what they can do. However, for them, it is a way to find new ways to get rewards. If they find a loophole, they will not report it unless they feel that others are earning more than them exploiting it.

There are several studies conducted in the past that imply the positive effects of using this model, for example, the gamified learning design which is based on Hexad model has a better potential to be integrated into the game's gamified learning. The model is built to motivate the users after they played the game. Thus, these model users are relevant to the researcher's study for finding out the player's characteristics.

METHODOLOGY

This research methodology will explain the respondents, instruments, and procedures.

Respondents

A total of 400 respondents involved in answering the questionnaires and most of them were from UTHM engineering faculties and about 30.0%, civil engineering and environmental faculty, 27.5% mechanical and manufacturing engineering faculty and 42.5% electrical engineering faculty and electronics. According to Cohen (2001), if the total of the engineering student population in UTHM is 4657, which the population round to 5000, and therefore the value no of respondent needed for this study is around 357. The selection of engineering students coincides with the objective of the study, which is to evaluate the cognitive level of each student, such as decision-making and problem-solving skills as well as having the elements of the engineering itself.

Instruments

In this study, a set of questionnaires was adopted from Marczewski (2015). The questionnaires used a five-point Likert scale. Respondents needed to choose from a scale of one to five based on the questions being asked. A value of Likert scale one represents a "very disagreeable" and in contrast with the value of Likert five represents a "strongly agree". The use of a five-point Likert scale used to ensure that respondents will answer objectively (Best and Kahn, 1998). The questionnaire consists of 70 questions which contain ten main themes. The eight themes that were adopted from Marczewski (2015) Gamification User Types Hexad framework.

Procedure

Researchers have determined that the instrument used is in accordance with the standards set before commencing the study. Before initiating the actual pilot study it should be conducted by providing a set of questionnaires to be given to 30 respondents with a similar demographic background in the actual study. All respondents involved in this pilot study were not selected in the actual study. In this phase quantitative data is obtained through the questionnaire form provided. This questionnaire was given to 400 respondents comprising UTHM students pursuing engineering. These three areas of engineering are from the Faculty of Public and Environmental, the Faculty of Electrical and Electronics and the Faculty of Mechanics and Manufacturing. The respondents were selected on a sample basis which included aspects of engineering students from the three faculties. This questionnaire was provided to the respondents with the help of a class representative. Before the selection of these students, the researcher made sure that the students had used the gamification or had not been based on the observations in the classroom. The questionnaire was distributed by giving the questionnaire to the class representative. The researcher described a small number of studies conducted to the class representative to ensure that the class representative presented it to the other students. Next, the class representative will contact the researcher when the questionnaire is ready to be answered and it will gather up to 400 questionnaires. Next, when the questionnaire is completed the researcher is compiled using SPSS software to find the mean value of each component and construct.

RESULTS AND FINDINGS

The data were analysed according to the theme that involved. The analysis aims to identify criteria for the user interface for gamified learning and to enhance cognitive awareness among students. The data were collected and analyzed to find the mean and frequency value of each component and construct. The collected data will be analyzed and reported for further discussion based on the data found.

Demography Respondents

The first part of the questionnaire demographic questions about age, gender, faculty, years of study, and experience of gamified learning. Respondents' age ranges from 19 to over 26 years. Students with age 19-20 have a frequency of 60 or 15.0%, age 21-22 is 182 or 45.5% which is the majority, age 23-24 is 96 or 24.0%, age 25 -26 are 28 persons or 7.0%

while 34 persons or 8.5% are more than 26. For gender, the majority of the respondents involved were 248 or 62.0% women while 38.0% or 152 men. Furthermore, faculty distribution frequency and percentage of respondents were composed of various faculties. Faculty of Civil and Environmental had 120 respondents, 170 respondents from the Faculty of Electrical and Electronic while the Faculty of Mechanical and Manufacturing was 110 respondents. A total of 48 people of respondents were from less than one year of study. Additionally, the year of study up to two years has a frequency of 58. For respondents who have been enrolled for a two to three-year study have a total of 149 people and while respondents who exceed four years were 145. Also, 146 people of experienced respondents have used gamified learning while the remaining 254 or 63.5% have never used gamified learning.

Table 1: Demography

	n	n (%)		n	n (%)
Age			**Year of study**		
19-20	60	15.0	<1 tahun	48	12.0
21-22	182	45.0	> 1 – 2 tahun	58	14.5
23-24	96	24.0	> 2 – 3 tahun	149	37.2
25-26	28	7.0	> 4 tahun	145	36.3
> 26	34	8.5			
Gender			**Experience in using gamified learning**		
Male	152	38.0	Yes	146	36.5
Female	248	62.0	No	254	63.5
Faculty					
FKAAS	120	30.0			
FKEE	170	42.5			
FKMP	110	27.5			

Consumer

Table 2 illustrates the mean of the highest variables i.e. 4.17 which represents item number five. 166 respondents responded very strongly and 152 respondents claimed to agree. Also, 72 respondents gave neutral answers while 2 respondents disagreed with the item and the remaining 8 respondents responded "strongly disagree" to this. In facts, Klock, Pimenta, and Gasparini (2018) also claimed that as a user has badges, point, and reward in gamified learning, they will also be motivated to use the gamified learning frequently.

