CONCEPTUAL GAMIFICATION FRAMEWORK FOR E-LEARNING SYSTEM BASED ON WEB 2.0 TECHNOLOGIES

THESIS

Literature as one of the conditions
to obtain Master's degree from
Bandung Institute of Technology

By

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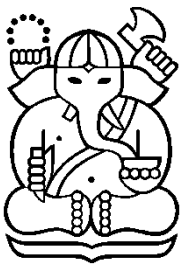

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ABSTRAK

FRAMEWORK GAMIFIKASI PADA SISTEM E-LEARNING BERBASIS TEKNOLOGI WEB 2.0

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Sistem e-learning sudah banyak dipergunakan di sekolah dan universitas, akan tetapi masih terdapat permasalahan seperti kurangnya motivasi dan keinginan siswa dalam menggunakan sistem tersebut. Banyak metode sudah dipergunakan untuk meningkatkan motivasi siswa tersebut, beberapa contohnya adalah gamifikasi dan teknologi Web 2.0.

Dalam implementasi gamifikasi dan e-learning 2.0 terdapat beberapa kekurangan atau kesulitan, seperti kurangnya perencanaan dan desain. Untuk menyelesaikan masalah ini, diperlukan sebuah framework konsep atau pedoman yang dapat digunakan dalam proses mendesain, perencanaan, dan implementasi sistem e-learning yang menggunakan desain gamifikasi dan berbasis teknologi Web 2.0.

Riset ini menggunakan Design Science Research sebagai metodologi dimulai dari proses review studi literatur pada topik gamifikasi dan Web 2.0, yang kemudian dilanjuti dengan proses analisis framework. Metodologi yang digunakan berfokus pada tahapan Design & Development, di mana sebuah framework konsep dibangun dengan menggabungkan gamifikasi, Web 2.0, dan model instruksional ADDIE Model. Framework yang dibuat juga didemonstrasikan dengan menggunakan studi kasus di Fakultas Informasi Teknologi, Universitas Kristen Maranatha. Framework konsep yang dibuat meliputi tahapan analisis, desain, pembangunan, implementasi, dan evaluasi.

Dari survey yang sudah dilakukan, dapat disimpulkan bahwa untuk menggunakan sebuah sistem e-learning bergamifikasi diperlukan game mekanis sepert point, badge, atau leaderboard. Siswa juga masih perlu diberikan dorongan, dengan memberikan mereka point atau hadiah kepada siswa yang paling aktif. Untuk membuat sebuah sistem E-Learning dengan desain gamifikasi yang baik, dibutuhkan banyak waktu untuk evaluasi ataupun mengawasi kegiatan siswa dan dosen.

Kata Kunci: E-Learning, Web 2.0, gamifikasi, framework konsep

ABSTRACT

CONCEPTUAL GAMIFICATION FRAMEWORK FOR E-LEARNING SYSTEM BASED ON WEB 2.0 TECHNOLOGIES

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E-learning has been used in many universities and schools, but currently the problems are student's motivation and engagement. A lot of methods have been used to improve student's motivation and engagement in using e-learning system, such as gamification and Web 2.0 technology.

There are some difficulties in implementing gamification and e-learning 2.0 such as lack of planning or design. To solve these, a conceptual framework or guideline was developed, to help design, planning, and implementation process of e-learning system that utilizes gamification design and Web 2.0-based technology.

This research is used Design Science Research as methodology which starts by doing some literature reviews on gamification and Web 2.0 studies and making analyses of the frameworks. It focused on Design & Development step, where a conceptual framework was developed by combining gamification, Web 2.0, and Instructional ADDIE Model. This framework also demonstrated by using real case study at Faculty of Information Technology, Maranatha Christian University. The conceptual framework which is developed consists of analysis, design, development, implementation, and evaluation phases.

Survey results conclude that to make a gamified e-learning system, there are game mechanics which need to be considered at design and implementation process such as points, badges, or leaderboards. Students are also needed to be pushed, by giving points or prizes to the most active students, so that they use e-learning system. In making good gamified e-learning system, there also a lot of time needed, these time are used to evaluate and monitor students and staff's activities.

Keywords: E-Learning, Web 2.0, gamification, conceptual framework

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The author also realizes that this thesis is still far from perfect, and has many shortcomings. Therefore, the authors will need good criticism and constructive suggestions to improve the shortcomings, so that in the future writer can be better again. Hopefully this thesis's report can be useful for the reader, especially in expanding the horizons of information technology.

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LIST OF ACRONYMS

ABBREVIATION	WORD	Used First on Page
LMS	Learning Management System	1
PLE	Personal Learning Environment	2
DSRM	Design Science Research Methodology	3

Chapter I Introduction

I.1 Background

There are a variety of technologies use to assist students in the learning process, one of them is the E-Learning system. By utilizing E-Learning system, student who cannot come to class, will still be able to learn the lessons by taking material that has been prepared by the teacher. Student who lack of understanding in any subject matter, can make a discussion room for the topic of the lesson by asking another student or teacher by using E-Learning system. In addition, this system can help teachers to manage course material and prepare exam or quiz that can be implemented directly in the E-Learning using Learning Management System or often referred to LMS (Clark & Mayer, 2011).

In Rodger's research, it is mentioned that students who more frequently use an E-Learning system, get higher test scores, compared to other students who do not or rarely use the system (Rodger, 2008). Based on this research, we can utilize E-Learning system to help in improving student test scores, by increasing their motivation and engagement to use the system. There are several methods that can be used to increase student motivation and desire to use E-Learning system; some of them are gamification and Web 2.0 technologies.

Gamification is a design model that utilizes game mechanism and elements to be implemented into an application or system that is not in the form of a game. By using gamification design on E-Learning systems can improve student's motivation and engagement by letting them to having fun in the system (Muntean, 2011) (Lazzaro, 2004). Some examples of gamification that usually used in the E-Learning system are avatars, points, rewards, achievements, badges, and leaderboards (Erenli, 2012). There are two gamification designs, which are structural and content gamification. Structural gamification focuses to motivate users in exploring the system by using environment or functional or social

component in the system. While content gamification focuses on the existing content in a system, by adding storyline or a multimedia that is interesting to motivate the user (Kapp, Blair, & Mesch, 2014).

While by using Web 2.0 technology implemented in the E-Learning system, motivating students to participate in organizing subject matter, discussing with their friends on the subject, change the system from Learning Management System into Personal Learning Environment or PLE (Attwell & Pontydysgu, 2007). In PLE learning system, students become as active users of the system for managing learning material, while the teacher acts as a supervisor to supervise the learning process that occurs in students (Ebner, 2007). Utilization of Web 2.0 technologies on the E-Learning systems are often referred to E-Learning 2.0 (Ehlers, 2009).

There are several studies on the implementation of Gamification and the E-Learning 2.0, which was found some difficulties, some of them are lack of planning and strategy, bad design (Lowendahl, 2014), and the difficulty of changing the learning process (Lee & Hammer, 2011) (Berkling & Thomas, 2013). While other studies concluded that the Gamification process and the implementation of E-Learning 2.0 can improve student motivation, and there development of learning strategies needed to take advantage of E-Learning system, which can increase the level of effectiveness in achieving the student learning processes (Barata, Gama, Jorge, & Goncalves, 2013) (Dimauro & Trullo, 2010) (Tamburri, Razavian, & Lago, 2013) (Stott & Neustaedter).

Therefore, a framework or guideline needed which can help person who wants to implement the E-Learning system, which utilizes Gamification design and Web 2.0-based technology. In addition, this conceptual framework will take up the planning and strategy, and make gamification design which can be change for improvement in the future. It can also be used as an initial basis for someone who wants to implement Gamification and Web 2.0 technology on the E-Learning system.

In conceptual gamification framework development, this research uses existing stages of Design Science Research Methodology or known by the acronym DSRM (Preffers, Tuunanen, Rothenberger, & Chatterjee, 2007). It starts with identifying the problem, defining objectives and solutions, design and implementation, demonstration, evaluation, and communication.

I.2 Identifying Problems

Based on the background of the problem, then the problems can be identified as follows:

1. What are factors needed in design, planning, and implementation of Gamification design and Web 2.0 technologies for E-Learning system?
2. How to design a conceptual framework that can be used to design, planning, and implement Gamification design and Web 2.0 technology on the E-Learning system?

I.3 Objectives

Based on the identification of the problems, the objectives can be described as follows:

1. Finding factors needed in design, planning, and implementation of Gamification design and Web 2.0 technology for E-Learning system from literatures, books, survey, and reports with topics related to Gamification and E-Learning 2.0.
2. Design a conceptual framework that can be used to design, planning, and implement Gamification design and Web 2.0 technology on the E-Learning system by using the stages of the Instructional Design ADDIE Model.

I.4 Scopes and Limitations

Limitation of the existing problems in this thesis can be described as follows:

1. *Conceptual Framework* made in this thesis is a *guideline*, which give step by step explanation to develop E-Learning system utilizing Gamification design and Web 2.0 technology.
2. Survey was administered to experts in Gamification and E-Learning systems related to the field of information technology.
3. Prototype of E-Learning system that implemented using this conceptual framework is performed on students at Faculty of Information Technology in Maranatha Christian University.
4. Conceptual gamification framework in this research focuses on structural gamification on Learning Management System.

I.5 Methodologies

The method used to accomplish this study is qualitative procedures, using existing stages on Design Science Research Methodology with the following descriptions:

1. Problem Identification

   Problem identification performed by doing literature studies, searching and studying many books and literatures which related to gamification, E-Learning, and E-Learning 2.0 topics.
2. Define Objectives and Solutions

   This stage is performed to define objectives and solutions in design the conceptual framework, by using the results from the problem identification stage.
3. Design and Development

   This stage is performed to design and design the conceptual framework, using the result from stages before.

4. Demonstration

   In demonstration stage, the conceptual framework will be demonstrated to make E-Learning system.

5. Evaluation

   In evaluation stage, the conceptual framework will be evaluated by experts using surveys with gamification and E-Learning topic.

6. Communication

   In the last stage, there will be made conclusions from research result, and discussion of future research.

I.6 Systematic Writing

This research report is divided into six chapters. Below is a brief explanation of each of these chapters:

1. **Chapter I. Introduction** contains a discussion of problems and solutions and how the research work. This chapter covers the background of the problem, purpose of research, problem definition, research methodology and systematic writing used.
2. **Chapter II. Literature Review** contains reviews from literatures and the theories related in the research.
3. **Chapter III. Research Methodology** contains the research methodology and step by step which used and done in this research.
4. **Chapter IV. Design and Development** contains analysis, design, implementation, and demonstration of conceptual framework model which utilizes Gamification design and Web 2.0 technology in E-Learning system.
5. **Chapter V. Evaluation** contains evaluation of the conceptual framework using surveys on gamification and E-Learning experts.
6. **Chapter VI. Conclusion** contains of conclusion and suggestions by looking at the results of the research.

Chapter II Literature Review

II.1 Conceptual Framework

Conceptual framework or theoretical framework means "*either graphically or in narrative form, the main things to be studied---the key factors, constructs or variables---and the presumed relationships among them. Frameworks can be rudimentary or elaborate, theory-driven or commonsensical, descriptive, or causal."* (B.Miles & Huberman, 1994, p. 18). While Maxwell referring conceptual framework as "*the actual ideas and beliefs that you hold about the phenomena studied, whether these are written down or not; this may also be called the theoretical framework or idea context for the study*" (Maxwell, 2012, p. 42). The other Sinclair's research in midwifery society said that conceptual framework consists of relationship theoretical understanding and meaningful practice. (M., 2007). There also Anfara who defines theoretical framework as a variety of levels like explanatory than can be applied to the understanding of phenomena (Anfara & Mertz, 2006).

From these definitions, conceptual framework in this research can be summarized as a guideline or step which consists of systematical relationships between gamification frameworks and Web 2.0 technologies in practical use. This conceptual framework then can be used practically in creating an e-learning system that using gamification and Web 2.0 technology.

II.2 E-Learning

E-Learning for short is a system build intended for support someone in learning about something. It can be formed as multimedia teaching software based on digital technology (Huandong, et al., 2008) or digital device such as computer or mobile device, which has many features like storing lesson, includes content relevant to the learning objective, uses media in delivering learning content, and helps learners build new knowledge and skills (Todor & Pitică, 2013). In E-

Learning process, it can be led by an instructor called as synchronous learning, or designed for self-paced individual study called as asynchronous learning (Clark & Mayer, 2011). E-Learning meaning also dependent on the context in which it used, it can be referred to the strategies used by the company to deliver training for employees, or defined as a specific mode to attend courses for college students in studying online (Xin, 2009). Some advantages in using e-learning are the ability to overcome time and distance, explore complex models of the world using simulations, better access to more information through the internet, the ability to repeat topics, mass customization: through the use of a variety of techniques it will become possible to offer personalized courses.

