



# Designing Engaging Community Learning Application with Children Using Gamification

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## Abstract

This research presents an approach to engage the children with a learning mobile application. The interest in education and learning process are increasing significantly due to the emerging of digital technologies. The use of e-learning in particularly for children to improve the learning process has been an issue as educators are facing problems on how to promote and to stay engaged with them. Due to the new technology that applies the new method into the e-learning process they able to overcome the problem. The aim of this study is to identify the features and guidelines for designing engaging for community learning with children using gamification technique. Hopefully the proposed community learning application can engage the children using the proposed technique. The research finding revealed that the gamification technique could help the student to engage with the learning material effectively.

**Keywords:** Community learning, Engage, Gamification, Mobile Application

## 1. Introduction

Information and Communication Technology (ICT) has affected people as well as the education in all way. From a report published by New Media Consortium, the reports identified that the emerging technologies and the impact might have on the education all over the globe. Due to the technological progress, gamification shows the proliferation in any application. Games have been part of human activity throughout the history. Games have multiple forms such as, cardboard and various forms. The first academics to make an attempt to apply the games for learning process were the Austrian philosopher Ludwig Wittgenstein (Philosophical Investigations, 1958). The game illustrates the inadequacy to define abstract concept. Ever since the first attempt to apply the gamification technique in learning process, many other academics tried to apply the technique, which lead to the progress in gamification in learning process (Wittgenstein, 1958).

The consequences of applying the gamification technique in any learning process for children is they become familiar with this method starting from a very young age. Through the gaming technique, it is proven that children cultivate creativity (McGonigal, 2011). Playing games is proven to stimulate the mental and provides education, and it is believed it will encourage and engage the children to play. It is not a surprise that the children from young ages are familiar with any medium of games (Lenhart et al., 2008). A prominent executive Bing Gordon, in the games industry, stated that the new form of people was born after 1971, because they are accustomed to the video games rules (Gordon, 2013). A system that designed resonates with such principles, will be tools to engage the children in learning.

Azriel et al. (2009), stated that regardless the age, or the social background, most people understand basic in playing games. Games offer a good medium for students to learn and interrogate the useful information in an interactive way and it is critical to engage with the students (O'Riordan, 2010), this supported by Calahoun (1980) stated that students must be motivated to learn. As Malaysia moves towards the newer globalized knowledge economy, communities in rural and regional areas are encountered with challenges. It is established and manages by the local community to provide learning opportunities such as basic education and will be supported by the local government. Learning community concepts has been introduced around 1970 (Kennelly, 2003). Economy is characterized through significance of knowledge, in the form of development technology and research, as the input component advanced education will be used for overall economic activity (Gurstein, 2011).

## 2. Related Works

### 2.1. Gamification Technique

In recent years, Gamification becoming more popular method in enriching the information technologies (Morschheuser, 2017). It is a borrowed feature from the video games, which bring the term gamification (Huotari, 2016) and has become the notable progress in both industry and academia (Hamari, 2014). For the last few years, the gamification technique has appeared in a few fields including education (Strmečki, 2016). Due to proliferation of gamification technique in education, information studies, health and human-computer, it has drawn attention of business professionals and practitioners.



The term of gamification is defined variously by the literature in many fields (Aldemir, 2018), but the general definition of gamification is the application of gaming to non-gaming context (Deterding, 2011). Gamification is creating effect into non-game fields with game mechanism to make the game fun by targeting point, ranking, achievement, and it is a technique to trigger people's natural to compete and desire the achievement (Park, 2014). While game is rule-based environment, which responsive to the action of the player, and offers challenge, that will keep cumulative record of the action (Mayer & Johnson, 2010). According to Boer (2013), gamification is the use of element of game thinking in the non-game application to increase the engagement. Gamification is application of game dynamics, game mechanics and the psychology into a non-game situation, where people will focus into its success (Coppens, 2017) and the gamification can use to promoting the motivation and engagement for learning purpose (Alsawaier, 2017). Burke (2014) defines gamification as the use of the game's mechanic to design digitally to engage and motivate the user to achieve their particular goal. The game mechanics lead to the engagement, promoting learning and to motivate the action of user (Kapp, 2012), gamification can be use or apply in any problem solving application (Zichermann & Cunningham, 2011). Practically it can be describe as a phenomenon to create experience in gaming (Koivisto, 2011). The effective game must be addictive and motivating which will encourage the player to keep playing when they fail and try to play until they tackle their desired goal (O'Donnell, Gain & Marais, 2013).