The lowest mean of 3.77 represents item number one. 136 respondents responded very well and 108 respondents agreed to the item. Also, 106 respondents gave a "neutral" answer while 28 respondents gave "disagree" answer and the remaining 22 respondents gave very "disagree" answers on this topic. Recent studies show that the use of badges is low in terms of treatment (Kelders, Spijkerman & Goldberg, 2018). Furthermore, badges also have less impact on motivation (Kyewski & Kramer, 2018; Buckley & Doyle, 2014).

Table 2: Consumer

No Item Consumer	N	Min	Strongly Disagree (%)	Disagree (%)	Neutral (%)	Agree (%)	Strongly Agree (%)
I like to display the badges I received on my player profile	400	3.77	22 (5.5)	28 (7.0)	106 (26.5)	108 (27.0)	136 (34.0)
I enjoy playing sequels to the games that reward me for playing their previous series.	400	3.84	14 (3.5)	12 (3.0)	94 (23.5)	186 (46.5)	94 (23.5)
I prefer to use a system that can benefit me.	400	4.00	4 (1.0)	4 (1.0)	86 (21.5)	200 (50.0)	106 (26.5)
I like having the rewards throughout the learning.	400	4.10	4 (1.0)	12 (3.0)	73 (18.3)	164 (41.0)	147 (36.8)
I get motivated when I get rewarded accordingly.	400	4.17	8 (2.0)	2 (0.5)	72 (18.0)	152 (38.0)	166 (41.5)

Exploiter

Table 3 visualizes the highest mean of min is 4.06 representing item number seven. 152 respondents responded "strongly agree" and 144 respondents responded in agreement. Also, 86 respondents gave a "neutral" answer while 10 respondents gave "disagree" answer and the remaining 8 respondents responded "strongly disagree" to this. In relation to that, Lessel, Altmeyer, and Kruger (2018) stated that most users love to explore by themselves during the learning process in a gamified learning environment.

The lowest mean is 3.68 and it represents item number five. There were 106 respondents responded "strongly agree" and 124 respondents responded, "agree". Also, 122 respondents gave a "neutral" answer while 32 respondents gave "disagrees" answer and the remaining 16 respondents responded "strongly disagree" to this. Based on Sciessere (2015), users prefer to do anything in gamified learning. These users prefer to take part in gamified learning when it is necessary only (Khan, 2018).

Table 3: Exploiter

No Item Exploiter	N	Min	Strongly Disagree (%)	Disagree %	Neutral %	Agree %	Strongly Agree (%)
I like to look for the chance of loopholes in a game.	400	3.74	8 (2.0)	26 (6.5)	116 (29.0)	162 (40.5)	88 (22.0)
I will report a bug if it does not affect my progress.	400	3.73	8 (2.0)	26 (6.5)	94 (23.5)	212 (53.0)	60 (15.0)
I will engage with team-based game interaction if it provides me with. a reward.	400	3.92	12 (3.0)	16 (4.0)	86 (21.5)	164 (41.0)	122 (30.5)
I like to utilize cheat codes available to further my progress in games.	400	3.68	20 (5.0)	30 (7.5)	94 (23.5)	172 (43.0)	84 (21.0)
I am not interested to follow the rules.	400	3.68	16 (4.0)	32 (8.0)	122 (30.5)	124 (31.0)	106 (26.5)
I like to explore new things.	400	4.00	10 (2.5)	4 (1.0)	86 (21.5)	178 (44.5)	122 (30.5)

Self-Seeker

Table 4 shows it is found that the highest variable mean is 4.38 which represents item number ten. 208 respondents responded "strongly agree" and 144 respondents responded, "Agree". Also, 38 respondents gave a "neutral" answer and 8respondents responded with disagreement. The study shows that the gifts offered in gamified learning also help to stimulate the users in gamified learning (Mora, Gonzalez, Moreno & Alvarez, 2015; Khaleel et al., 2016).

The lowest mean is 3.96, representing item number five. 104 respondents answered "strongly agree" and 190 respondents responded, "Agree". Also, 90 respondents gave a "neutral" answer while the remaining 16 respondents responded to disagree with this. This can be supported by a study from Klock, Pimenta, and Gasparini (2018), in which users prefer to be alone when playing games.

