

# The Gamification Element Selection Method

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**Abstract**—The Massive Open Online Course (MOOC) is considered as a new education platform which supports learners in accessing information anytime anywhere. However, the high dropout rate is still a crucial problem for MOOCs which is linked to the uncertainties of learner motivation. Thus, gamification can be a potential concept which promotes motivation and engagement for learners. Previously, many researchers already implemented game elements such as points, badges, or leaderboard in online learning contexts. The adaptation of different game elements provides different results. It seems that there is no empirical method which provides a guideline or suggestions on how to select such gamification elements. This paper provides a game element selection method for developers.

**Keywords**—MOOCs, Gamification, Game element

## I. INTRODUCTION

The Massive Open Online Course (MOOC) is a learning innovation platform that has the potential to allow learners to gain access to education. Many organizations have already adopted this platform as a core training platform for improving their staff's knowledge and skills [1]. 195 HR and teaching professionals reported that 72 percent of them see the value in implementing MOOCs into their knowledge and skills programs [2]. However, the high dropout rate in MOOCs suggests that learner engagement and progression in the courses are problematic. High dropout rate related issues in MOOCs cast doubt on whether or not MOOCs can potentially increase access to higher education, since not all MOOC students throughout the courses [3]. engagement patterns of students may have different motives for learning and not are interested in completing the whole course. For example, training and learning materials which are appropriate for an adult learning style in Thailand are visuals (i.e. picture, 3D graphics, diagrams, and demonstrations) and active styles (i.e. discussions, brainstorming, experimenting, testing) [4]. Moreover, learning in poorly designed MOOCs for students [5]. Therefore, gamification can be adopted as the main concept with the potential to increase learner motivation.

Gamification is now highly adopted in education. This concept is potentially increasing given its capacity to capture and sustain learners' attention, which is crucial for learners' success in educational environments [6]. Generally, gamification can be defined as the use of game elements in non-gaming contexts to improve user experience and user engagement, loyalty, entertainment and fun. Many researchers have applied this concept to their work for fostering motivation [7]. However, the implementation of gamification has shown different results. For example, Dominguez et al. (2013) applied gamification elements such as badges, trophy, and leaderboard in Backboard program. The result showed that the attention rate and practical

assignments were greater in the experimental group, but performance on written assignments suffered [8]. Goehle, G. et al. (2013) used gamification in WeB-WorK (home-work app) and found that at least half of the students who completed 90% of the homework put in extra effort to obtain achievements [9]. However, the researcher could not conclude what effect, if any, gamification had on the performance of students in the course. Chernbumroong et al. implemented leaderboard as a gamification element for fostering motivation and performance of Thai students. Their result indicated that different kind of leaderboards provides a different kind of outcomes [10]. As mentioned, since gamification elements contain a diversity of game element types such as points, leaderboards, badges, levels, stories, goals, feedback, rewards, or progress bar, the method for selecting the right game elements is still missing. The game element selection method should support the game developer and should suggest when and how to implement game elements in MOOC contexts. Therefore, the aim of this paper is to develop a game element selection method.

## II. LITERATURE REVIEW

### A. Gamification Generic Framework

In the past decade, gamification framework has been developed by several researchers in different dimensions. The overview of generic gamification frameworks has been reviewed by Alberto Mora et al. (2015) in his article [11]. For example, the framework for Success has been defined by Di Tomasso (2011) which is influenced by the Self-Determination Ryan and Deci(2000). In this method, he proposed the following steps: discover the reason to gamify (stakeholders and business objectives), identify players' profiles and motivational drivers, set up goals and objectives, describe skills, track and measure, define lenses of interest, desired outcomes and play-test, and polish [12][6]. Meanwhile, Werbach and Hunter (2012) have developed a well-known framework which is presented in Six Steps to Gamification [13]. This framework starts from a definition of business objectives and then proceeds to target the expected behaviors, describes the players, devises the activity forgetting the fun, and finally, deploys the gamification system with the appropriate tools. On the other hand, The guidelines or step to gamification has also been proposed by De Paz (2013) which can basically be applied to any type of project. The overview of this framework seems to be highly influenced by Werbach and Hunter's Six Steps to Gamification [14]. The into three phases: the setting up of the business goals (preparation), the determination and the use of game elements. the system and running it. This approach also recommends the use of metrics. Versteeg (2013) also defines a simplified framework for moral persuasive gamification design [15]. This combines a normative ethical framework with the most relevant issues of

the following methodologies. It is based moral design framework by Berdichevsky and Erik Neuenschwander (1999) and golden rules that a designer should never exceed [16]. Furthermore, it incorporates a methodology for analyzing the ethics of persuasive proposed by Fogg (2002) [17]. The steps are: definition of moral principles and values, conceptual investigation, the involvement of the stakeholders, and evaluation and iteration.