As in daily life, the gamification technique can enriched the teaching practices by applying the element into the context (Sharpley et al., 2013). Even though, gamification is not a truly an academic methodology, but it is still can help to improve the student's performance in learning (Xu, 2012). Gamification can lead to 'disruptive innovation', which refers to new innovation in education that has the potential to alter the practice and the effort in positive way (Christensen & Raynor, 2003). Player will be much immersed and engaging with the game they play, and effective leaning will take place if by applying the motivational power through gamification (Boyd, 2018), because one of the greatest challenges in education field is engagement and the motivation of student (Boer, 2013; Barkley, 2018).

Educational gamification is different from the serious games; the focus of the educational games is to impact the education (Ian, 2013), educational computer game, intended to extend the player's knowledge (Goehle, 2013; Mayer & Johnson, 2010), while serious games is far beyond education, health, and therapy. (Wilkinson, 2016). To identify any game the match curriculum and the learning objectives to fit for the student in the classroom to deliver is a challenging task (Annetta et al., 2009). Activities in games typically defined to win the conditions and overcome the obstacles to complete the activity Smith-Robbins (2011), and it is quite similar with the learning process where the learner or the player is being directed to complete the task to achieve the desired outcome, in order to get to the next level or to complete the understanding of topic (Ames, 1990; Pintrich, 2003). Any goals that will lead to skill or topic have been proved to engage and increase the motivation on the learning task, especially with high difficulty (Ames, 1992). Motivation might increase when the public recognition of achievement if the goal is related to the performance, though the real learning is not affected (Meece et al., 2006).

A study has been done by Osipov (2014), in his paper study of gamification effectiveness in online eLearning systems, concluded that the e-learning system also presents opportunity social analysis for different parameters. He developed new open educational resources known as i2istudy purposely for learning foreign languages from the native speakers. The learning involves live interaction between the native speakers and the participants. The new technology allows the students learn the basic start in short period

of time from the scratch or enhance the foreign language proficiency. In the field of computer, it is recently become quite popular for open educational resources for language assistance learning (Coreyll, 2007). Skype play crucial learning in the system, which are corporative which provides engagement (Clark & Mayer, 2012). In the system introduced by Osipov (2014), the system has a system with the main feature that provides a common space purposely for any educational materials. Based on the real time communication the system provides real time communication, which is built into the interface of the web. The continuing of gamification in education it has allows increasing the engagement of users online as well as to motivate and engage the millennial learners (Lewis, 2018).



Fig. 1: Serious Game and Game Based Education

Gamification in this particular system is use to utilize the elements of game in the system and motivate the principles in the non-game situation. It is necessary to stimulate the user to engage with the system in this case in order to achieve the volume and practical skills; this is supported based on the modern principles of e-learning (Bubnov, 2015). He also stated that the system is not fit to user, due to different characteristic of user which some of them is shy to communicate with strangers.

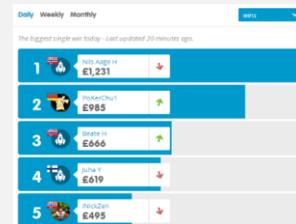
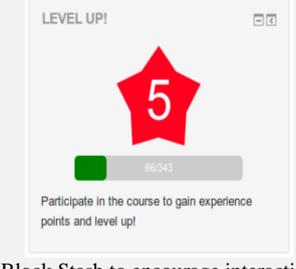
Few questioned were address in a Dicheva et.al (2015) in his research for gamification in education, what are the educational contexts has the gamification been applied, and what are the elements in gamification use in educational system. In order to answer the address questions, they performed a concept review to focus on the categories that related to the game's context. The study covers few areas to provide information such as game elements, type of application and education level. Zichermann and Cunningham (2011) stated that the game theorists categorized the game into aesthetics and dynamics. Deterding et al. (2011), has categorized the game elements into five different of abstraction. The study by Dicheva et al. (2015) revealed that many research on the use of gamification in education field but there is only some mechanism that applied in the context. There are few element of gamification that are use in the learning process shown in Table 1 such as leaderboard (Khaleel et al., 2016; Stanculescu et. al., 2016; Bianchini et al., 2016), badges (Werbach & Hunter, 2015; Morrison et al., 2014; Khaleel et al., 2016; Bianchini et al., 2016), points (Bunchball, 2010; Educause, 2011), Level (Mahfuzah, 2017) and Avatar (Turkle, 1995; Thomas 2007; Gee 2003).