Table 4: Self-Seeker

No Item Self-Seeker	N	Min	Strongly Disagree (%)	Disagree %	Neutral %	Agree %	Strongly Agree (%)
I enjoy receiving experience points	400	4.25	0 (0.0)	12 (3.0)	40 (10.0)	184 (46.0)	164 (41.0)
I enjoy gaining new levels in games	400	4.28	0 (0.0)	4 (1.0)	38 (9.5)	202 (50.5)	156 (39.0)
I enjoy having badges/ avatars, displayed as status symbols in games.	400	4.14	0 (0.0)	8 (2.0)	72 (18.0)	178 (44.5)	142 (35.5)
I like to use leader boards to see how I perform against others.	400	4.18	0 (0.0)	14 (3.5)	54 (13.5)	178 (44.5)	154 (38.5)
I work in a group during the games purely to get rewards.	400	3.96	0 (0.0)	16 (4.0)	90 (22.5)	190 (47.5)	104 (26.0)
I am interested in developing friendship while playing games.	400	4.00	8 (2.0)	10 (2.5)	86 (21.5)	168 (42.0)	128 (32.0)
Return of investment is important to me.	400	4.10	0 (0.0)	22 (5.5)	82 (20.5)	130 (32.5)	166 (41.5)
Awarding rewards are good for my motivation.	400	4.22	0 (0.0)	8 (2.0)	50 (12.5)	190 (47.5)	152 (38.0)
I like mastering difficult tasks.	400	4.07	0 (0.0)	6 (1.5)	104 (26.0)	146 (36.5)	144 (36.0)
I like the competition that offers a winning prize.	400	4.38	0 (0.0)	10 (2.5)	38 (9.5)	144 (36.0)	208 (52.0)

Networker

Based on table 5, the highest mean is 4.20 which represents item number six. There were 148 respondents answered "strongly agree" and 186 respondents responded, "Agree". Also, 64 respondents gave a "neutral" answer while 2 respondents gave "disagree" answer on this topic. This study shows similarities with Gil, Catandor, & Marczewski (2015) studies, where users prefer to apply teamwork in a collaborative way to solve such gamified learning.

The lowest mean is 3.94 and the standard value is 0.760 which represents item number two. There were 82 respondents responded with "strongly agree" and 234 respondents responded with "agree", while 62 respondents gave a "neutral" answer and the remaining 22 respondents were in a disagreement. Holmes, Charles, Morrow, McClean, and McDonough (2015) claimed that all gamified learning demonstrates an emphasis on networker attributes, only fluctuating in the specific design pattern and reputation system. This is because of the features of this player's concern more with relationships with friends in the game.

Table 5: Networker

No Item Networker	N	Min	Strongly Disagree %	Disagree %	Neutral %	Agree %	Strongly Agree (%)
I enjoy playing as a part of a group in game play.	400	4.20	0 (0.0)	14 (3.5)	44 (11.0)	192 (48.0)	150 (37.5)
I like being identified as a member of a certain group based on its competitive reputation.	400	3.94	0 (0.0)	22 (5.5)	62 (15.5)	234 (58.5)	82 (20.5)
I enjoy playing online game modes on my own.	400	3.97	0 (0.0)	16 (4.0)	92 (23.0)	182 (45.5)	110 (37.5)
I enjoy working on team-based objectives while playing games	400	4.03	0 (0.0)	20 (5.0)	88 (22.0)	154 (38.5)	138 (34.5)
I enjoy group activities.	400	4.10	4 (1.0)	8 (2.0)	72 (18.0)	178 (44.5)	138 (34.5)
Interaction with others is important to me.	400	4.20	0 (0.0)	2 (0.5)	64 (16.0)	186 (46.5)	148 (37.0)
I like helping others to orient themselves in a new situation.	400	4.08	2 (0.5)	10 (2.5)	76 (19.0)	180 (45.0)	132 (33.0)
It is important for me to feel like I am part of the community.	400	4.17	2 (0.5)	14 (3.5)	46 (11.5)	192 (48.0)	146 (36.5)

Philanthropist

Table 6 illustrates the mean of the highest variables is 4.25, representing the first item. There were 88 respondents answered “strongly agree" and 162 respondents responded, "agree". Also, 116 respondents gave a “neutral” answer, while 26 respondents gave "disagree" answer and the remaining 8 respondents responded "strongly disagree" to this. Also, Tondello et al. (2016); Sciessere (2015) stated that user will be motivated if someone helps them in gamified learning. They will feel more comfortable and enjoyed to finish the task in gamified learning.

The lowest mean is 3.74 which represents ítem number three. There were 122 respondents responded “strongly agree" and 164 respondents responded, "agree". In addition, 86 respondents gave a “neutral” answer, while 16 respondents gave “disagree” answer and the remaining 12 respondents responded “strongly disagree” to this.