There are Learning Management System (LMS) and Learning Content Management System (LCMS) that can be used in supporting E-Learning system. LMS is a database application that creates a self-learning environment like what courses need to be taken, serving courses, and storing employee training information, while LCMS helping in course creation management in the system (Rosen, 2009). LMS provides an instructor a way to create and deliver learning content for learners in self-studying (Clark & Mayer, 2011), monitoring student participation, and assessing student performance. It also provides students the ability to use interactive features such as threaded discussion, forums, and chat (De Almeida Souza-Concilio & De Almeida Pacheco, 2013).

II.3 Web 2.0 Framework

Banday researches a framework for implementing Web 2.0 in Education which consists of four phases from Planning, Support, Development, and Implementation (Banday, 2012). This framework consists of procedures and steps which can be a guideline for educator in implementing Web 2.0. In using this framework, an educator can expand and add others important factors as needed (Baxter, Connolly, H, & Tsvetkova, 2011). Below is the Web 2.0 implementation Framework shown on Figure II.1.

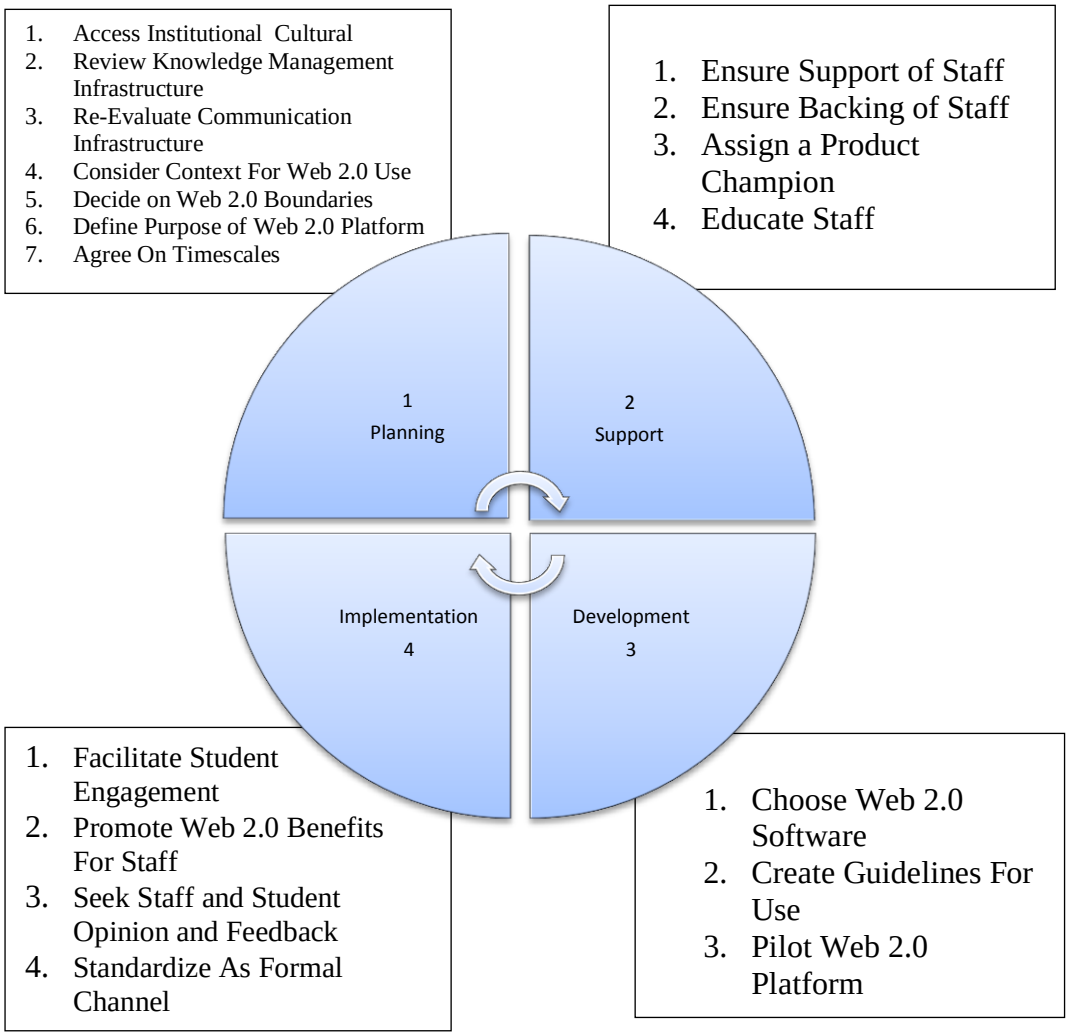

Figure II.1 Web 2.0 Framework Implementation (Banday, 2012)

II.4 E-Learning 2.0

E-Learning 2.0 is an e-learning system which implemented by using Web 2.0 technology which transforms from what was called "the Read Web" to the "Read-Write Web" (Downes, 2005). In further explanation E-Learning 2.0 is not a new technology, neither innovative variety of E-Learning, rather refers to a number of developments, which require change from teaching to learning. It means using social software and learning services, which can be combined according to individual needs, makes the learners use the entire internet as a learning resources not only given lesson materials in the class only (Ehlers, 2009). By using the

social software and learning services, enabling the student to the self-governed activities such as reflection and collaboration (Rodrigues, Sabino, & Zhou, 2011), changing the process of LMS from distribution of learning contents to Personal Learning Environment (PLE) (Pozgaj & Vuksic, 2012). PLE emphasizes participation over presentation, and facilitates users to be innovative in exploration, experimentation, also forms the basis of understanding which emerge from actions, not passivity (Brown & Adler, 2008). Below is the table displays the differences of E-Learning with E-Learning 2.0 system shown on Table II.1.

Table II.1 Different conditions and subjects of quality assessment (Ehlers, 2009)

E-Learning	E-Learning 2.0
Quality is assessed by experts	Quality is assessed by learners and peers
Learning platform	Personal learning environment
Content	User-created content
Curriculum	Learning diaries/e-portfolios
Structure of classes	Communication
Availability of tutors	Availability of tutors Interaction
Multimedia (interactive)	Social networks and communities of practice
Appropriation processes	Appropriation processes

In the E-Learning 2.0 system, John Seely Brown and Richard P.Adler research that Web 2.0 utilizes tools such as blogs, wikis, social networks, tagging systems, mash-ups, and content-sharing sites, helps teachers and students in communication and collaboration (Brown & Adler, 2008). By using this technologies in e-learning system make students to be active in creating, collaborating, editing, and sharing their learning contents, while facilitates discussion for students in interactive manner under the supervision of teachers (Banday, 2012).

Implementation in E-learning 2.0 system focuses on making system for interacting, socializing, and learning in a PLE (Wever, Mechant, Veevaete, & Hauttekeete, 2007). In this system, students can study or download materials proposed not only by the teachers but also from other students, students can also

add a comment and enroll in courses while looking the learning contents. Teachers manage the course materials and the materials added by the students (Dimauro & Trullo, 2010). Rodrigues J.J.P.C., Sabino F.M.R., and Zhou L. researched on improving e-learning experiences with online social networks which use several modules called Wall, Chatroom, Groups, Links, and RSS. Students can place comments or posts, chatting in real time, create groups of interests, sharing link between users, sharing RSS feeds, share information to an online social network or send an email from each module (Rodrigues, Sabino, & Zhou, 2011). In summary, some features that can be used in e-learning 2.0 to help students to be active in learning are, comments, chats, share information to an online social network, and add personal materials.

II.5 Gamification

Gamification consists of design models that use game elements and mechanics like rewards, achievements, leaderboards, or badges, which implemented in non-game context application which differentiate it with serious games (Deterding, Dixon, Khaled, & Nacke, 2011). Other than Deterding's research, Zichermann defines gamification as, the process of game-thinking and game mechanics to engage users and solve problems. (Zichermann & Cunningham, 2011). And Viola defines gamification which desires to combine intrinsic and extrinsic motivation to raise motivation and engagement. Intrinsic motivations come from within, the user decides whether to make an action or not such as, competition, cooperation, or sense of belonging. While extrinsic motivations, occur when something or someone determines the user to make an action like levels, points, badges, awards, and missions (Viola, 2011). While Kapp Karl distinguished Gamification as two types, one is structural gamification and the other one is content gamification. Structural gamification focuses on gamified environment, while content gamification focuses on the content like using storyboard (Kapp, Blair, & Mesch, 2014).

Gabe Zichermann researched on gamification design with system of rewards called SAPS that stands for Status, Access, Power, and Stuff. Gabe Zichermann's

study concerns on social engagement loop with four processes which include motivating emotion, social call to action, player reengagement, and visible progress/reward.

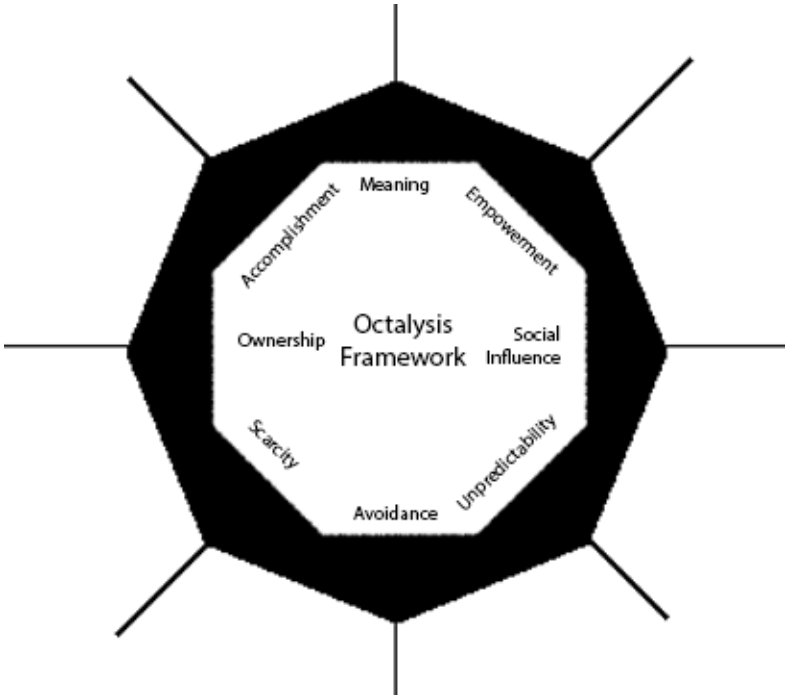

Figure II.2 Octalysis Framework, 8 Cores Driver (Chou, A Framework for Actionable Gamification, 2014)

While Yu-Kai Chou researched on gamification design consists of 8 core drivers consist of Meaning, Empowerment, Social Influence, Unpredictability, Avoidance, Scarcity, Ownership, and Accomplishment showed on Figure II.2.

II.6 Gabe Zichermann's Gamification Framework

Gabe Zichermann's gamification study consists of MDA framework which stands for Mechanics, Dynamics, and Aesthetics. Mechanics are for the functioning components of the game, Dynamics for player's interactions with those mechanics, and Aesthetics for how the game makes the player feel during interaction (Zichermann & Cunningham, 2011).

In his book, Gabe Zichermann focuses on seven primary elements in the game mechanics consist of points, levels, leaderboards, badges, challenges/ quests, onboarding, and engagement loops are described below.

II.6.1 Points

Points are required and important in making gamified system and can help developer in see how well users interact with systems, also helping in design for outcomes, and for making appropriate adjustments in the system. Points in system can have form like experience points, redeemable points, skill points, karma points, or reputation points. Usually points are related to action what users can do in the systems, and by giving bigger points to users in gamified system, can help users in defining which action is more important and valuable than others. Below is an example for giving point related to online forum activities in gamified system shown in Table II.2 which telling users that by posting thread action is more valuable than others because they will get highest points than doing others action.

Table II.2 Points Related To Forum Activities

Action	Points Given
Post Thread	5 Points
Post Comment	2 Points
Read Thread	1 Points

II.6.2 Levels

In gamified system, using level can indicate progress, helping users in understand where they are heading, and knowing that they are on the right path. Users will encounter harder challenges in higher level, but if the level is well-designed in system, users can gains confidence and experience. The level can be well-designed by making the challenges not too hard and not too easy to beat. Because if the level is too easy, users will become bored, and if it is too hard, users will stop using the system. But in some systems, hard level can become more challenging and engaging to users than making the level design easier.

A progress bar can be used in making level design becoming visible to user, serving as a percentage-based progress for user. In some systems, it best to make progress bar never reach 100% by adding more and more challenges to user. Below a figure example which tell how progression in level's difficulty shown in Figure II.3.