Most of the suggestive point for evaluation missed the critical motivational elements in the gamification application (Morrison & DiSalvo, 2014), and only small changes of the implementation required ongoing monetary (O'Donovan, Gain, & Marais, 2013). The designer in the educational field must consider the ability of the learners when decide the badges Abramovich, Schunn, and Higashi (2013). Game mechanics is a tool for gamification engine to help the user to tackle the goal, which is helpful in leaning process (Stanculescu et al., 2016).

Mahfuzah et al. (2017), the problem and issues with regard to gamification technique in learning such as lack of game element to provide to full explanation of the content (Khaleel, 2016). Game et al. (2014) stated that lack of time for the course, and the frustration with the course, and the student feel bored and the inappropriate use of system González et al (2014). The lack of analyzing studies and the gamification's effect through massive online course, but most of the researcher agree that the gamifica-

tion element in learning process can increase the user engagement as well as the engagement to learn (Dominguez et al., 2013; Paisley, 2013) and the gamification can increase the social relationship among the user (Charles et al., 2011).

**Table 1.** Gamification Element

No	Element of Game	Example
1	Leaderboard – Score tables, for the player performance (Bunchball, 2010; Educause, 2011).	 <p>Leaderboard at Casino room</p>
2	Badges - Trophies that appear for the player's achievement (Bunchball, 2010; Educause, 2011).	 <p>Awards for player in Lithium Communities</p>
3	Points – Tokens collected by player (Bunchball, 2010; Educause, 2011).	 <p>Score point in Rits of Passage</p>
4	Level - Level and points are connected to maximize the sense of achievement. (Mahfuzah, 2017).	 <p>Block Stash to encourage interaction</p>
5	Avatar – Online Identity (Turkle, 1995; Thomas 2007; Gee 200).	 <p>Avatar in World Warcraft</p>

To engage user and solve problem by applying the game mechanics as well as the use of game thinking is the general meaning of gamification. The goal for meaningful gamifica-

tion is to let the student to understand the reward based gamification and let them explore, to get the student have a clear understanding of reward based gamification (Nicholsan, 2013). Juul (2003), provide explicit explanation of game and the correlation with learning process, a variable and the quantifiable outcome which refer to the grade is the rule-based formal system, which the outcome is assigned with different value the player need to exerts their effort to affect the outcome (grade). Instead of providing external rewards, the main purpose of meaningful gamification is helping the participants so that they can find the connection to the underlying topic. This can be done through the focus on concept of playing that use the game elements, which provide information (Nicholas, 2012). In a research by Looystyn (2017), gamification technique can increase in engagement of online programs with user. It is used or applied in application or any process to improve the user engagement, or to return the learning, timeliness, data quality, and investment (Robson, 2015). Application of gaming in learning has shown to be effective (Liu et al., 2014) because the learning takes place, which allow the user to practice more (Van Eck, 2006) in a very meaningful context and much more motivational compared to non-gaming material (Papastergiou, 2009). Concept of gamification is always used as incentives in order to modify behavior, like encouraging work or even to discouraging distraction (Ian, 2004).

The fundamental of gamification is the idea of effortful activity to encourage and motivate, to improve the user experience as well as the engagement in non-game application (Deterding et al., 2011a). The game design has powerful effects on the engagement, motivation, learning outcomes as well as the secondary variables (Specht, 2015). Despite the widespread comment and the shortcomings, little empirical has validate that gamification as a concept or an effective tools to engage user in a non-entertainment way (Deterding, 2011). In a survey published for gamification on its interaction of the system and the interaction with human, an outline of the current understanding of the theoretical has been draw (Seaborn, 2015). Nicholson (2012), he applied several gamification techniques to the non-gamers users. He used structure of variable ratio reward for the activities that he held, where the participants did not know the points that will be rewarded. The structure was claimed to be the most effective to bring a behavior (Zichermann & Cunningham, 2011).