Table 6: Philanthropist

No Item Philanthropist	N	Min	Strongly Disagree %	Disagree %	Neutral %	Agree %	Strongly Agree (%)
I like to help people who are struggling with progress in learning through games.	400	4.25	8 (2.0)	26 (6.5)	116 (29.0)	162 (40.5)	88 (22.0)
I like to contribute to the games forum, so I can share knowledge with others.	400	3.99	8 (2.0)	26 (6.5)	94 (23.5)	212 (53.0)	60 (15.0)
I like to spend my time maintaining online communities.	400	3.74	12 (3.0)	16 (4.0)	86 (21.5)	164 (41.0)	122 (30.5)
I like to share the knowledge that may give me an edge in games.	400	3.96	20 (5.0)	30 (7.5)	94 (23.5)	172 (43.0)	84 (21.0)

Achiever

Visualized in Table 7, it is found that the highest mean is 4.28, representing item number five. There were 136 respondents

who responded "strongly agree" and 172 respondents responded only "agree". In addition, 62 respondents gave "neutral" answer while 24 respondents gave "disagree" answer and the remaining 6 respondents showed strong disagreeableness to this topic. In addition, Gil, Catandor, and Marczewski (2015) also found that the user would feel proud when earning a reward such as badges or points in gamified learning. For example, when the user earns the reward frequently, they will focus more and enjoy gamified learning.

The lowest mean is 3.86 which represents item three. Although this min value is the lowest according to the min interpretation, it is classified as high-level interpretation. There were 124 respondents who responded "strongly agree" and 162 respondents responded only "agree". In addition, 64 respondents gave "neutral" answer; while 34 respondents gave "disagree" answer and the remaining 16 respondents responded "strongly disagree" with this topic. This finding outlines the study in which players are focused on competition and can deceive themselves to achieve their targets (Tondello et al., 2016).

Therefore, this player type is an effect on two sides that need to be fine-tuned to have a positive impact on the user.

Table 7: Achiever

No Item Achiever	N	Min	Strongly Disagree (%)	Disagree %	Neutral %	Agree %	Strongly Agree (%)
I enjoy learning game courses because of my interest.	400	4.18	0 (0.0)	12 (3.0)	62 (15.5)	168 (42.0)	158 (39.5)
I tend to work on the learning activities until I completed the course.	400	3.99	0 (0.0)	10 (2.5)	82 (20.5)	212 (53.0)	96 (24.0)
Winning is more important than taking part in the games.	400	3.86	16 (4.0)	34 (8.5)	64 (16.0)	162 (40.5)	124 (31.0)
I like to display the rewards I received.	400	4.02	18 (4.5)	40 (10.0)	80 (20.0)	146 (36.5)	116 (29.0)
I feel proud whenever I got an award in games.	400	4.28	6 (1.5)	24 (6.0)	62 (15.5)	172 (43.0)	136 (34.0)

Socializer

Table 8 shows that the highest mean of min is 4.28, representing the first item. There were 182 respondents responded "strongly agree" and 168 respondents responded, "Agree". In addition, 32 respondents gave a "neutral" answer while 16 respondents gave "disagree" answer and the remaining 2 respondents gave "strongly disagreeable" answer to this topic. It is evident that the features of this player are developed to emphasize social interactions such as communication, teamwork, and motivation among other players in the game (Tuunanen & Hamari, 2012)

The lowest mean is 3.59, representing the fifth item. There were 78 respondents responded "strongly agree" and 166 respondents responded, "Agree". In addition, 86 respondents gave a "neutral" answer while 52 respondents gave "disagree" answer and the remaining 18 respondents showed strong disagreeableness to this topic. Similarly, Tondello et al., (2016) stated that a feature of this socializer player will be motivated on its own without the help of any party. For instance, this feature of this player, they like to be helped and prefer not to be watched when they are playing gamified learning.

Table 8: Socializer

No Item Socializer	N	Min	Strongly Disagree (%)	Disagree %	Neutral %	Agree %	Strongly Agree (%)
I use social networking regularly.	400	4.28	2 (0.5)	16 (4.0)	32 (8.0)	168 (42.0)	182 (45.5)
I enjoy following people on social media as opposed to talking to others.	400	3.81	12 (3.0)	30 (7.5)	86 (21.5)	168 (42.0)	104 (26.0)
I have more people following me than people I follow.	400	3.87	20 (5.0)	32 (8.0)	60 (15.0)	156 (39.0)	132 (33.0)
I enjoy sharing content with my followers.	400	3.90	10 (2.5)	34 (8.5)	100 (25.0)	98 (24.5)	158 (39.5)
I feel motivated and satisfied when others are watching me playing the games.	400	3.59	18 (4.5)	52 (13.0)	86 (21.5)	166 (41.5)	78 (19.5)
I like to communicate with other people.	400	4.06	4 (1.0)	8 (2.0)	92 (23.0)	154 (38.5)	142 (35.5)

Free Spirit

Table 9 shows, the mean of the highest variables is the ítem number one. There were 148 respondents strongly agreed and 118 respondents agreed to the item. In addition, 102 respondents gave a "neutral" answer, while 26 respondents gave "disagree" answer and the rest strongly disagreed with the item. The findings show that they are more creative in gamified learning.