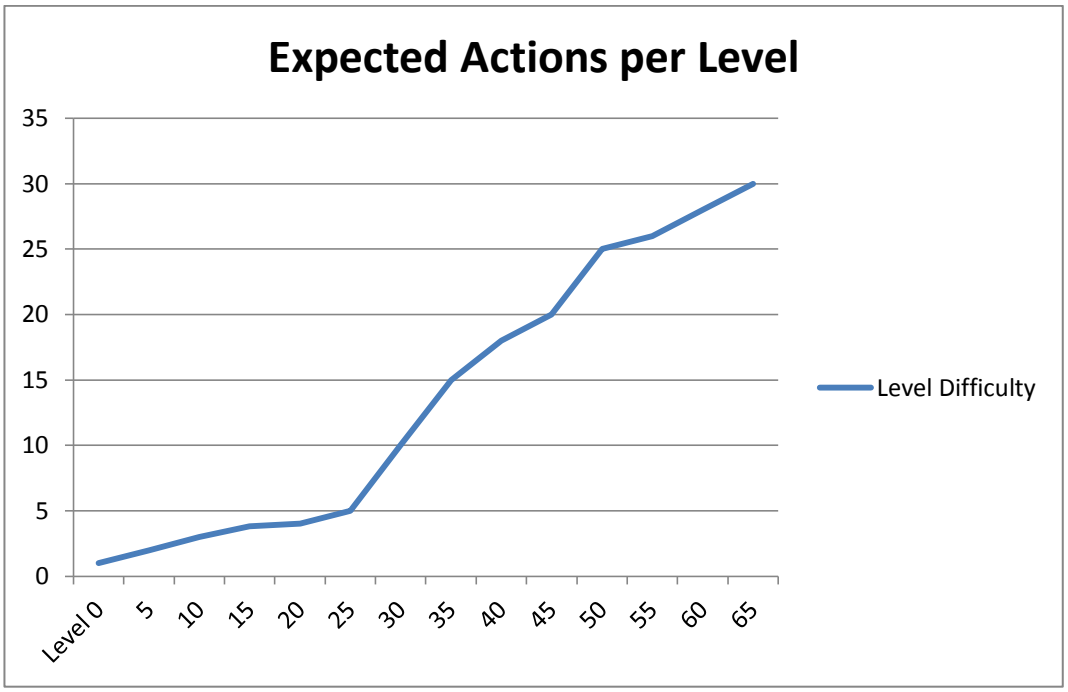

Figure II.3 Expected Actions per Level (Zichermann & Cunningham, 2011, p. 46)

II.6.3 Leaderboards

Leaderboards are formed as ordered list with a score beside each name used to make competition in users. There are two types of leaderboard, one is no-disincentive and the other is infinite leaderboard. No-disincentive leaderboard will put user in the middle without concern to user's rank, except the user get top 20 or 10 in the rank, then he/she will see all others user in the top rank. Different with no-disincentive leaderboard, infinite leaderboard allow user to track others user's rank. In some games, infinite leaderboard sliced in various ways, like locally, socially, and globally. Locally which rank users in the system in immediate area,

socially rank users to his/her friends, and the last globally rank users with global view in the system.

Using leaderboards can be a powerful tool to make users become competitive and motivated in using the system. But for most users it can be both positive and negative, so don't forget to consider user's motivation in creating good leaderboards.

II.6.4 Badges

Badge can be formed as a simple picture, line of letters, numbers, words or a logo. Using this will let other users know, what users have achieved in the system. It also makes users motivated in collecting, and others enjoy sudden surprise when they finally achieve something in gamified system. Badge is also an excellent way to encourage social promotion of products or systems, and make users know the steady progress in gamified systems. Below is the example of badges in forum shown in Table II.3.

Table II.3 Badges Relate To Forum Activities (BitCoinTalk)

Post/ Comment Count	Title Given	Badge Given
0 Post	Brand New	O
None	Newbie	O
30	Jr. Member	O
60	Member	OO
120	Full Member	OOO
240	Sr. Member	OOOO
480	Hero Member	OOOOO
775-1030	Legendary	OOOOO

II.6.5 Onboarding

Onboarding is a function that lets new users who are new in using the gamified system, it helping them having experiences and values in the system. It is a good approach to engage new users, so they will get to experience the core behavior of the system. A good system will let new users having good experience and getting

the values of system before asking users to register. The system also cannot giving too much information to new users, if really needed the information can be change into several steps that will guide users, or into several tasks that users need to done, and giving them some prizes like badges after they finish the tasks. In building a good onboarding function, it cannot give users opportunities to fail, rather than give them no-risk and no-losing actions are good approaches.

II.6.6 Challenges and Quests

Challenges and quests act by giving several tasks or actions to users, using these also giving users direction what to do in a gamified system. Usually after users finish the tasks given, they will get some prizes and harder challenges become accessible for users to do. A good system should ensure there are always more challenges for users to take. Or the system can also giving users an action that letting users in creating their own challenges and complete them for rewards.

In designing a gamified system, it is a good approach to design the system which can give users to choose cooperative plays, after they gain enough experiences or more users using the system. This cooperative play let users doing the challenges and quests by working together with others, or called as cooperative quests. The design can also have formed as, where users doing their tasks alone, but their achievements count up or shared with their group. In some systems, users also get some prizes if they can invite other users, or making others to be active in using system.

II.6.7 Social Engagement Loops

Social engagement loops are the way users engage and what bring them to use the system. It consists of four processes which are visible progress or reward, motivating emotion, social call to action, and player re-engagement shown on Figure II.4.

Motivating emotion is main function in the system that can motivate users in using the system; it can be exploration, getting lesson materials, or collecting badges. Social call to action is what social related users do to others, so they will take some actions because of it, like giving comment or reply in a forum, or ranking in leaderboard. Player re-engagement is what makes users to engage the system again after they finish using it, player re-engagement can be completing challenges or daily tasks, or finishing assignments. And visible progress/ reward is by letting users knowing what they have achieve, which can be shown as progress bar in several points, giving badges or titles to users.

Figure II.4 Social Engagement Loop (Zichermann & Cunningham, 2011)

II.7 Yu-kai Chou's Octalysis Gamification Framework

Yu-Kai Chou's research on gamification state that a good gamification design is start from how designer want users to feel or called as core drives, and then pick which game mechanics that designer need to achieve them.

These core drives contain eight elements which are, Epic Meaning and Calling, Development and Accomplishment, Empowerment of Creativity and Feedback, Ownership and Possession, Social Influence and Relatedness, Scarcity and Impatience, Unpredictability and Curiosity, and the last, is Loss and Avoidance.

These 8 core drives are described into an octagonal diagram shown on Figure II.5 which separated by white hat gamification for top, black hat gamification for bottom, extrinsic motivation for left side, and intrinsic motivation on the right side.

Extrinsic motivation on the left side being more related to logic, calculation, and ownership, while intrinsic motivation on the right side more related to creativity, self-expression, and social aspect. And for black hat gamification means by pushing users to doing something by giving them more negative emotions, rather than giving positive emotions like white hat gamification do. A good gamified system will need to implement these two types of gamification, because sometime users become more engaging if they can express their creativity or success in getting something good, while the others feeling challenged because they don't know what will happen next, or sometimes they must be pushed by giving them a fear in losing something (Chou, Yu-Kai Chou & Gamification).

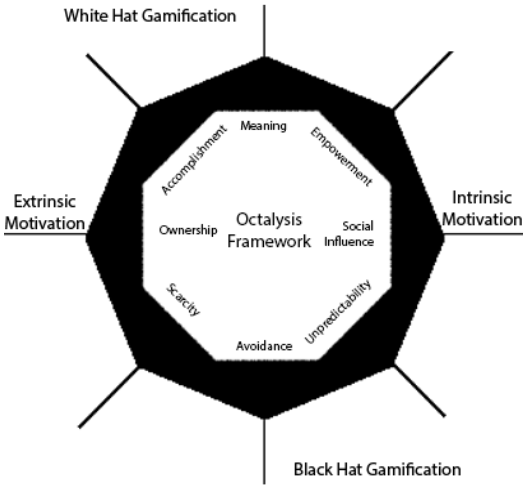

Figure II.5 Octalysis Diagram (Chou, A Framework for Actionable Gamification, 2014)

There are up to five levels in using Octalysis Framework but on this research only discussed until level three. On level one, designer need to list all of the functions which are going to be use in an octalysis diagram, and then the designer need to evaluate and make it balance. On level two, designer need to evaluate the diagram and prepare it for four types Discovery (how to make users want to use gamified

system), Onboarding (how to help users in use the gamified system), Scaffolding (what actions users usually do regularly in gamified system), and End Game (what the difference of active or veteran users than others). And on the level three, the four types of octalysis diagram on level two become separated and linked into four Bartle's player types (Socializer, Explorer, Achiever, and Killer).

Beside three level of octalysis diagram, Yu-Kai Chou also present Strategy Dashboard consists of five steps as described below (Chou, A Framework for Actionable Gamification, 2014):

1. Define Business Metric (Objectives): What designer want to improve in system in order of importance and need to be quantifiable.
2. Define User: What motivate users, making them doing current activities and why they don't want to do the activities.
3. Define Desired Action: What actions do designer wants users do.
4. Define User Status (Feedback): What users need to keep their tracks or progresses.
5. Define Incentives: What will users get after they do the activities.

II.7.1 Epic Meaning & Calling

Epic Meaning & Calling is where the users feeling that they are doing something greater than themselves or was chosen to do something useful (Chou, Yu-Kai Chou & Gamification). The final result is like where users devoted their time in doing activities like maintaining their position or rank in forum activities by keep posting. The other thing that can move users is when they are believe, that they have something more valuable or precious than others. Other example is twitter, where users use their precious times to maintaining their followers by keep tweet or re-tweet as shown on Figure II.6.

Figure II.6 Twitter Profile (twitter.com)

II.7.2 Development & Accomplishment

Development & Accomplishment is where users developing skills in using gamified system by looking at their progress, badges, and achievement to eventually overcome all challenges. In making badges or trophies, challenges are also important, because without challenges they won't be meaningful to users at all (Chou, Yu-Kai Chou & Gamification).

II.7.3 Empowerment of Creativity & Feedback

Empowerment of Creativity & Feedback is where users trying their best in a creative process to solving something by using different combinations. Users not only need ways to expressing their creativities, but also need to be able see their results by looking at feedback, progress bar, or respond from the systems (Chou, Yu-Kai Chou & Gamification). Some video game examples that motivating user's creativity are Minecraft, puzzle games like chess, or FarmVille where users can create their own farms with many different ways. In e-learning system, we can give tasks or quests to students and challenge them to do the tasks by looking at different ways.

II.7.4 Ownership & Possession

Ownership & Possession is core drive which users become motivated because they feel like owning something. When users feel that ownership present, they want to make their own to be the best, or better than the others. A good example is where users have their own avatar, and can change the looks the way they want it to be, or collecting many virtual goods like stamps, badges, or achievement collections. Sometimes it will become awkward if users have three from five items. Because of this, users will become more motivated and trying their best in collecting the final pieces (Chou, Yu-Kai Chou & Gamification).

II.7.5 Social Influence & Relatedness

Social Influence & Relatedness is where users have feelings to want to get the same level as their competitor because of social elements like, mentorship, acceptance, competition, companionship, or social responses. Because when users see their friends own some valuable things or getting some extraordinary skills, they don't want lose to them, so they will try their best to not get left behind, by also getting more valuable things or honing their skills to reach the same level as their friends. Some examples that can be used in gamified system are group quests or mentorship where they must working together to achieve the same objectives (Chou, Yu-Kai Chou & Gamification).

II.7.6 Scarcity & Impatience

Scarcity & Impatience is when users want something that they can't get because of various reasons. For simple example is people waiting for new items to come out, it motivates people to think about it all day along. Many people wanted that items because previously they can't get them. Other examples are like there are some new functions in system that would make users get more new skills and new items, but they must wait for them in new update. Or stop user's actions and making them to wait for some minutes, before they can do the actions again. This example implemented in some games like Candy Crush and others mobile games (Chou, Yu-Kai Chou & Gamification).

II.7.7 Unpredictability & Curiosity

Unpredictability & Curiosity gives users of wanting to find out what will happen next in the system. Making users don't know what will happen will motivate them to engage and think about it often. This Unpredictability & Curiosity often uses in gambling or lottery, where people feel addicted because they can't predict which results will happen. Some examples that implemented in system are chances to get valuable item, users will need to pay a lot of money or virtual currency to get it (Chou, Yu-Kai Chou & Gamification).