According to Jenkins (2015), gamification can be a key to engage with mobile user. He lists out a cycle, which can help the engagement of user with the mobile use. Stockholm sounds campaign applies challenge, achieve and rewards as real world example gamification technique that applied for guide-app. The first state, which is challenge, will challenge the user to voluntary take the challenge and the feedback of the challenge will be provided by the audience in the next level, achieve level. The reward will be the consequences of the user achieving or unlock certain level. Three important aspect that has been applied to engage the user is socializing to take user to connect with other player, relationship for long term relationship which meaningful with other user, and teamwork to derive the satisfaction of being an effort of teamwork (Jenkins, 2015). A list by the Facebook team listed the top 10 of uses in smart phone, email, web browsing and Facebook are on the top of the list (IDC and Facebook, 2013). The smartphone is slowly placing as the centre of human interaction with the technology (iBeacons, 2014). Mobile can be use to control the most of the technology nowadays (Berndhardsson, 2011). A good metrics need to be choosing to ensure the engagement with user. There are few metrics to measure the engagement with mobile such as revenue, download in apps, pages like, and etc. Dell Engage SG app the award winning from the 3 radical applies the gamification technique in the app. In their report they state that the most download app is the heavily mobile game. It is important to refresh the gaming applied in the apps to attract more user since the younger the user the easily they get bored (Koivisto, 2014). Gaming Moti-

vation (GAMS) is the tools to scale the gaming motivation. Jenkins (2015) conclude that the agreement of business objectives to ensure the gamification techniques aligned to the objectives is very important, and to understand the user needs to tackle the gamified communication are relevant. To understand what gamification element is suitable it is crucial to know what types of application the games mechanism will be apply (Kiryakova, 2013).

## 2.2. Engagement in E-Learning

Engagement is the attention of the children on the learning material (Al Hout, 2017). It will be easier to deliver the point if the system-apps can get the user attention (Kare, 2013). To improve the effectiveness of teaching, the education system should target to develop e-learning method to encourage high engagement with different learning style (Rodgers, 2008). The learning outcomes may be affected by the actual time of the user spends online (Pera & Richardson, 2010). This is supported by the results that show the user which spend time less on the online is performed less in academic (Davies & Graff, 2005). Kenne (2014) define the engagement when the user wants to occupy the intention of persons. A study shows that student who attempted the quizzes through online multiple times perform better, which perform more engagement on the e-learning materials (Williams, Birch & Hancock, 2012). In a research done by Rodgers, he examines the interaction effects between engagement of e learning and personal characteristics. In general, the engagement and performance relationship's is complex, and the engagement is correlated with the grades of the students (Carini et al., 2006). In other word, the engagement focusses on the learner's attention for quite long time, and without the engagement learners or the user will not be able to complete the task (Stanculescu et al., 2016). According to Maloshonok (2014), the theory of engagement can be split into few main areas such as relate, create and donate. This statement is supported by many empirical studies, like the engagement level is significant to examine the performance of student (Rodgers & Ghosh, 2001). Cristina (2011) applied the gamification to the e-learning processes, where it is proven to increase to the engagement between the specific task and e-learning. Gamification does not necessarily creating a game; it can be define as make education engaging. While the gamification has multiple uses in commercial practices, it is found similar with the one in games. The paper focuses the most appropriate techniques to apply to engage the user with the e-learning. Students will gain more motivation to study due to the more interactive method, and from the positive feedback, the gamification method in learning process stimulated them to study (Christina, 2011). Important metric for gamification to be success is the engagement, which has several metrics to analyze the engagement that can be include such as web application. Frequency of visit and total time per user are the example of metrics proposed for e-learning process. Motivation and engagement of user with system can be improved by modification. By offering the combination of gamification and engagement which stinger and for long term it can generate positive behavior for student, and can use to create effective as well as the engaging e-learning application (Cristina, 2011).

A study by Dixcon (2010) on what activities or interaction that can lead to more high engagement of the student with the online courses set the scale to measure the engagement. This is supported by a research that stated the observer needs to constantly monitor the user's engagement, because when the user's lose their attention, they might not going to focus again (O'conell, 2013). Since they are no specific scale to measure the engagement, the first stage of the study was to develop a measurement scale for the engagement with the online course. The study use two engagement instruments for student that are the classroom survey of student engagement (CLASSE) and student course engagement questionnaire (SCEQ) and a measure of interaction within online course using rubric for assessing interactive qualities in distance courses (RAI-