The lowest mean is 3.57 which represents ítem number seven. There were 116 respondents who responded "strongly agree" and 104 respondents responded in agreement. In addition, 98 respondents gave "neutral" answer while 56 respondents gave "disagree" answer and the remaining 26 respondents gave "strongly disagree" answer to this topic. Khan (2018) also claimed that users do not prefer getting controlled and they are more willing to move by themselves.

Table 9: Free Spirit

No Item Free Spirit	N	Min	Strongly Disagree (%)	Disagree %	Neutral %	Agree %	Strongly Agree (%)
I enjoy creating custom pictures for my gaming online profile.	400	3.94	6 (1.5)	26 (6.5)	102 (29.0)	118 (40.5)	148 (22.0)
I prefer the freedom to explore rather than a story when playing a game.	400	3.93	0 (0.0)	14 (3.5)	106 (26.5)	174 (23.5)	106 (53.0)
I like to create and upload content to social sites like Instagram, YouTube, and Pinterest.	400	3.65	20 (5.0)	28 (7.0)	110 (27.5)	158 (39.5)	84 (21.0)
I fully utilize a bug that helps me to win the game.	400	3.70	22 (5.5)	24 (6.0)	92 (23.0)	176 (44.0)	86 (21.5)
I often spend a lot of time trying out some features in a game.	400	3.74	8 (2.0)	36 (9.0)	102 (25.5)	160 (40.0)	94 (23.5)
I am a creative person.	400	3.80	12 (3.0)	18 (4.5)	122 (30.5)	134 (33.5)	114 (28.5)
I enjoy designing games.	400	3.57	26 (6.5)	56 (14.0)	98 (24.5)	104 (26.0)	116 (29.0)

Making Decision

Table 10 illustrates the mean of the highest variable which is 4.20, representing item number ten. There are 148 respondents who responded "strongly agree" and 198 respondents gave "agree" answer. In addition, 38 respondents gave a "neutral" answer, while 16 respondents responded in disagreement with this. In addition, Lieder and Griffiths (2016) claimed, when a user used gamified learning in decision making, it can help the user to make better decisions that are less short-sighted. For example, in gamified learning, certain tasks in gamified learning need to be solved within the provided time, so it will help to provide a better decision making the skill.

While the lowest mean is 3.80 which represents item number eight. There were 104 respondents who responded "strongly agree" and 160 respondents responded, "agree". In addition, 90 respondents gave "neutral" answer and 42 respondents responded with disagreement and the remaining 4 respondents strongly disagreed.

Table 10: Making a decision

No Item Making Decision	N	Min	Strongly Disagree (%)	Disagree %	Neutral %	Agree %	Strongly Agree (%)
I decide carefully while playing a game.	400	4.08	0 (0.0)	36 (9.0)	49 (12.3)	162 (40.5)	153 (38.3)
I always list all the options before making a decision.	400	4.04	6 (1.5)	10 (2.5)	64 (16.0)	204 (51.0)	116 (29.0)
I always consider all options available before deciding while learning.	400	3.92	0 (0.0)	12 (3.0)	80 (20.0)	236 (59.0)	72 (18.0)
I always make decisions that remain unchanged and organised.	400	3.96	0 (0.0)	18 (4.5)	86 (21.5)	190 (26.5)	106 (26.5)
I always think of the consequences and effects of the decisions/actions made.	400	4.14	4 (1.0)	12 (3.0)	56 (14.0)	182 (45.5)	146 (36.5)
I can produce new ideas that can help me to decide.	400	3.87	2 (0.5)	20 (5.0)	98 (24.5)	188 (47.0)	92 (23.0)
I will check the advantages and disadvantages of each alternative before	400	4.08	0 (0.0)	24 (6.0)	64 (16.0)	168 (42.0)	144 (36.0)

making any decision.							
I will disregard feeling and emotion when deciding the best decision.	400	3.80	4 (1.0)	42 (10.5)	90 (22.5)	160 (40.0)	104 (26.0)
I can make the right decision as a result of complete information gathering.	400	3.97	0 (0.0)	16 (4.0)	102 (25.5)	162 (40.5)	120 (30.0)
I consider the long-term of a decision taken.	400	4.20	0 (0.0)	16 (4.0)	38 (9.5)	198 (49.5)	148 (37.0)
I consider the short-term effects of a decision taken.	400	4.05	8 (2.0)	26 (6.5)	56 (14.0)	160 (40.0)	150 (37.5)

Problem Solving

Based on table 11, the mean of the highest variable is 4.24, representing item number one. 184 respondents responded "strongly agree" and 146 respondents only "agree" to the item. In addition, 52 respondents gave a "neutral" answer and while 18 respondents responded disagreed with this. Barata *et al*., (2014) claimed that the user likes to build a strategy to overcome the obstacles in gamified learning before solving the problems. For example, in gamified learning, certain tasks need a strategy to be solved. It can help the student to build confidence in problem-solving skills.