II.7.8 Loss & Avoidance

Loss & Avoidance motivate users to become more active by giving them fear to lose. Users tend to avoid losing in what they are already doing; like by quitting from the system, they don't want to feel what they already done useless or they have achieved gone, also don't want to give up of opportunities that they see in front of them (Chou, Yu-Kai Chou & Gamification). This core implemented in system giving negative emotions to users; if it not designed well, sometimes it will make users to stop using the system because they tired in getting the negative emotions, while the others become more challenged.

II.8 Player Motivation

In game design and application, user in the system usually called as a player. Some of the researches define player's motivation in using a system, like Bartle's player types which divides player's motivation as Socializers, Explorers, Achievers, and Killers showed on Figure II.7 (Bartle, 2003).While Nicole Lazzaro defines player's types by looking at their emotions which consists on a reason people play in different aspect of the Player Experiences such as, Hard Fun, Easy Fun, Altered States, and The People Factor (Lazzaro, 2004). In this research, this player's types used in deciding the flow and the features of e-learning system built.

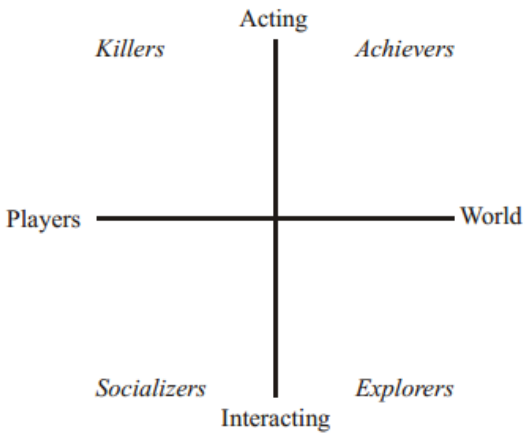

Figure II.7 Bartle player's Types (Bartle, 2003)

II.9 Instructional Design: ADDIE Model

Instructional Design is systematical guideline that can be used in supporting learning processes by making them to be structured by using this design. It can be change the process of learning, creating activities or making the environment of learning more engaged for students. Instructional Design can help making clear instructional goals, lessons designed to focus on students, improve student performance, and making the learning experience more engaging (Davis, 2013). There are several instructional designs that can be used in making learning system, the one that this research use is ADDIE Model.

ADDIE (Analyze, Design, Develop, Implement, and Evaluate) Model is a process applied to instructional design in order to generate episodes of intentional learning. The procedures and steps associated with each phase can be vary depend on designer's perspective, the background of the design team members, and the context of ADDIE being applied in design (Branch, 2009). Using this model also help in giving guidelines and fundamental approaches, because there many models created based on ADDIE (Soto, 2013). ADDIE Model consists of 5 steps as described below (Branch, 2009):

1. Analyze: identify the goal, objective, and the cause for performance gap. In this phase designer also need to find a good instruction with potential of success to close that gap. In simple definition, analyze process is where designer making analysis, constraint, and behavior of the problems from users and system perspective.
2. Design: verify and define learning objective and technology selection used to solve the problem. This process's result can be user interface, visual design or prototype.
3. Develop: identify and validate selected learning resources that will be used. It can be tools that will be used or learning contents. In some conditions, this process can become implementation and integration of learning resources and technologies used.

4. Implement: prepare the learning environment and engage the students in using the system developed.
5. Evaluate: assess the quality of the instructional products and processes, before and after implementation.

II.10 Delphi Method

Delphi method is based on structural surveys and makes use of the intuitive available information of the participants, who are mainly experts. It delivers qualitative as well as quantitative results (Cuhls). Delphi survey is done in some stages of operations, such as exploration, distillation, and utilization showed on Figure II.8. In this research there will be done a survey on experts which have expertise in e-learning, games, or gamification topics to help in evaluate the framework. One of the main objectives of this Delphi method or survey is to obtain estimates important parameters in the evaluation of framework (Simon, Matovelle, Pereira, & Pedrosa).

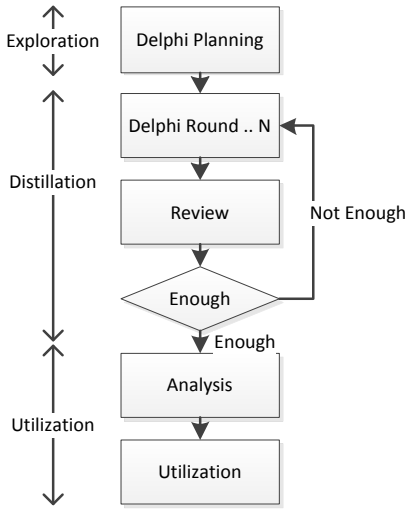

Figure II.8 Delphi Survey Implementation (Day & Bobeva, 2005)

Chapter III Research Methodology

III.1 Design Research Methodology

This research uses Peffer's Design Science Research Methodology (DSRM) for Information System as procedure and guideline (Preffers, Tuunanen, Rothenberger, & Chatterjee, 2007), using six phases consist on identify problem and motivate, define objectives of a solution, design & development, demonstration, evaluation, and communication as showed in Figure III.1.

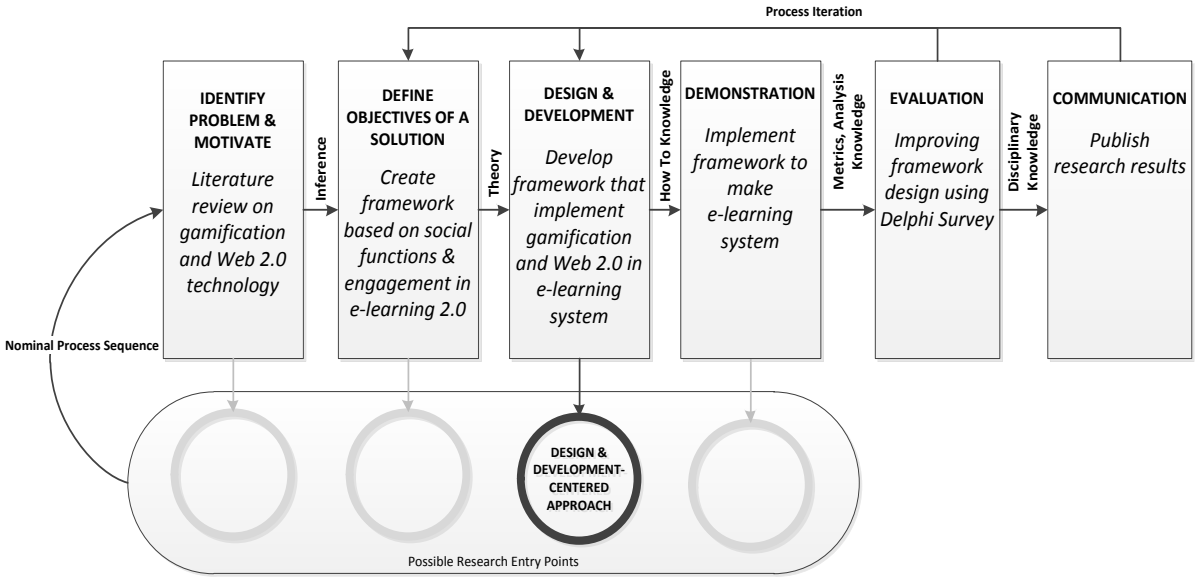

Figure III.1 Design Science Research Methodology Approach (Preffers, Tuunanen, Rothenberger, & Chatterjee, 2007)

This DSRM delivery is centered to design and development a conceptual framework which combining Gamification, Web 2.0, and Instructional ADDIE Model which can be used to planning, design, and implementation process to develop E-Learning system.

The phases in this conceptual framework are Analysis, Design, Development, Implementation, and Evaluation which are also the same with the phases or steps in Instructional ADDIE Model.

Below are described each of the DSRM phases which are used in this research.

III.2 Identify Problem & Motivate

In the identify problem & motivate step, there are literature reviews done on some international conference papers, journals, and books related to E-Learning, Gamification, and Web 2.0 Technologies topics. Literature reviews also done on Games topic are to help in defining what motivate users to play or use system, there also some literature reviews on Bartle Player Types which define users as four personalities from Socializer, Explorer, Achiever, and Killer. This player types can be used to define which activities will be implemented in system.

The problems that concluded from literature review and case study are described below:

1. Improve student's motivation and their engagement in E-Learning system.
2. There are a lot of gamified systems with no planning process and have bad design.

III.3 Define Objectives of a Solution

From identifying problems step above, the objectives in this research focus on designing a conceptual gamification framework, which can be used as a guideline to help in designing, planning, also implementing gamification and Web 2.0 technology in e-learning system. By using this conceptual framework can help in planning and designing E-Learning system, which will improve student's motivation also their engagement in e-learning system because of gamification and Web 2.0 Technology implemented.

III.4 Design & Development

On this design and development step, the conceptual gamification framework is designed and combined by focusing on personal learning environment, Gamification design, Web 2.0 framework, and instructional ADDIE model. In this

step, this conceptual framework also described for further explanation in each process.

To design a conceptual framework, some analyses are done on gamification and Web 2.0 framework which are used to define new phases of steps in it. After the analyses done, the processes which concluded in the framework are related to each of the step and combined with Instructional ADDIE Model.

In this conceptual framework design, each of the frameworks from Gamification and Web 2.0 is concluded in five simple steps. From these steps, each of the process is related to one another and combined with instructional ADDIE Model into new conceptual framework.

Below are described the analysis of Gamification and Web 2.0 framework done.

III.4.1 Gamification Framework Analysis

From Gabe Zichermann and Yu-Kai Chou gamification framework, below are game mechanics that can be used in gamified system shown on Table III.1.

Table III.1 Game Mechanics in Gamification (Zichermann & Cunningham, 2011)

Type	Game Mechanics	Additional Description
Rewards	Points, Badges, Virtual Goods, Virtual Currencies	Points are related to user's activities in system.
Objectives	Challenges/ Tasks	The objectives must be clear and meaningful to users.
Feedback/ Progress	Level, Progress Bar, Leaderboard	Progress must be visible to users.
Social	Invite, Share	- Player Re-engagement - Social Call to Actions - Motivating Emotion - Visible Progress

In the octalysis framework, Yu-Kai Chou also mentioned about strategy dashboard that could be used to defining gamification and used as a guideline shown on Table III.2.

Table III.2 Strategy Dashboard in Using Gamification (Chou, A Framework for Actionable Gamification, 2014)

Define	Description	Example
Objectives	- Analyze the system that is being used - Analyze for system weakness - Analyze what is to be improved by designer	- Improve user's motivation and engagement in using e-learning system. - E-Learning system which being used is too complex for novice user.
Users	- Analyze user's affection to system - Analyze user's behavior (socializer, explorer, achiever, killer)	- User feeling bored when using e-learning system - Most people in the classroom are socializer and explorer type.
Actions	- Prepare to do list actions for user - List onboarding actions for user.	- Read lesson's slides - Do assignments - Post comment - Read forums
User's Status/ Feedback	- What feedback used to help user - What difference for novice and veteran user.	- Onboarding like tutorial - Leaderboard - Level - Progress Bar - Titles
Incentives/ Rewards	List rewards that work as gifts for users	- Badges - Points - Access as forum's moderator

III.4.2 Web 2.0 Framework Analysis

From literature review done on some researches, Web 2.0 framework that can be used to help in making framework design for e-learning system consists of Planning, Support, Development, and Implementation phases which shown on Table III.3 below.

Table III.3 Web 2.0 Implementation Frameworks (Baxter, Connolly, H, & Tsvetkova, 2011)

Phase	No	Step	Justification
Planning	1	Assess educational culture	Ensure educational culture in school can accommodate Web 2.0 technology
	2	Decide on Web 2.0 boundaries	- Prepare the environment objective whether Web 2.0 will be used individually or collectively by students - Analyze which departments will use Web 2.0 and whether there needed a changed in curriculum or courses.
	3	Agree on Context for Web 2.0 use	Decide where Web 2.0 tools will be applied.
	4	Define purpose of Web 2.0 platform	Analyze what is going to be improved by using Web 2.0 tools
	5	Agree on timescales	Prepare the timescales for implement and evaluate Web 2.0 tools used.
Support	6	Ensure support of staff and students	Facilitate staff and students to experiment with Web 2.0 tools implemented.
	7	Ensure backing of staff	Giving information to staffs how by using Web 2.0 can accommodates their ways of teaching.
	8	Assign a product champion	Take some students as assistances to help others in learning using Web 2.0.