QDC). These instruments are strong in its own. On the study, by Dixcon (2013) the students were asked three main questions, that are what is the activity that might attract the user to engage with the online course, what are the interaction that might be interesting to attract the user to interact with the instructor, and what are the activity that help the student to interact with another students. The findings show that, regardless on type of activity the students prefer the meaningful connection with the activities and the system. This supported by the study that stated the people tend to remember the information that triggers their emotional response (Amy, 2013). The new system will be try to tackle the emotions of the children to engage with them, so that they can engage with the apps monitor and monitor the engagement using the time taken spend on the apps study has been done to explore until which extent the engagement and the immersion of the challenge to the e-learning (Hamari, et al., 2016). The questionnaire were examined to study the level of engagement, and the question ask do the challenge and the skills predict engagement and immersion, how engagement and immersion can perceived the learning, and how does the engagement and immersion able to mediate and affect the challenge and skills on the learning. Serious games in learning are different from the entertainment-oriented games, while they are enjoyable and designed for other purpose then entertainment (Davidson, 2008; Hamari & Koivisto, 2015b). Playful and serious games often combine by challenging activities to maximize one skills (Csikszentmihalyi & Schneider, 2000). More complex and cognitive the challenges engage the student more deeply in learning by concentrate harder in classroom. The skill in challenging also been proved to increase the motivation by extending the players capacity in game-based e-learning (Fullagar, Knight, & Sovern, 2013). According to Covington (1985), students have high motivation when they get competent. They are few studies that measure the engagement in psychological in game-based, which separated into few parts, which are behaviorioul, cognitive, and emotional (Fredricks, Blumenfeld, & Faris, 2004). Students who did homework in game-based are more clearly engage in the activity compare who are not (Coller & Shernoff, 2009). Somehow, engagement into educational game-based been observed to be moderated by the gaming experience. (Deater-Deckard et al., 2014). Positive association between learning and engagement has been found in previous studies (Hsu, Tsai, & Wang, 2012; Huizenga, Admiraal, Akkerman, & Dam, 2009). The engagement is indirectly contribute to the focus on grades on the learning (Tüzün et al., 2009). In a study by Hamari et al. (2016) they study the impact of the operationalized as heightened challenge and skill, and conclude that the educational video games can engage effectively the student in learning activity and it is demonstrate by the concentration, interest, and the enjoyment during the process. Observation method can be use to measure the engagement in both individual and group engagement especially for education purpose (Volpe et al., 2005). Observation technique was use by Lee and Brophy (1996) and noted that the technique can provide detailed. Therefore observation is the best way to get information from children, because someone can learn so much about the children through observation (Amanda, 2013).

One of the most frequent questionnaires to get the data is Game Engagement Questionnaire (GEQ). The GEQ consist of three structures, which are core questionnaire, social presence module, and post-game, which must be administered immediately after the session ended (Jesselteijn, 2013). This particular questionnaire provides strong measurement of engagement with games. According to a journal by Brockmyer et al., (2009) high engagement with game can give high impact for game playing, and the GEQ is valid and reliable to measure player engagement with the game. Ryan et al. (2006) introduced player experience to measure the scale including physical, emotional, and narrative to measure the presence satisfaction of the player.

Traditionally, education only offered in classroom where the student has two ways communication with the teacher. The phone has been widely using a piece of technological equipment since

1980s (Huet & Tcheng, 2010). The use of mobile phone in education is clear example of the phone as the technological equipment (Fu, Su & Yu, 2009). Since iPhone was launched in 2007 the engagement of the smartphone to enhance the learning process is noticed by educationalists (Attard, 2013; Melhuish & Falloon, 2010; Traxler, 2010; White & Martin, 2014). In a paper by Wilacy (2017), a study has been done on the student's engagement with Mathematics apps in Regional Health School (RHS); this is due to the interests of the educators on the innovation of mobile apps (Johnson et al., 2012). The study has been done by examines the influence of the apps on mathematical learning process. The study was semi-structured interview, observations and through questionnaire (Table 2) to get the data. The study shows that the use of mobile phone influence the student in positive way, this is supported by a study that the mobile application can give impact on the student performance (Alqahtani, 2015).

**Table 2.** Game Engagement Questionnaire

No	Items
1	I lost track of time
2	Things seem to happen automatically
3	I feel different
4	I feel scared
5	The game feels real
6	If someone talk to me, I don't hear them
7	I get wound up
8	Time seems to kind of standstill or stop
9	I feel spaced out
10	I don't answer when someone talks to me
11	I can't tell that im getting tired
12	Playing seems automatic
13	My thought go fast
14	I lose track o where I am
15	I play without thinking how to play
16	Playing makes me feel calm
17	I play longer than I meant to
18	I really get into the game
19	I feel like I cant just stop playing

### 2.3. User Experience in Gamification with Children

Bobo Explores Light in the report by Apple (2013) that selected among the best app for kids by USA Today and The New York Times introduces children with kid-friendly experiment to explain the scientific phenomena. The robot known as Bobo will guide the children through this experiment with some gadgetry that appeal to their age. The material such as animation, videos and hands-on experiment will be use to investigate the physics phenomenon. The apps take the children to explore the light through interactive e-book. The apps take the children to explore the topic related to lasers. The parent's review from the App Store stated that the learning apps are excellent and the kids age 7, 5, and 4 enjoy it very much.