While the lowest mean is 3.82 which represents item number eight. There were 120 respondents who responded very well and 136 respondents "agree". In addition, 106 respondents gave "neutral" answer and 28 respondents responded with disagreement and the remaining 10 respondents strongly disagreed.

Table 11: Problem Solving

No Item Problem Solving	N	Min	Strongly Disagree (%)	Disagree %	Neutral %	Agree %	Strongly Agree (%)
I always try to identify the obstacle of a problem before completing it in gamified learning.	400	4.24	0 (0.0)	36 (9.0)	49 (12.3)	162 (40.5)	153 (38.3)
I always try to understand the problem before completing it in gamified learning.	400	4.08	6 (1.5)	10 (2.5)	64 (16.0)	204 (51.0)	116 (29.0)
I always identify the best solution to solve the problem while learning.	400	4.03	0 (0.0)	12 (3.0)	80 (20.0)	236 (59.0)	72 (18.0)
I am more readily accepting views and criticisms in resolving a problem.	400	3.89	0 (0.0)	18 (4.5)	86 (21.5)	190 (26.5)	106 (26.5)
I am more confident about solving the problem alone by myself.	400	3.82	4 (1.0)	12 (3.0)	56 (14.0)	182 (45.5)	146 (36.5)
I always accept creative ideas from others in helping to solve the problems.	400	4.10	2 (0.5)	20 (5.0)	98 (24.5)	188 (47.0)	92 (23.0)
I break down the problem to a small part, so it will be easier to find a solution.	400	4.07	0 (0.0)	24 (6.0)	64 (16.0)	168 (42.0)	144 (36.0)
I solve problems related to teaching and learning better, based on the experience of using gamified learning.	400	3.99	4 (1.0)	42 (10.5)	90 (22.5)	160 (40.0)	104 (26.0)

Relationship between Making Decision and Hexad Player Type

This section aims to examine the relationship between hexad player type and cognitive awareness aspects. The correlation coefficient analysis was applied to identify the relationship between the variables in the gamified learning approach, used by students. Table 12 shows, player features that have a high coefficient which are the philanthropist, networker and free spirit. Gil et al. (2015) claimed that philanthropist players have an active learning style. So, this active learning focuses more on developing students' skills that have a relationship between the cognitive process.

Table 12: Relationship between Making Decision and Player Type

No	Player Type	Coefficient value	Relationship Interpretation
1	Consumer	0.163	Low
2	Exploiter	0.424	Moderate
3	Self-Seeker	0.594	High
4	Networker	0.681	High
5	Philanthropist	0.703	Very High

6	Achiever	0.514	High
7	Socializer	0.533	High
8	Free-Spirit	0.593	High

Relationship between Problem Solving and Hexad Player Type

Table 13 shows, three main criteria that have a high coefficient which are the networker, philanthropist and free spirit. Margaryan & Littlejohn (2011) claimed that the networker player has a collaborative worked out that give an impact in terms of cognitive load.

Table 13: Relationship between Problem Solving and Player Type

No	Player Type	Coefficient value	Relationship Interpretation
1	Consumer	0.301	Moderate
2	Exploiter	0.568	High
3	Self-Seeker	0.602	High
4	Networker	0.722	High
5	Philanthropist	0.679	High
6	Achiever	0.611	High
7	Socializer	0.548	High
8	Free-Spirit	0.652	High

CONCLUSION

In this working-progress paper, we have described our research plan. We distributed a questionnaire which aimed at demonstrating the cognitive awareness in gamified learning according to users' preferences. Upon completion of this study, we will be able to provide two main contributions to the extant literature on personalized gameful systems. First, we expect to provide empirical evidence that the respondents' selection of user preferences in gameful design elements will be corresponding to the theorized relationships suggested by prior survey-based research (Tondello et al., 2016; Tondello, Mora & Nacke, 2017). Second, we expect to provide empirical evidence which proves that it is possible to implement a simple system to help users overcome the information overload problem, by suggesting the gameful design elements that they are more likely to enjoy based on their user types and their cognitive awareness. The results of this research will provide an actionable path for gamified learning designers to implement personalized gameful systems for cognitive awareness. Furthermore, the empirical evidence that will be collected as part of this research will represent a valuable model, which in the future could be used to implement recommendation algorithms for gameful systems in cognitive awareness (Tondello, Orji & Nacke, 2017). In this analysis of this study, it is elaborated that the mean value and the relationship between hexad player type and cognitive aspects can be used to evaluate the students' needs. The use of hexad player type towards the cognitive aspects is still relatively new. It can be manipulated to help the researcher to search for the best element to be connected to the cognitive aspects.