Phase	No	Step	Justification
	9	Educate staff	Give some practical workshop for staff in using Web 2.0 tools
Development	10	Choose Web 2.0 software	Analyze which Web 2.0 tools that the most applicable with learning environment
	11	Create guidelines for use	Make a guideline for direction and to helping staff in using Web 2.0 tools, like creating contents that want to be added to system.
	12	Pilot web 2.0 platform	Giving experiment and testing for using Web 2.0 tools for given time.
Implementation	13	Facilitate student engagement	Recognition for student's activities, like giving them rewards for creates discussion with others using Web 2.0 tools.
	14	Promote web 2.0 benefits to staff	Giving news and information about benefit in using Web 2.0 tools to staffs.
	15	Seek staff and student opinion and feedback	Ask for staffs and students opinions about using Web 2.0 tool whether it need to be improved.
	16	Standardize as formal channel	Make Web 2.0 tools as the formal channels in learning environment
	17	Monitor success of Web 2.0 platform	Review how Web 2.0 tools implementation.

III.5 Demonstration

The conceptual framework designed from previous step is demonstrated by using E-Learning system at Faculty of Information Technology in Maranatha Christian University as a real case study. The e-learning system developed in this step is prototype which used for further research in Faculty of Information Technology at Maranatha Christian University.

This demonstration is using the conceptual gamification framework which developed in this research. By using this demonstration, there also can be concluded some conclusions whether the gamification and Web 2.0 designs which chosen in the conceptual framework have been good or they still need to be changed to be used in future designs.

III.6 Evaluation

On the evaluation step, the conceptual framework evaluated by using Day's and Bobeva's Delphi Survey method, which will be conducted in two different groups of interviewees, the first group which expert in field of learning or e-learning system, and the second group which expert in gamification or game development. This survey used to support processes on the five stages in the conceptual framework.

Delphi Survey method is usually done in two or more cycles; in this research there will be done just one cycle of survey but takes two types of experts to participate in this survey.

From the results of survey, then can be concluded that whether the process in conceptual framework design need to be change or not by looking at the majority of expert's answers. In the survey, there will be some questions that asking for expert's opinion in gamification or e-learning problems from their experiences and their knowledge.

III.7 Communication

In this last step, the results are communicated to public and researchers to help in further development, especially in education, gamification, and e-learning perspective. This communication step done by giving presentation to some reviews about this research and result. There also two research papers created which published in an international conference in IEEE.

First paper with title “Gamification Framework Model, Based on Social Engagement in E-Learning 2.0” has published in IEEE and presented at international Conference Time-E 2014. This paper is describing about proposed framework that can be used as one of literature for designers who wants to use Gamification or E-Learning 2.0. They can also change or modify this proposed framework to improve it further.

The second paper with title “Conceptual Gamification Framework for E-Learning System Based on Web 2.0 Technology” also will be published and presented in one of international conference with IEEE or Scopus index. This paper is describing about the proposed conceptual gamification framework which has developed in this research by combining Gamification, Web 2.0, and Instructional ADDIE Model.

Chapter IV Design and Development

IV.1 Gamification Framework Design

From the analysis of gamification framework, below are shown five simple steps to create gamified system on Figure IV.1 which consists of:

1. Define objective of using gamification and user's activities in the system.
2. Define feedbacks and game mechanics that will be used as gamification factor.
3. Combine contents with game mechanics defined in the previous step.
4. Implement gamification in the system with the design from the previous steps.
5. Monitor and evaluate gamification process in the system.

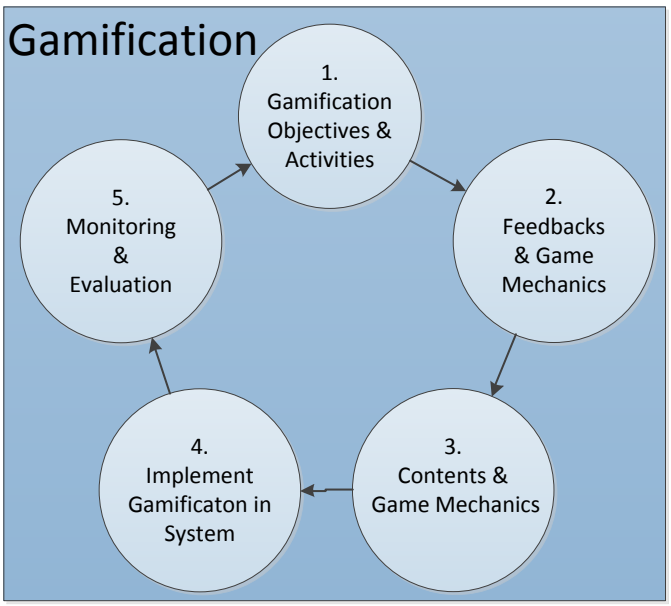

Figure IV.1 Gamification Concept Design

IV.2 Web 2.0 Framework Design

From the analysis of the framework, below are shown new phases of Web 2.0 as a guideline to make an E-Learning 2.0 system at Figure IV.2. These five phases consist of:

1. Analyze and prepare the learning environment
2. Prepare the contents which will be used in the system, like learning materials and assignments.
3. Prepare E-Learning system that will be used and implemented.
4. Implement E-Learning system with the contents in the previous step.
5. Evaluate the progress of E-Learning system.

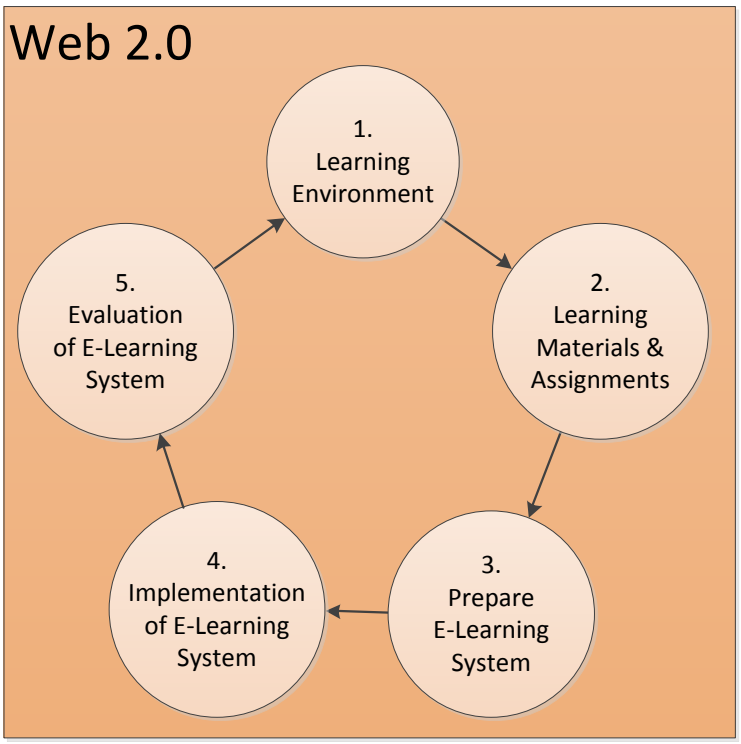

Figure IV.2 Web 2.0 Concept Design

IV.3 Conceptual Framework Design

From Gamification and Web 2.0 framework analysis, and integration with instructional ADDIE model, below is the combination of these three designs shown at Figure IV.3.

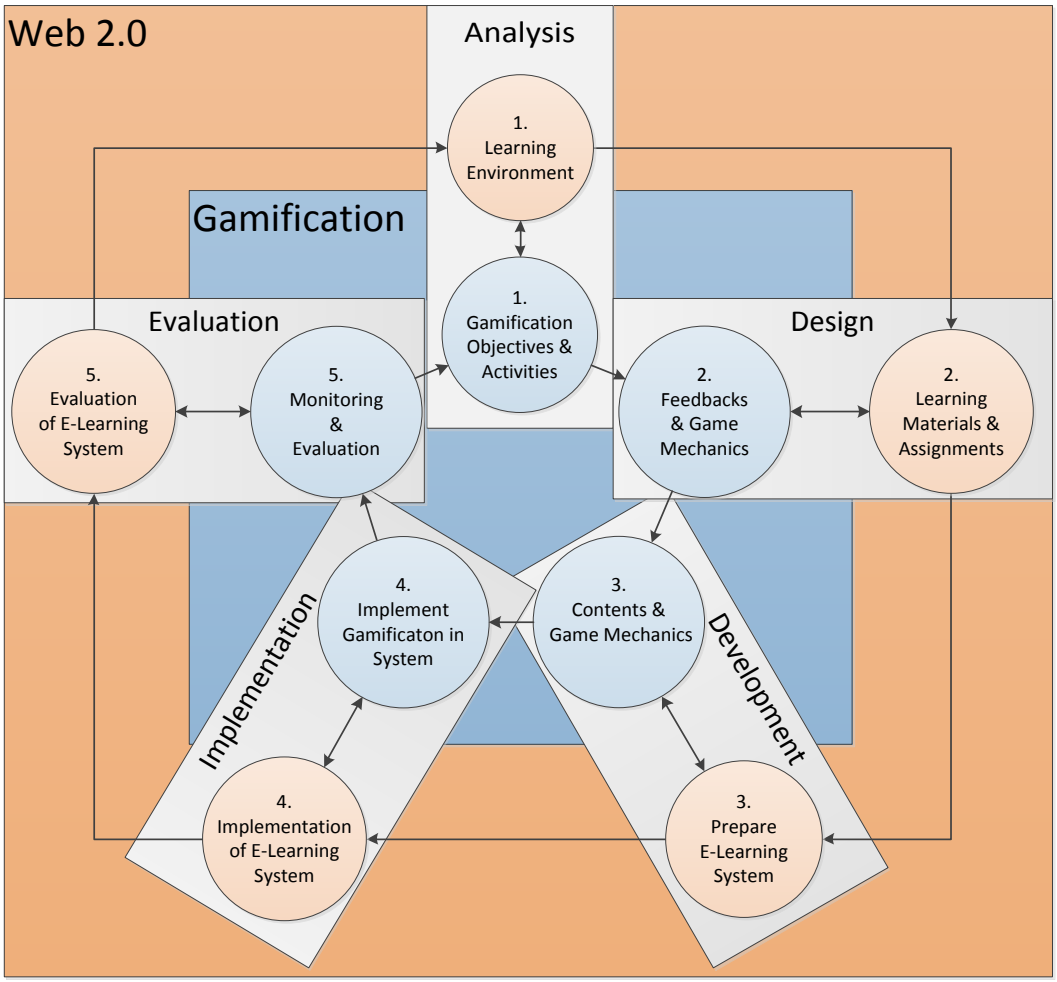

Figure IV.3 Combination of Gamification, E-Learning 2.0, and ADDIE model

In the figure above shows that there are relations between E-Learning 2.0 system with gamification steps. Between the relationship of E-Learning 2.0 and gamification design can be combines with the steps in ADDIE model.

IV.4 Conceptual Framework Development

In this conceptual framework development, this design model separate the framework into five steps consist of Analysis, Design, Development, Implementation, and Evaluation which have more detailed information as shown on Figure IV.4.