**Fig. 2:** Winner of the Apple Design Award 2012

In health care the technology is applied regularly, and way to do so is by applying the gamification technique especially for the patient's at young age. Many apps such as Thinkrolls, Endless Alphabet and many more developed purposely for the children and a study have been done to review to test the suitability either for pc or iPad (Amantha, 2012). From a study by Google (2017), they list few techniques that can be improved for the children from the experience in gamification. The home screen and the navigation, it should provide the children with interesting journey and functionality to complete their task. The navigation should be clear and not confusing for the children to use and should be visible like via swipe or tap. For the apps that target the children as a user an excellent search facility will help them. The content should be direct to the main purpose of the apps, so that it would not confuse the children. This is supported by a research that claims that content are the king, and for the game-based learning events it should begin with strong objective's learning as well as the clear and solid content (Thomas, 2013).

The power of gamification has been illustrate in pain squad for children healthcare with user experience (UX) design. Research team iOUCH from the hospital for sick children (SickChildren) has created the Pain Squad App for patients at young child to track the pain before and after the treatment. To test the app with the user and to publish the findings in any medical journal Z was the goal of the team to further the gamification for children in healthcare tools. The developer chooses the character purposely for the children, because they need to attract the children to use the apps. It is important to know the targeted audience includes the age to design the specific module for them (Summa, 2013). The app use the character from the Canadian police dramas to motivate the children to earn the badge of the police by undergoes the treatment, which the combination of user experience, gamification and some new features.

With limited grant the team has to work with existing and update the UX to suit the children. The design was tested on the children and it shows that they're more gravitated towards the app, because it is more fun and playful. From the kid's feedback the apps added new game- status and navigation and contrast the size and the color. The app need to have a point where the players which for this apps, the players are the children, where the players are engaged in order to keep track and monitor their health.

The research by the Children hospital (2016) focused to provide user experience, which are gather the feedback and test iteratively, and created updated and more playful which loves by the children. The updated features allow the children to cope with their healthy level in the same time the children have some fun through the apps. It is proven by the apps that interacting with patients manage to gather the information which critical to be complete in typical healthcare method particularly for the children. Not all of the game can attract the children, and not suitable for them, for instance not all children can collaborate play and have the social skills to interact with the games (Charman & Baird, 2002). Therefore it is a crucial key in development for children to know the design to engage with them.

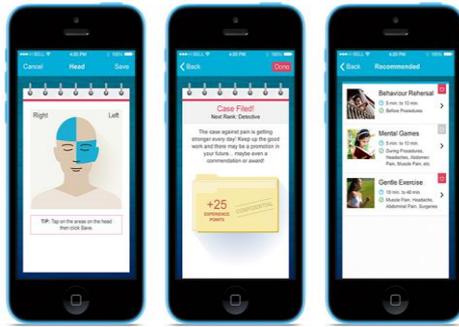


Fig. 3: Mobile Run On the Real Patient

### 2.4. Development Engagement with Children

Critical time for children to develop is in preschool period, where in these years the children will improve their skills substantially, which play important role in their academic and social life in the future, and it is also believed that they are in need to explore their environments (Piaget, 1980). It is a critical time, where children are receptive to learn with less effort (French, 2007). It is also a time where they explore the opportunity interpret all the experience(s) (NCCA, 2004).

Concept of engagement between the children and the school has proven to attract attention as reprehensive to antidote in academic and motivation achievement declining (Fedrick, 2004). In a research of Virginia CASTL stated that the children develop their abilities, through the self-regulation like focusing attention and managing emotions. There are wide gap among the children themselves. The disparity is seems to increase, but due to the positive interactions that surrounded the children in early age, can attenuate the gap. The research focuses on the overall performance of the classroom instead the individual performance. The result from the research shows that it is crucial to define the factor that affects the self-regulation of an individual among the children. The research helps in develop the understanding on different way of interaction in order to promote the skills, and help the children to succeed in academic. The research has examined the children as a group whether their engagement in the class was related to the skills of self-regulation. From the research, it shows that the few combination of children’s of engagement related to the children’s skills. Specifically the engagement between the children’s affected to the compliance. But, unexpectedly for the children with low levels of negative engagement, their self-regulation does not supportive by positive peer engagement (Amanda, 2011). Since preschool is the critical time for the children to learn and develop, the apps will be target to five years old children.