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REFERENCES

1. Barata, Gabriel & Gama, Sandra & Jorge, Joaquim & Gonçalves, Daniel. (2014). Identifying Student Types in a Gamified Learning Experience. International Journal of Game-Based Learning. 4. 19-36. https://doi.org/10.4018/ijgbl.2014100102
2. Best, John W. and James V. Kahn (1998 Re-edition) "Research in Education" Allyn and Bacon Press, London, PP-343
3. Borja Gil, Iván Cantador, and Andrzej Marczewski. 2015. Validating Gamification Mechanics and Player Types in an E-learning Environment. In: Proceedings of the 10th European Conference on Technology Enhanced Learning (ECTEL'15), pp. 568-572. Lecture Notes in Computer Science 9307, Springer, ISBN 978-3-319-24257-6.
4. Buckley P., Doyle E. (2014), Gamification and student motivation, Interactive Learning Environments, 1-14.
5. Chou, Yu-Kai (2014): Octalysis: Complete Gamification Framework. Retrieved March 5, 2015.
6. Cohen, B. H. (2001). Explaining Psychological Statistics (2nd ed.). New York, NY: John Wiley & Sons, Inc.
7. De Vries M, Prins PJ, Schmand B, Geurts H. (2015). Working memory and cognitive flexibility-training for children with an autism spectrum disorder: a randomized controlled trial. Jurnoul Child Psychol Psychiatry. 2015;56 (5):566–76. https://doi.org/10.1111/jcpp.12324
8. Doman, N. (2017). The implications of Google Apps are being taught and the UTHM-based student learning lessons. University Tun Hussein Onn of Malaysia. Thesis Master Degree.
9. Endsley, M. R. (1995). Toward a theory of situation awareness in dynamic systems. human factors, 37(1), 32-64. https://doi.org/10.1518/001872095779049543

10. Gilbert, S. (2016). Please turn on your phone in the museum: Cultural heritage institutions learn to love selfies and social media. The Atlantic, 318(3), 32-33.
11. Hamari, J., Tuunanen, J. (2014). Player types: A meta-synthesis. Trans. Digit. Games Res. 1. https://doi.org/10.26503/todigra.v1i2.13
12. Holmes, D, Charles, D, Morrow, P, McClean, S, and McDonough, S, (2015), Rehabilitation Game Model for Personalised Exercise, IEEE Intl. Conf. on Interactive Technologies and Games, Nottingham, pp.41-48. https://doi.org/10.1109/iTAG.2015.11
13. Jafari, S. M. B. Abdollahzade, Z. (2018). Investigating the Relationship between Player Types and Learning Styles in Gamification Design. *Iranian Journal of Management Studies (IJMS).* Vol. 11, No. 3, Summer 2018. pp. 573-600
14. Jim, L. Edwards, E. Lawrence, N. S. David, C. Marcus, R. M. (2016). Gamification of Cognitive Assessment and Cognitive Training: A Systematic Review of Applications and Efficacy. JMIR Serious Games. 2016 Jul-Dec; 4(2): e11. https://doi.org/10.2196/games.5888
15. Kapp, K. M. (2012). The gamification of learning and instruction: Game-based methods and strategies for training and education. San Francisco: Pfeiffer.
16. Kelders, Saskia & Sommers-Spijkerman, Marion & Goldberg, Jochem. (2018). The impact of design on engagement: an exploratory experiment investigating the direct impact of a gamified versus non-gamified well-being intervention (Preprint). *Journal of Medical Internet Research. 20*. 10.2196/jmir.9923. https://doi.org/10.2196/jmir.9923
17. Khalid, F. (2015). Gamification: Implication and concepts in education. Pembelajaran Abad ke-21: Trend IntegrasiTeknologi. Pp 144-154
18. Khan, M. Y. (2018). Data Literacy And Serious Games: Can The Gamification Of Open Data Provide A Solution To Its Disuse?. *Master's Thesis; Lappeenranta University Of Technology*.
19. Kim, B. (2015). Gamification in education and libraries. Library Technology Reports (Vol. 51,2). Chicago.
20. Kirschner, P.A. (2002). Cognitive load theory: implications of cognitive load theory on the design of learning. Journal of Learning and Instruction. Vol. (12) (1), pp 1-154. https://doi.org/10.1016/S0959-4752(01)00014-7
21. Klock, A. C. T., Pimenta, M. S. & Gasparini, I (2018). A Systematic Mapping of the Customization of Game Elements in Gamified Systems. *Proceedings of SB Games 2018*. Pp 11-18
22. Kolb, D. A. (2015). Experiential Learning: Experience as the Source of Learning and Development. Upper Saddle River, NJ: Pearson Education.
23. Kyewski, E., and Kramer, N.C. (2018). To gamify or not to gamify? An experimental field study of the influence of badges on motivation, activity and performance in an online learning course. *Computers & Education 118*: 25-37. https://doi.org/10.1016/j.compedu.2017.11.006
24. Layth Khaleel, Firas & Ashaari, Noraidah & Tengku Wook, Tengku Siti Meriam Tengku Wook & Ismail, Amirah. (2016). Gamification Elements for Learning Applications. International Journal on Advanced Science, Engineering and Information Technology. 6, no. 6, 2016.. 10.18517/ijaseit.6.6.1379.
25. Lessel, P. Altmeyer, M. Kruger, A. (2018). Users As Game Designers: Analyzing Gamification Concepts in a "Bottom-Up" Setting. *Academic Mindtrek 2018 October 10–11, 2018*, Tampere, Finland. ACM, New York, NY, USA, https://doi.org/10.1145/3275116.3275118
26. Lewandowski (2015). The Effects Of Minimum Wage On A Labour Market With High Temporary Employment. IBS Working Paper. 07/2015. EDEN Annual Conference. Expanding Learning Scenarios, Barcelona, Spain.
27. Lieder, F. & L Griffiths, T. (2016). Helping people make better decisions using optimal gamification.
28. Marczewski, A (2015). User Types. In Even Ninja Monkeys Like to Play: Gamification, Game Thinking & Motivational Design. CreateSpace Independent Publishing Platform, 69–84.
29. Marczewski, A. (2015) Gamification Mechanics and Elements. In: Even Ninja Monkeys Like to Play: Gamification, Game Thinking & Motivational Design. pp. 165–177. Create Space Independent Publishing Platform
30. Margaryan, Anoush & Littlejohn, Allison. (2011). Are digital natives a myth or reality?: Students ' use of technologies for learning. Computers & Education 56. 429–440. https://doi.org/10.1016/j.compedu.2010.09.004
31. Mora, Alberto & Zaharias, Panagiotis & González González, Carina & Arnedo-Moreno, Joan. (2015). FRAGGLE: a Framework for Agile Gamification
32. Nacke, L.E., Bateman, C., Mandryk, R.L. (2014). Brain Hex: A Neurobiological Gamer Typology Survey. Entertain. Comput. 5, 55–62. https://doi.org/10.1016/j.entcom.2013.06.002
33. Orji, R. Tondello, G. F. Nacke, L. (2018). Personalizing Persuasive Strategies in Gameful Systems to Gamification User Types. CHI 2018. https://doi.org/10.1145/3173574.3174009
34. Padzil, A. S. N. A., Hamzah, R., & Udin, A. (2011). PTV Education in the development of first-class manpower. Journal of Edupres, 1(September), 279–286.
35. Pramana, D. (2015). "Perancangan Aplikasi Knowledge Sharing dengan Konsep Gamification.Jurnal Sistemdan Informatika. STMIK STIKOM Bali.