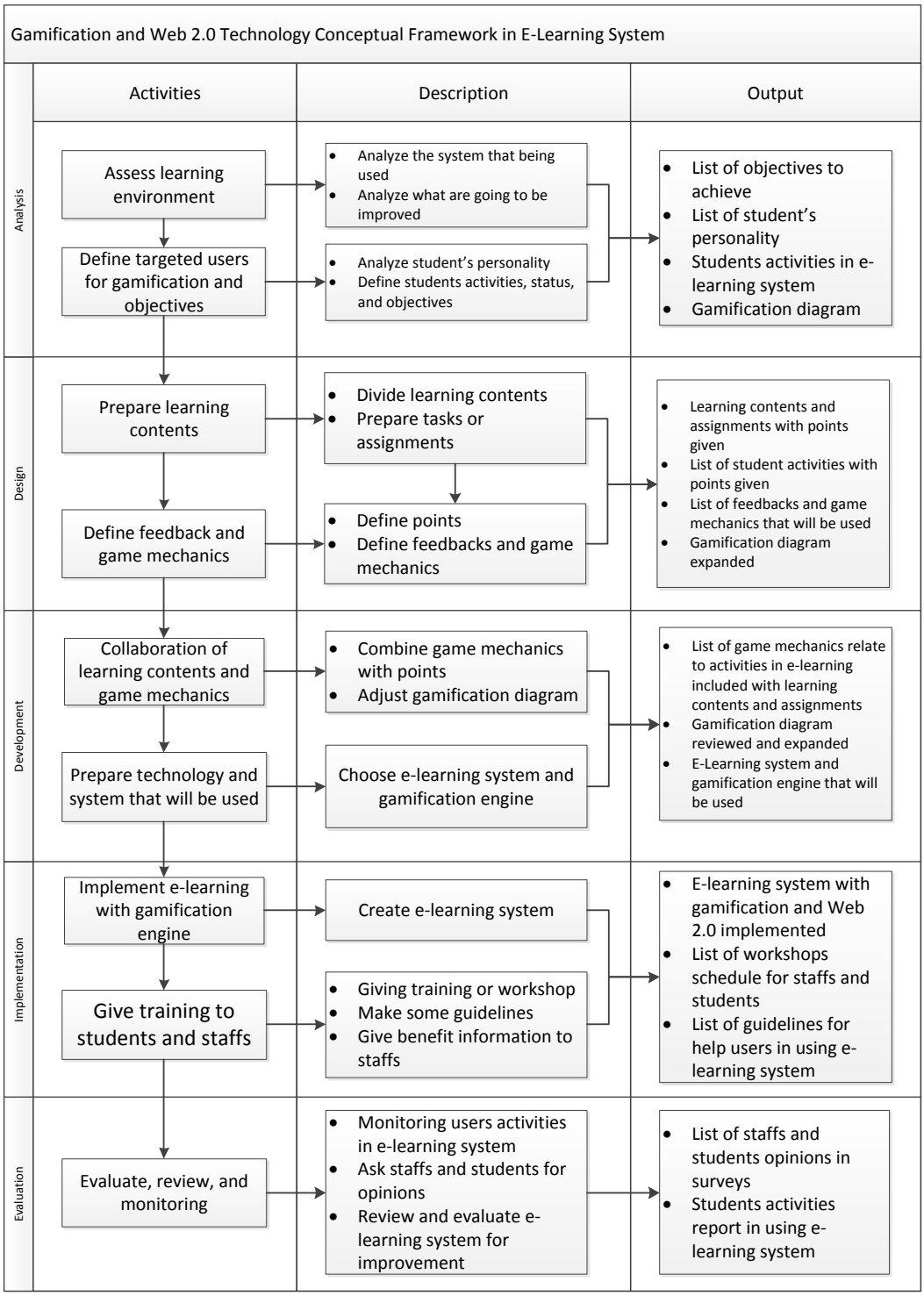

Figure IV.4 Conceptual Framework Design using ADDIE model in E-Learning system

IV.4.1 Analysis

From analysis step, designer will know how they want to build or improve e-learning system and the objectives of using gamification in e-learning system. There are two activities in this step which are assessing learning environment and define targeted users for gamification. The activities includes of four steps as described below:

a. Analyze the system that being used

   If there are no existing system, then this step can be skipped, and changed to analyze or prepare e-learning system so that can be used in learning environment. Analyze and prepare e-learning system consists of:

   1. Prepare a server for implementation
   2. Ask a permission to supervisor to make an e-learning system
   3. Check the lecture's process, whether e-learning can be implemented, or add e-learning in lesson.

b. Analyze what are going to be improved

   Define what designer wants to improve in existing or create a new e-learning system, it can be for improving motivation and engagement students in learning by using e-learning system. If there are several objectives that need to be improved, they should be ordered from critical one first.

   Keep in mind that not every problems or objectives can always be solved by using gamification or Web 2.0 technology. The reasons could be:

   1. There is no adequate system, network, budget, or hardware for users to use e-learning.
   2. No staffs that want to use e-learning system because it is hard to maintain and use.
   3. There is not enough knowledge for students in using e-learning.
   4. Or others reasons that not mention above.

   If the problems are user's lack of knowledge or no staffs that want to maintain e-learning system, it can be solve by giving workshop or training for several days.

c. Analyze student's personality

In this step, designer needs to analyze student's behavior by using Bartle's player motivation. Using this step, designer can knows how student's personality, whether they are more likely to be a socializer, achiever, explorer, or killer personality. Designer can create a survey manually or search for several online test that already created by others. One of the online surveys that can be used is in gamerdna site in this link gamerdna.com/quizzes/bartle-test-of-gamer-psychology. A person can have all types of personality, but there will be percentage majority in them. If there are too many students to take surveys or not much time, designer can skip this step and make the activities and game mechanics balanced for all of four types personality, by going this way can make the gamified system friendlier for all types of personality.

d. Define students activities, status, and objectives

This step contains all of the student's activities that will be used in e-learning system. Some e-learning activities that can be considered are letting students to make their own tasks or assignments with staffs or educators validation, so students will have feeling that they have ownership in e-learning system. It can also be student's status, which they can change freely like profile picture. Below are other activities that can be done in e-learning system combined with Web 2.0 activities shown on Table IV.1.

Table IV.1 Activities in E-Learning system (Ehlers, 2009)

Type	Description	Examples
Self-Assessment	Students can see their progress by themselves	Progress bar in each modules
Participation	Students can participate in activities with others students	Forum for discussion on learning, or working on tasks together with other students
Interaction	Students can interact with learning contents in e-learning system	RSS Feed, add link or learning contents, ask a question in a post, or mentoring others.
Communication	Students can communicate with other students directly or indirectly	Chat feature, add post or comment on forum discussion.

In this step, designer also need to consider student's activities which gamification objectives that will be used in gamified system by looking at social engagement shown on Table IV.2.

Table IV.2 Social Engagement in Gamification (Zichermann & Cunningham, 2011)

Type	Description	Examples
Feedback	Students can see reward and progress they achieve in gamified system	Progress bar, giving badges or titles
Motivating Activities	Students become motivated to use the system.	Exploration, getting lesson materials, collecting badges
Social	Student want to do some activities because of other students	Giving comment in a forum
Re-engagement	Students want to use the system again.	Daily tasks or challenges, solve assignments

While choosing student's activities and status, these activities in e-learning system need to be assigned into a diagram. One of the examples is octalysis diagram, which can be used in this link (yukaichou.com/octalysis-tool/). By using diagram, it will help designer in adjusting and balancing activities and game mechanics in the next Design step.

IV.4.2 Design

In design step, the designer will prepare the learning contents and assignments that will be used in e-learning system, after that he/she will need to define how many points given to each task and student's activity. Designer also needs to define all of the game mechanics that will be used in gamified system in this process. These game mechanics will collaborate with student's activities in the next Development step. Below are described all the processes in Design step:

a. Divide learning contents

   In this process, designer will need to divide learning contents that will be used in e-learning system into a small chapters or modules. By doing this

process, designer then can separate each modules to be assigned points in the next process.

b. Prepare tasks or assignments

   Besides preparing learning contents and divides them, designer also needs to prepare tasks or assignments that will be done by students. These tasks will be used as challenges for students to solve. Consider in design, that some assignments given, let students to join up with others for working together.

c. Define points

   In this process, all of learning contents, assignments, and student's activities will be given points. By giving points to learning contents means that if students have finish reading them, they will get some points because of it.

   This point will be collaborate in the next Development phase and used as a motivation for students. Higher points given to activities or assignments mean that they have higher meaning than others.

d. Define feedbacks and game mechanics

   And the last process of Design step is to define game mechanics that will be used in e-learning system. Some examples for the game mechanics are badges or leaderboards. Game mechanics should be reconsidered with student's activities on Analysis step before.

   On this process, if designers are using octalysis framework, they also need to create and design onboarding, scaffolding, end game, and discovery processes. These four phases can be created optionally, we can know detailed information about gamification process in e-learning system, whether it need another adjustment or not.

IV.4.3 Development

In Development step, designer needs to combine the learning contents with game mechanics chosen from steps before, adjust game mechanics in gamification

diagram, and choose which e-learning system that fit with the design from Design and Development step. Below described the explanation with each processes:

a. Combine game mechanics with points

   In this process, designer needs to combine the points given in assignments, learning contents, and student's activities with game mechanics. For example, if badge in game mechanics used, we need to prepare some pictures model which will be given to students, if they have achieved in targeted points or finished in reading learning contents.

b. Adjust gamification diagram

   Designer need to adjust gamification diagram from Design step, whether it needs to be added more activities or game mechanics to make it balanced. Designer can also improve to more detailed gamification diagram in this process, so that it covers the four player personality, onboarding, discovery, scaffolding, and endgame. By doing this, a designer can grasp the gamified system easily, whether it needs more adjustments or changes in the future to improve gamification diagram and gamification in the system.

c. Choose e-learning system and gamification engine

   After adjusting the gamification diagram, designer need to choose an e-learning system and gamification engine that will be used and fit in to the gamification diagram and list of student's activities created. An example for e-learning system is Moodle. There are several gamification engines that can be used freely or commercially use, one of the examples is Captain Up (captainup.com) which can be integrated into Moodle system.

IV.4.4 Implementation

Implementation step covers up to create e-learning system with gamification and web 2.0, giving training, guidelines for users, and benefit information to staffs. Below are described further:

a. Create e-learning system

   In this process, an e-learning system created using a framework, or from scratch with gamification design from steps before. Several frameworks that have been integrated with Web 2.0 technology as example are Moodle (moodle.com), eFront (efrontlearning.net), and KanataLV (kanatalv.sourceforge.net). In implementation process, the designer needs to integrate gamification design in system. If there are little times to create full e-learning system, then designer can also create prototype, so it can be used by students and staffs in a few times.

b. Giving training or workshop

   After create e-learning system, designer need to give a training or workshop to staffs and students about how to operate the e-learning system or use gamification system built in.

c. Make some guidelines

   To making it easy for future users that use e-learning system, designer can make some guidelines about how to operate e-learning system or develop it for further development. The guidelines can be a manual book or just "how to" in system description.

d. Give benefit information to staffs

   To make this e-learning system used by all of the staffs, designer needs to give benefit information in using e-learning 2.0 and gamification to all of staffs. It can be by giving a seminar or another workshop which will give them a certificate if they join up until finish to accumulate their interest.

IV.4.5 Evaluation

On Evaluation step, e-learning system which has been designed and implemented will need to be evaluated, monitored, and improved further to achieve best result in gamification and Web 2.0 design, as described below:

a. Monitoring user activities in e-learning system

   In this step, designer needs to monitor and maintain user's activities in e-learning system, which include students and staffs activities. Some examples for activities are maintaining student's motivation in using e-

learning features like discussion forum, or discussion board, where students will need reply or answer on their board. For these things, designer can asks for student's assistances in maintaining discussion forums. Beside e-learning features, designer also needs to maintain gamification features, like badges and achievements. Because when there are some students that already get all of badges, challenges, and achievements, they will become bored if there are no new badges or challenges.

b. Ask staffs and students for opinions

   In evaluate e-learning system, opinion from staffs and students are important and need to be considered in improving the system. The opinions can be gets from taking some students and staffs for samples, or use surveys and questioners.

c. Review and evaluate e-learning system for improvement

   After get e-learning's performance and user's opinions, designer needs to review and evaluate e-learning system for improvement. Some improvement can be, change or add new game mechanics or gamification design, or add new features in e-learning system.

IV.5 Demonstration

Below are the demonstrations of the conceptual framework which use E-Learning at Faculty of Information Technology in Maranatha Christian University as real case study.

IV.5.1 Analysis (Demonstration)

For the implementation of this framework, it will use Web Programming lesson from one of the lectures Information Technology program in Maranatha Christian University. Below are described more detailed information about analysis step:

a. Analyze the system that being used

   The conditions for e-learning system in Maranatha Christian University are:

1. In Maranatha Christian University, especially for Information Technology program has e-learning system and hardware supported already.
2. There are still few of students which used and login to e-learning system.
3. Some of the lecturers use e-learning for exam and lecture materials, but many don't use it.
4. There are some laboratories that can be used for students, if they don't have required hardware or network specification in using e-learning.

b. Analyze what are going to be improved

By integrate e-learning system in Maranatha Christian University, below are things that want to be improved:

1. Motivation and engagement students to use e-learning system.
2. Lecturers will use and maintain e-learning system.

c. Analyze student's personality

For reduce the time needed to imply this framework, so there are no surveys done to analyze student's personality. But the gamification will be balanced and focused on all four types of personality.

d. Define students activities, status, and objectives

Below described all of student's activities, status, and objectives in using gamification in e-learning system:

1. Gamification Objective

To define gamification objective, below used Social Engagement shown on Table IV.3. These objectives differ for novice and expert user to increase their engagement.

Table IV.3 Gamification Objective

Type	Novice User	Expert User
Feedback	Progress bar and badges	Title, Reputation points
Motivating Activities	Do assignments, reading and getting learning materials, collecting badges	Discuss with other student in forum
Social	Giving comments in a forum	Answer other student's question, mentoring
Re-engagement	Daily tasks or challenges, solve assignments	Reply posts in forum discussion

2. Students activities and status

Below described student activities and status that worked as features in e-learning system shown on Table IV.4.

Table IV.4 Students activities

Type	Features
Self-Assessment	Progress bar in modules
Participation	Forum discussion, work on tasks together
Interaction	Add and read learning's content, ask a question in a post, mentoring others, take exam.
Communication	Chat, add post or comment on forum discussion.
Status	Change profile picture, name, add personal interest

3. Gamification Diagram

Below is a diagram made by using octalysis framework by combining all of student activities and gamification objectives shown on Figure IV.5.