### 3. Methodology

The study processes undergo phase where will tackle an objective to be completed. **Phase I**: Identifying the guidelines and feature for user interface design that significant to engage with children. This phase focusing of identifying the guidelines for creating an engaging design. Therefore some data about the right gamification technique and the interface needed to be collected in deciding the design that could be use to tackle the children to engage with community learning application. The preliminary study need to be done in order to collect the data from the children that will be use to develop an engaging application. According to John Stuart Mill (1950) in his book *Philosophy of the Scientific Method*, preliminary study is the original study on any particular topic. The preliminary study can lead to early assumption or any hypotheses, which can be observe measure or replicate. The ultimate goal of it preliminary study is to learn something new and can be confirm without bias by others (Driscoll, 2011).

The data for the preliminary study will be collect by observing the children using the simple existing game. The technique that will be use to collect the data which is observation does not necessary by asking the children with simple question, but it is enough by watching the children use the existing apps that is “Kids Spelling Learning” application because the apps is one of the high review and installed by the parents from play store and have a good feedback by parents (Google Paly, 2018). The children will be given the apps, and will be observe. One can learn so much about the surrounding through the observation (Urquhart, 2015). Observation method ca be classify into two classes, that are formal and informal, and the teachers in preschool prefer the informal observation method to get the data from the children by observing, collecting sample from their work, parents interviewing, and talking to the children which are more appropriate for the children program learning (Willcox, 2003). This technique is suitable for the children, due to the children at age 5 still do not know how to describe their feeling, but the observation method can capture the reaction of the children to any existing apps. The observation must be detailed and the all the data get during the observation must be record to identify the gridline. Recording is documenting the data that observed, recording the way children communicating help the adult to see the way they are (Cohern & Stern, 1974).

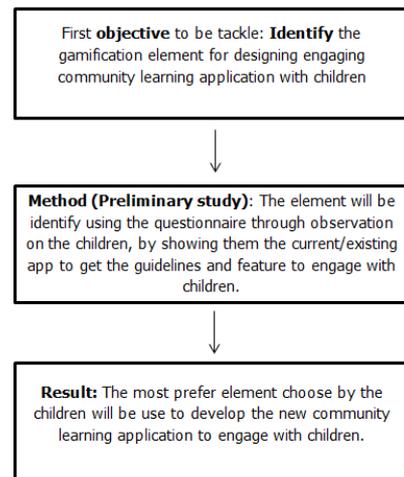


Fig. 4: Research Flow

### 3.1 Participant and Procedure

This study will use children from CLC PACOS at Taska Suasindak Penampang Sabah. This study will use 10 children because the previous will study involved four children. The children will be given the current apps and the new developed learning application to observe and the question will be ask to the teacher and feedback from the children through questionnaire.

Fig. 5 shows the demographic data of 15 participants consisting of 5 teacher and 10 students. The majority of the participant is female, which is 4 students and 5 staff. All the students from the same age, which is 10 years old and the staff’s age’ majority around 30-39 years old with diploma in education and the longest teaching experience is almost 20 years.

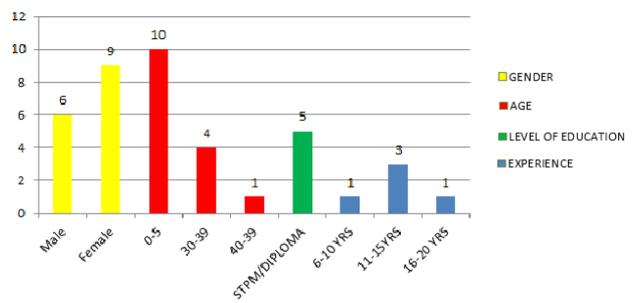


Fig. 5: Demographic Data of Participant

### 3.2 Results and Analysis

Fig. 6 shows the analysis of Game Engagement Questionnaires (GEQ) on the children participant based on the current apps used on them. The result shows the highest question asked were, that the children play the apps without thinking. This may be due to the apps itself are not being interactive and does not engage on their focus to use the apps to learn. All of the participant agree that they do not feel calm at all to use the apps, and it can be concluded the apps do not engage with the children.