36. Prambayun, A. dan Farozi, M. (2015). "Pola Perancangan Gamifikasi untuk Membangun Engagement Siswadalam." STMIK AMIKOM.
37. Prasetyo Adi Isnanto, Destya Senie, Rizky (2016). "Penerapan Konsep Gamifikasi Pada Perancangan Aplikasi Pembelajaran Al-Qur'an". Magister Teknik Informatika STMIK AMIKOM Yogyakarta.
38. Sciessere, L. (2015). Gamification and user types: Reasons why people use gamified services. The University of Kassel. Germany.
39. Tobias, S., Fletcher, J. D., & Wind, A. P. (2014). Game-Based Learning. In Handbook of Research on Educational Communications and Technology (pp. 485-503). New York, NY: Springer. https://doi.org/10.1007/978-1-4614-3185-5_38
40. Tondello, G.F., Wehbe, R.R., Diamond, L., Busch, M., Marczewski, A., Nacke, L.E. (2016). The Gamification User Types Hexad Scale. In Proceedings of 2016. Annual Symposium on Computer-Human Interaction in Play - CHI PLAY '16. pp. 229–243. ACM, Austin, TX, USA (2016). https://doi.org/10.1145/2967934.2968082
41. Tondello, G.F., Mora, A., Nacke, L.E. (2017). Elements of Gameful Design Emerging from User Preferences. In: Proceedings of the 2017 Annual Symposium on Computer-Human Interaction in Play - CHI PLAY '17. pp. 129–142. ACM, Amsterdam, Netherlands (2017). https://doi.org/10.1145/3116595.3116627
42. Tondello, G.F., Orji, R., Nacke, L.E. (2017). Recommender Systems for Personalized Gamification. In: Proceedings of UMAP'17 Adjunct. ACM, Bratislava, Slovakia. https://doi.org/10.1145/3099023.3099114
43. Tuunanen, J., & Hamari, J. (2012). Meta-synthesis of player typologies. In Proceedings of 2012 DiGRA Nordic. R.
44. Yamin, M. (2008). Desain Pembelajaran Berbasis Tingkat Satuan Pendidikan. Jakarta : Gaung Persada Press.
45. Yee, N., Ducheneaut, N., Nelson, L. (2012). Online Gaming Motivations Scale: Development and Validation. *In: Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*. pp. 2803–2806. https://doi.org/10.1145/2207676.2208681