Figure IV.5 Gamification Diagram of Students Activities (yukaichou.com/octalysis-tool/)

IV.5.2 Design (Demonstration)

For design process, the design steps are as described below:

a. Divide learning contents

   On this step, the learning content which Web Programming lesson are divided as several modules shown on Table IV.5.

Table IV.5 Lesson Materials

Lesson Materials
Introduction
HTML Part 1
HTML Part 2
Table
Form + Introduction to PHP
CSS Part 1
CSS Part 2
Javascript Part 1
Javascript Part 2
Jquery
Introduction to HTML5
XML and XHTML

b. Prepare tasks or assignments

   Some assignments also prepared in this step for students to solve. In each assignment, students need to make two or three websites with criteria for each of them. After they finished the assignments, then they need to upload their website source code using the features in e-learning system.

c. Define points

   Each of lesson module, student's activity, and assignments are given points shown on Table IV.6 and Table IV.7. For student activities, the activities listed that given points are taken in as general or more simple, for example if there is student activity related to reading lesson material, then the activity that listed is just read activity.

Table IV.6 Points Given to Lesson Materials

Lesson Materials	Points Given	
	Lesson	Assignment
Introduction	150	300
HTML Part 1	200	400
HTML Part 2	250	460
Table	250	500
Form + Introduction to PHP	200	600
CSS Part 1	200	600
CSS Part 2	250	500
Javascript Part 1	200	450
Javascript Part 2	250	600
Jquery	200	450
Introduction to HTML5	200	400
XML and XHTML	250	650

Table IV.7 Student Activities Points

Student Activities	Points Given
Visit	30
Read Lesson Materials	50
Submit Assignment	40
Add or comment in forum	20
Propose new assignment	1000
Propose new lesson materials	1000

d. Define feedbacks and game mechanics

Feedbacks and game mechanics which used in this gamification design are shown at Table IV.8. These are combined with student's activities and included in gamification design which created in previous Analysis step, shown at Figure IV.6.

Table IV.8 Feedbacks and Game Mechanics

Feedbacks	Progress Bar, Achievement, Activity Review
Game Mechanics	Badges, Leaderboard

Figure IV.6 Gamification Design with Game Mechanics

To know gamified e-learning system objectives more detailed, below described gamification types for player journey at Table IV.9.

Table IV.9 Gamification Types for Player Journey

Types	Features or Actions
Onboarding	- Students fill personal information - Check lesson modules - Start reading lesson materials - Avoid getting bad score in exam - Getting additional points in exam
Discovery	- Have discussions with others in forum - Explore e-learning features - Explore badges and achievements
Scaffolding	- Reply and comment on posts in forums - Working on assignments - Chatting with friends - Check leaderboard for achievement - Waiting for score
End Game	- Helping other students in lesson's problem - Have higher titles than other students - Complete all badges and achievements - Propose new assignments - Add learning contents - Waiting for approval of proposal in assignment and learning contents

Below are gamification diagrams driven from student activities and game mechanics for onboarding, discovery, scaffolding, and end game shown on Figure IV.7, Figure IV.8, Figure IV.9, and Figure IV.10.

Figure IV.7 Onboarding Gamification Diagram

Figure IV.8 Discovery Gamification Diagram

Figure IV.9 Scaffolding Gamification Diagram

Figure IV.10 End Game Gamification Diagram

IV.5.3 Development (Demonstration)

The development step described by several processes as below:

a. Combine game mechanics with points

By combining the points that already given in previous Design step with game mechanic, can help in how many badges or achievements that must be designed in gamified system. Below are achievements titles given to

students when a student achieved points require from CaptainUp gamification engine shown at Table IV.10.

Table IV.10 Points combined with game mechanics (captainup.com)

Achievement Titles	Points Required		Achievement Titles
Rookie	0	6100	Advanced
Beginner	100	7300	Specialist
Novice	200	8800	Veteran
Apprentice	350	10000	Scholar
Enthusiast	500	12000	Virtuoso
Craftsman	700	14000	Star
Artisan	900	16000	Leader
Journeyman	1200	20000	Champion
Expressive	1500	32000	Governor
Skilled	1800	44000	Master
Adept	2100	79000	Grandmaster
Intermediate	2500	110000	Elite
Experienced	2900	220000	Guru
Proficient	3900	330000	Superstar
Professional	4900	650000	Legend

b. Adjust gamification diagram

There is no adjustment or further improvement to gamification diagram with four types of player personality. So this process is skipped and the next Implementation step will use gamification diagram from last Design step.

c. Choose e-learning system and gamification engine

There are several e-learning systems and gamification engines that can be used to build gamified system. In this process the e-learning system used is Moodle and CaptainUp for gamification engine. CaptainUp engine chosen because it is easy to use and there are already several badges and titles or levels that can be used from start. So it will make the implementation of the gamification design faster and easier.

IV.5.4 Implementation (Demonstration)

Below are some processes from Implementation step as below:

a. Create e-learning system

In this process, e-learning system is implemented and hosted in a server. The implementation of e-learning system is following the gamification diagram from steps before. Below are some screenshots of e-learning system with CaptainUp gamification engine implemented shown at Figure IV.11 and Figure IV.12.

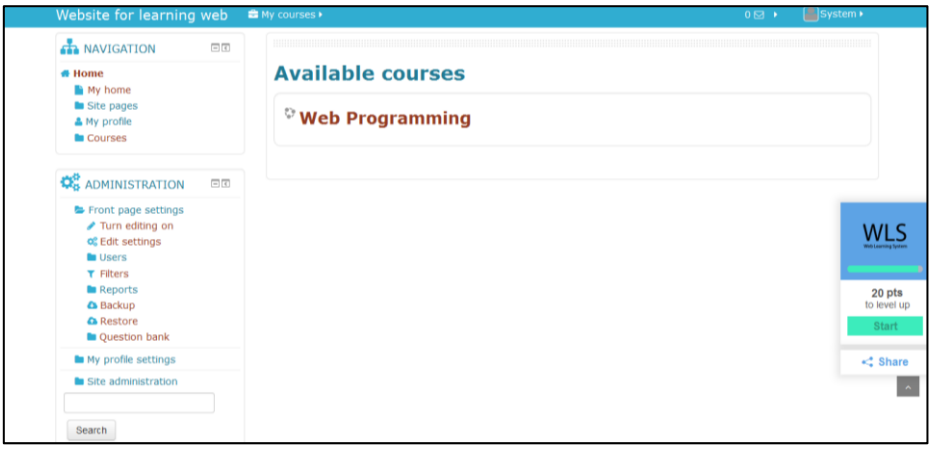

Figure IV.11 Front page of E-Learning system (weblearningsystem.tk,2015)

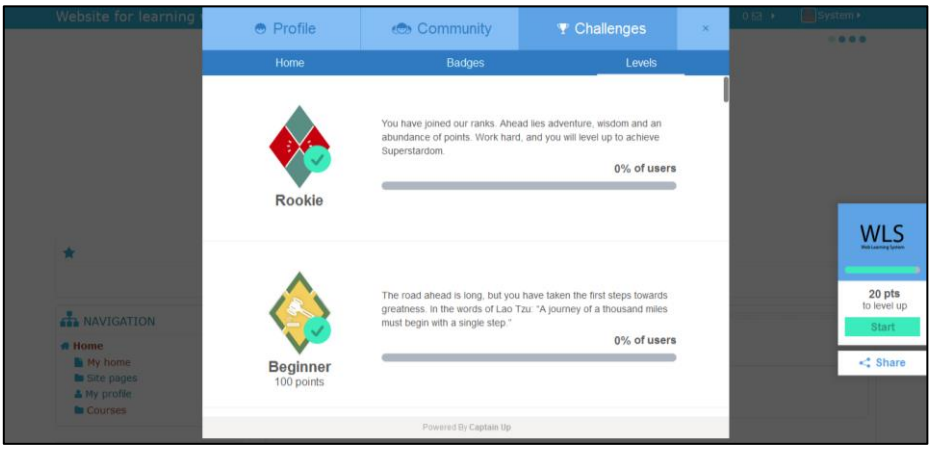

Figure IV.12 CaptainUp Gamification List of Levels/ Titles (weblearningsystem.tk,2015)

b. Giving training or workshop

For training and workshop process, there are an announcement and a small training to helping students understand how to use e-learning system.

c. Make some guidelines

For guidelines process, there are no manual books or guideline how-to in using e-learning system created or given. But there are some slides and presentations from seminar given to students to helping them in using e-learning system and gamification.

d. Give benefit information to staffs

For giving benefit information to staffs, there are some announcements to staffs and account given to each lecturer. There also a presentation and workshop done to help staffs in using new e-learning system.

IV.5.5 Evaluation (Demonstration)

In evaluation step, some processes done are described below:

a. Monitoring user activities in e-learning system

To monitoring students in e-learning system, there a daily checking to assignments submitted, forums for posting, and questions submitted using email notification which already implemented in Moodle system.

b. Ask staffs and students for opinions

The students are asked daily in classroom for their opinions whether there needed a fast review in e-learning system, they also can submit questions and suggestions by email or forum discussion in e-learning.

c. Review and evaluate e-learning system for improvement

There a forum discussion and questions asked to students and staffs, whether it already performed well or still need improvement in e-learning features and gamification.

Chapter V Evaluation

V.1 Evaluation

To evaluate this conceptual framework design, there are some surveys that given to some e-learning and gamification experts. Below are the surveys variables, questions, and summary of the surveys.

V.2 Surveys Variable

From the proposed conceptual Gamification framework, the variables in the surveys can be divided into two types, one is for check the e-learning process and the other is for gamification design used in this conceptual framework.

V.3 Surveys Questions

Below are surveys questions which are asked to e-learning and gamification experts following two types of questions to each expert shown at Table V.1 and Table V.2.

Table V.1 E-Learning Survey Questions

No.	Questions
1.	Students can learn by themselves using e-learning system
2.	E-Learning can help students learning process
3.	Implementation of E-Learning system need a lot of time
4.	E-Learning system need students participation
5.	E-Learning system need staffs participation
6.	Level of students participation have effect on their score
7.	Students motivation in E-Learning have effect on their score
8.	There needed workshops and training in implementation of E-Learning system
9.	Discussion forum in E-Learning system support student's learning process
10.	Chatting feature in E-Learning support student's learning process
11.	Students participation in add learning contents can help in E-Learning system process
12.	Students participation in propose new assignments can help in E-Learning system process
13.	Incentives can improve student's motivation in using E-Learning system
14.	Feedback can help in improving student's participation in E-Learning system

Table V.2 Gamification Survey Questions

No.	Questions
1.	Gamification can improve student's motivation and activities in E-Learning system
2.	Bad Gamification can make E-Learning system process worse
3.	Implementation of Gamification need a lot of time
4.	Gamification in E-Learning can help staffs in learning process
5.	Use of game and Gamification in a system are the same
6.	Implementation of Gamification needs daily evaluation and review
7.	Before implementing Gamification, one needs to make overall analysis of system's process
8.	Points in Gamification used to define student's participation in E-Learning
9.	Badges feature in E-Learning can improve student's participation in E-Learning
10.	Leaderboards feature in E-Learning can improve student's participation in E-Learning
11.	Difficulty in Gamification need to be varies
12.	The level of success in Gamification is related to student's participation

V.4 Summary

Survey questions are distributed to two types of expertise, one is E-Learning expert and the other is Gamification or Game expert. Below described the profile of E-Learning and Gamification experts shown on Table V.3 and Table V.4.

Table V.3 E-Learning Experts

No.	Name	Company / Institution	Expertise
1.	Rinardi Sarean	Maranatha Christian University	Lecturer, System and Server Administration
2.	Rikki Novar	Maranatha Christian University	E-Learning developer, Web Administration
3.	Timotius Witono	Maranatha Christian University	Lecturer, Network Administrator
4.	Doro Edi	Maranatha Christian University	Lecturer, System Information Expert
5.	Rotua Panjaitan	Institut Teknologi Del	Lecturer, Academy Staff
6.	Andoyo	STIKI - Malang	Lecturer
7.	Lalu Ganda	UNIDA	Lecturer

Table V.4 Game or Gamification Experts

No.	Name	Company / Institution	Expertise
1.	Risal Law	Maranatha Christian University	Lecturer, Game Developer, Gamification Expert
2.	Sulaeman Santoso	Maranatha Christian University	Lecturer, Game Developer, Gamification Developer
3.	Rosiana	Baidu	Education Game Designer Expert
4.	Wiyoga	Freelance	Web Game Developer
5.	Maulana	Unikom	Web Game Developer

After distribute the questions to each expert and calculate their answers from the surveys, then can be taken some conclusions as shown on Table V.5 and described below.