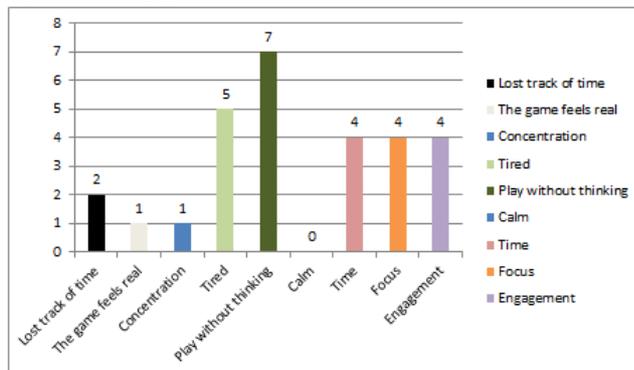


Fig. 6: Analysis of Game Engagement Questionnaires

The apps do not include any “fun” element to tackle the user or to engage with the user to achieve the objective of the apps.

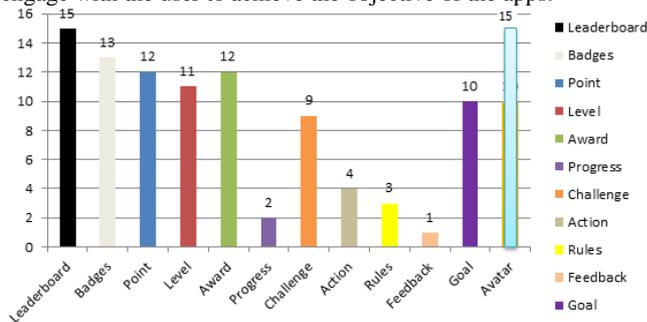


Fig. 7: Element of Gamification

Fig. 7 shows the results of gamification’s element collected from the participant. From 12 elements, eight elements identified as a standard elements that needed in the mobile application. There are: 1. Leaderboard, 2. Avatar, 3. Badges, 4. Point, 5. Award, 6. Level, 7. Goal, and 8. Challenge. The leaderboard and the avatar show as the preferred element chosen by the participant. The badges were chosen by 13 participants, followed by point, award, and goal. The least element chosen by the participant to be applying in the new mobile develop apps. From the result of the element of the gamification selected, it can be concluded that the user want an interactive learning application to be use and at the same time, achieving the goal of learning process.

### 4. Discussion

It is predicted the use of mobile application has a sustain growth in the coming years, therefore it is very important for the researcher to keep enhancing the current application. For this particular application, there are many enhancement that can be done, such as in term of the module, group of age, gamification element, ethnic and etc. There are only three modules in this learning application they are ‘primato’ (alphabet), ‘numbul’ (number) and ‘warana’ (color). The enhancement can be done by adding more modules, such as animal, shape and etc., which can attract more children to use the mobile application. The participant for this application only involved children at the age of 5 years old, where the

next research may use different group of age to see the difference in respond and result from the same level of participant and different level of age. During the development process of these apps there are only a few gamification elements included, new learning mobile application may use different elements of the gamification to see the engagement of the user with the application. This application, particularly use Kadazan ethnic from Sabah, the same application may use in others ethnic to help the ethnic to conserve their heritage of language to educate their young people to use their mother tongue.

### 5. Conclusion

The engagement of the student to learning process and material is a crucial topic in educational field, due to the result of the engagement between them will affect the student’s result. This project is to identify the features and the elements of the gamification technique to be applying on the mobile learning application to engage the children with the learning material. More detailed about the gamification technique and the gamification elements are explained briefly in the literature review. Most of the researchers have agreed on the definition of the gamification, which contributes in many aspects, and many element of the gamification has been highlight from the previous study that is noticeable. The elements of the gamification are presented in the table 1. A research on the elements of gamification has been identified to help in the engagement of the children with mobile learning application. A standard designing engaging learning community application with eight elements identified. There are: 1. Leaderboard, 2. Avatar, 3. Badges, 4. Point, 5. Award, 6. Level, 7. Goal, and 8. Challenge. Next phase will be the development of the leaning community application by using the identified standard elements. Thus, evaluation of the engagement of the developed application will be conducted to valid the impact on the community with the children. The objective of the learning process however can be achieved by inculcate the interest of the users which should be uniquely designed for the target group accordingly.

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