1. Most of the experts agree that e-learning system is needed to support student's learning environment.
2. Most of the experts agree that Web 2.0 features like chat room, forum, and student's participation managing learning contents can support student's learning process.

Table V.5 E-Learning Survey Conclusions

No.	Conclusion	Agreement
1.	Students can learn by themselves using e-learning system	Agree
2.	E-Learning can help students learning process	Agree
3.	Implementation of E-Learning system need a lot of time	Mostly Disagree
4.	E-Learning system need students participation	Agree
5.	E-Learning system need staffs participation	Agree
6.	Level of students participation have effect on their score	Mostly Agree
7.	Students motivation in E-Learning have effect on their score	Mostly Agree
8.	There needed workshops and training in implementation of E-Learning system	Agree
9.	Discussion forum in E-Learning system support student's learning process	Agree
10.	Chatting feature in E-Learning support student's learning process	Agree
11.	Students participation in add learning contents can help in E-Learning system process	Mostly Agree
12.	Students participation in propose new assignments can help in E-Learning system process	Agree
13.	Incentives can improve student's motivation in using E-Learning system	Agree
14.	Feedback can help in improving student's participation in E-Learning system	Agree

While from gamification experts can be taken some conclusions shown at Table IV.6.

Table V.6 Gamification Survey Conclusions

No.	Conclusion	Agreement
1.	Gamification can improve student's motivation and activities in E-Learning system	Agree
2.	Bad Gamification can make E-Learning system process worse	Agree
3.	Implementation of Gamification need a lot of time	Mostly Agree
4.	Gamification in E-Learning can help staffs in learning process	Agree
5.	Use of game and Gamification in a system are the same	Disagree
6.	Implementation of Gamification needs daily evaluation and review	Agree
7.	Before implementing Gamification, one needs to make overall analysis of system's process	Agree
8.	Points in Gamification used to define student's participation in E-Learning	Agree
9.	Badges feature in E-Learning can improve student's participation in E-Learning	Agree
10.	Leaderboards feature in E-Learning can improve student's participation in E-Learning	Agree
11.	Difficulty in Gamification need to be varies	Agree
12.	The level of success in Gamification is related to student's participation	Agree

Some conclusions that can be taken from this survey related to E-Learning and Gamification are described below:

1. E-Learning:
    a. To make E-Learning system useful, staffs and students participation are needed.
    b. Student motivation and participation in E-Learning may improve their score.
    c. Chatting, Discussion Forum, student proposing new assignments or learning contents will improve E-Learning system daily process.
    d. Beside students and staffs participation, there needed a daily review for add new feature to E-Learning system such as assignments or learning contents.
2. Gamification:
    a. Using Gamification can improve student's participation and help staffs in learning process.

b. In implementing gamification, a designer need to analyze overall of system and make daily review on gamified system to make it successful.
c. Points, Badges, and Leaderboards are needed in gamification implementation.
d. Using avatar or personalization in system can make students or users have an ownership in the gamified system.

Chapter VI Conclusion

VI.1 Conclusion

From this research, it can be taken some conclusion related to improving student motivation in E-Learning system using Gamification and Web 2.0 Technologies as below.

1. Student's learning environment and game mechanics like Points are needed in gamified system, because they act as measurement to see how well student performing in gamified system. From the survey also can be concluded, that personalization like avatar in a gamified system can be used to improve user's motivation. While to making a good gamified system, there are also daily reviews and evaluations needed.
2. A conceptual framework is developed by combining the stages of the Instructional Design ADDIE Model, which consists of Analysis, Design, Development, Implementation, and Evaluation process with Gamification and Web 2.0 phases.

   Several activities that included in this conceptual framework are as follow:

   a. Analyze learning environment and define target user
   b. Prepare learning contents and game mechanics
   c. Combine learning contents with game mechanics
   d. Implement e-learning system and prepare training for users
   e. Evaluation and review of e-learning system and gamification design
3. From the demonstrations step, it can be concluded that students in Faculty of Information Technology are actively used the system and they support the development further. But they also still need to be pushed and told that they will get additional points in the lecture's final score if they are using E-Learning system. This concludes that communication with the students is still needed, and it can be done in Implementation or Evaluation process at the conceptual gamification framework.
4. From conceptual framework development process, it can be concluded that designers dedication are needed in making good gamified e-learning system, whether it is in design, implementation, or evaluation process.

They also need to improve the gamification design further to covers all student activities in gamified e-learning system.

VI.2 Future Works

Some works and improvement that can be done in the future related to this research are described below:

1. This conceptual framework can be improves further, so it can be used to implement others distance learning technologies such as Mobile Learning.
2. Some steps in this conceptual framework can be changed and improved to include the process of content gamification process like storyboard.
3. The process of gamification and Web 2.0 technology in this conceptual framework can be pushed and improved further by combining them with other models which suited in E-Learning environment.

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Appendix A E-Learning Survey Question

Sebelumnya kami ingin mengucapkan terima kasih, karena Anda telah bersedia meluangkan waktu, dan membantu untuk mengisi survei ini. Survei ini merupakan salah satu bagian dari penelitian untuk meningkatkan motivasi siswa dalam menggunakan sistem E-Learning, dengan teknologi Gamifikasi dan Web 2.0.

Pada survei ini, Anda akan diberikan beberapa pertanyaan yang berhubungan dengan penggunaan fitur dan manfaat dari E-Learning, gamifikasi, dan teknologi Web 2.0.

Kami berharap Anda dapat mengisi semua pertanyaan yang ada, walaupun Anda tidak diharuskan mendalami semua topik yang ditanyakan.

Pada survei ini, partisipasi dan jawaban yang Anda berikan akan kami rahasiakan.

Bandung, 12 Januari 2015
Peneliti,

Oscar Wongso

1. Latar Belakang

Pekerjaan	
Perusahaan/ Institusi	
Lama pengalaman dalam pengajaran	…… tahun
Pengalaman E-Learning	Platform yang digunakan: □ aTutor □ Canvas □EFront □ Moodle □Joomla □Lainnya…… Pengalaman: …… tahun

2. Berikut adalah pertanyaan yang berhubungan dengan penggunaan dan manfaat E-Learning. Berikan persetujuan anda pada pertanyaan berikut dengan memberi tanda centang pada kotak yang disediakan dan berikan komentar anda bila ada.

No.	Pertanyaan	Persetujuan*					Tambahan Komentar
		STS	TS	N	S	SS	
1.	Dengan menggunakan E-Learning, siswa dapat belajar secara mandiri	□	□	□	□	□	
2.	Sistem E-Learning membantu proses pembelajaran siswa	□	□	□	□	□	
3.	Implementasi E-Learning membutuhkan waktu yang lama	□	□	□	□	□	
4.	Sistem E-Learning bergantung pada partisipasi siswa	□	□	□	□	□	
5.	Sistem E-Learning membutuhkan partisipasi pengajar	□	□	□	□	□	
6.	Tingkat keaktifan siswa dalam E-Learning mempengaruhi nilai siswa	□	□	□	□	□	

No.	Pertanyaan	Persetujuan*					Tambahan Komentar
		STS	TS	N	S	SS	
7.	Motivasi siswa dalam menggunakan E-Learning mempengaruhi nilai siswa	□	□	□	□	□	
8.	Pelatihan atau workshop dibutuhkan dalam proses implementasi E-Learning	□	□	□	□	□	

3. Berikut adalah pertanyaan yang berhubungan dengan fitur E-Learning dalam proses pembelajaran

No.	Pertanyaan	Persetujuan*					Tambahan Komentar
		STS	TS	N	S	SS	
9.	Forum diskusi yang ada pada E-Learning mendukung dalam proses pembelajaran siswa	□	□	□	□	□	
10.	Fitur chatting mendukung dalam proses pembelajaran siswa	□	□	□	□	□	
11.	Partisipasi siswa untuk menambah bahan ajar, dapat mendukung berjalannya sistem E-Learning	□	□	□	□	□	
12.	Partisipasi siswa untuk menambah latihan, dapat mendukung berjalannya sistem E-Learning	□	□	□	□	□	
13.	Dengan adanya insentif, akan meningkatkan motivasi siswa untuk menggunakan sistem E-Learning	□	□	□	□	□	
14.	Dengan adanya feedback akan meningkatkan aktivitas siswa dalam sistem E-Learning	□	□	□	□	□	

4. Menurut pengalaman anda dalam menggunakan E-Learning, sebutkan hal lain yang anda rasa penting untuk mendukung proses pembelajaran dengan menggunakan sistem tersebut.

   ……
   ……
   ……

5. Menurut pengalaman anda, sebutkan kendala – kendala apa yang biasanya didapatkan ketika membuat atau menggunakan sistem E-Learning.

   ……
   ……
   ……

Appendix B Gamification Survey Question

Sebelumnya kami ingin mengucapkan terima kasih, karena Anda telah bersedia meluangkan waktu, dan membantu untuk mengisi survei ini. Survei ini merupakan salah satu bagian dari penelitian untuk meningkatkan motivasi siswa dalam menggunakan sistem E-Learning, dengan teknologi Gamifikasi dan Web 2.0.

Pada survei ini, Anda akan diberikan beberapa pertanyaan yang berhubungan dengan penggunaan fitur dan manfaat dari E-Learning, gamifikasi, dan teknologi Web 2.0.

Kami berharap Anda dapat mengisi semua pertanyaan yang ada, walaupun Anda tidak diharuskan mendalami semua topik yang ditanyakan.

Pada survei ini, partisipasi dan jawaban yang Anda berikan akan kami rahasiakan.

Bandung, 12 Januari 2015
Peneliti,

Oscar Wongso

1. Latar Belakang

Pekerjaan	
Perusahaan/ Institusi	
Pengalaman dalam Pengembangan Game	Lama : …… tahun Bidang : ……
Pengalaman E-Learning	Peranan: □ Developer □ User □ Lainnya, sebutkan …… Pengalaman: …… tahun
Pengalaman Gamifikasi	Bidang : …… Platform : Mobile/ Desktop/ Web

2. Berikut adalah pertanyaan yang berhubungan dengan penggunaan dan manfaat Gamifikasi Berikan persetujuan anda pada pertanyaan berikut dengan memberi tanda centang pada kotak yang disediakan dan berikan komentar anda bila ada.

No.	Pertanyaan	Persetujuan*					Tambahan Komentar
		STS	TS	N	S	SS	
1.	Dengan menggunakan gamifikasi, dapat meningkatkan motivasi siswa dan aktivitas belajar pada E-Learning	□	□	□	□	□	
2.	Penggunaan gamifikasi yang salah, akan mempengaruhi kinerja dari sistem	□	□	□	□	□	
3.	Implementasi Gamifikasi membutuhkan waktu yang lama	□	□	□	□	□	
4.	Penggunaan Gamifikasi pada E-Learning dapat membantu pengajar dalam proses belajar mengajar	□	□	□	□	□	
5.	Penggunaan game dan gamifikasi pada	□	□	□	□	□	

No.	Pertanyaan	Persetujuan*					Tambahan Komentar
		STS	TS	N	S	SS	
	sistem adalah sama						
6.	Dibutuhkan evaluasi dan review yang rutin pada implementasi Gamifikasi	□	□	□	□	□	
7.	Sebelum implementasi Gamifikasi, dibutuhkan analisis dari proses sistem secara menyeluruh	□	□	□	□	□	

3. Berikut adalah pertanyaan yang berhubungan dengan fitur Gamifikasi dalam sistem E-Learning

No.	Pertanyaan	Persetujuan*					Tambahan Komentar
		STS	TS	N	S	SS	
8.	Point digunakan pada Gamifikasi untuk menilai keaktifan siswa pada E-Learning	□	□	□	□	□	
9.	Fitur badges dapat meningkatkan partisipasi siswa pada E-Learning	□	□	□	□	□	
10.	Fitur leaderboards dapat meningkatkan partisipasi siswa pada E-Learning	□	□	□	□	□	
11.	Tingkat kesulitan yang ada pada Gamifikasi harus bervariasi	□	□	□	□	□	
12.	Tingkat keberhasilan Gamifikasi membutuhkan partisipasi antar siswa	□	□	□	□	□	

4. Menurut pendapat anda, game mekanis apa yang diperlukan dalam implementasi gamifikasi pada E-Learning.

   ……
   ……
   ……

5. Menurut pendapat atau pengalaman anda, faktor apa saja yang menyebabkan implementasi Gamifikasi berhasil dari segi fitur dan pengguna pada sebuah sistem.

   ……
   ……
   ……