TABLE I. COMPARISON OF GAMIFICATION FRAMEWORKS

The Step to Gamification	Generic Gamification Framework			
	<i>Framework for Success. Di Tommaso (2011)</i>	<i>Six steps to Gamification. Werbach and Hunter (2012)</i>	<i>Steps to Gamification. De Paz (2013)</i>	<i>A moral framework for taking responsibility. Versteeg (2013)</i>
Identify objective	X	X	X	X
Identify type of player profiles and motivation	X	X		
Identify behavior and measurement	X	X	X	X
Identify activity		X	X	X
Design game element	X	X	X	
Tracking and testing	X			X
Implementation with tool		X	X	

According to the generic gamification framework review, most of the gamification framework has been overlapping in term of a process of qualifying. However, frameworks do not mention how to select the game element. Thus, before the game elements are selected, we decided to follow the step to gamification as the baseline. In our study, the step to gamification is listed as follow; 1. Identify objective, 2. Identify behavior and measurement 3. Identify activity, and 4. select game element.

### B. Classification of Game Elements

According to the above-listed frameworks, most of the researchers still do not mention game element selection methods. The frameworks only provide the steps which are able to turn non-game situations to gamification contexts. We proposed that the gamification framework needs to deal with the selection of elements. Previously, there existed methods or concepts that provide systematic accounts or frameworks which are helpful. However, these don't seem to be concrete enough. For example, the MDA framework (Mechanics, Dynamics, and Aesthetics) which is presented by Hunicke et al is designed to facilitate game designers in understanding how to create an engaging experience by typing mechanics to the dynamics that afford the appropriate aesthetics for the game [18]. However, the mechanics are not itemized and classified. Meanwhile, Yee offers a framework for gameplay motivation, based on a factor analysis of a large survey of player motivations [19]. However, this does not extend to the gamification features that satisfy motivations. Deterding et al also provide a sophisticated definition of gamification, which places gamification elements in a model of multiple levels of design abstraction, but their objective is not to provide the concrete examples of gamification elements themselves [20]. Dignan presents a 'game frame,' which is a conceptual framework or template comprising ten building blocks which he argues make up a

"behavioral game" (a gamified activity) and presents specific examples of "building blocks" of gamified experiences, which is exactly what we are looking for, but it is not organized concisely within a taxonomic structure with guidance on what level of commitment they are best suited to [21].

The framework which is nearly suited to our work is the taxonomy of gamification elements by D. Robinson and V. Bellotti (2013) [22]. This framework has provided a clear each of game elements which are classified in differences categories. In their proposed work, the six major categories of gamification elements were established.

TABLE II. THE CATEGORIES OF GAMIFICATION ELEMENTS

Categories	Description
General Framing	This category provides context and motivation for participation.
General Rules and Performance Framing	Explains in general what is expected such as operating an avatar in combat or scoring as high as possible on a test of health knowledge.
Social Features	Permit the user to interact with others, at the very least outside the experience.
Incentives	The element which motivate user to do something, these may be intrinsic or extrinsic motivation.
Resources and Constraints	are the bounds within which the user must operate to participate.
Feedback and Status Information	Allow the user to understand what is going on, what they must do next, what they have done recently and perhaps over the entire course of their engagement.

The game element can be designed into the experience, designed for the experience, or it may provide a context for an experience. All of the gamification elements that we were able to identify from related works or from articles online were able to be placed into the following set of top-level categories at a first subcategory or second subcategory level. Therefore, the taxonomy of gamification elements has been adapted to our work as a selection method since it provides a clear categorization of game elements.

Since the steps of the gamification framework have been adopted to our work, the gamification elements selection method needs to follow every step. Therefore, the category and element of gamification have been changed from the original.

TABLE III. PROPOSED STEPS TO GAMIFICATION AND GAME CATEGORY

Step to Gamification	Category	Description	Game Element
Identify objective	General Framing	Provides motivation content for participation	Context
			Background
			Narrative
Identify behavior and measurement	General Rules and Performance Framing	Explains how to achieve the objectives or how to evaluate one's own performance	Guidance
			Objectives/targets*
			Renewal/regeneration
			Template/set for completion
			Normative

Step to Gamification	Category	Description	Game Element
Identify activity	Constraints	The bounds within which the user must operate to participate.	Game accomplishments*
			Specific Rules
			Limited of resources
			Limited of time
	Incentive	Psychologically motivated anticipated real-world outcomes.	Intrinsic
			Extrinsic
	Social Features	Permit the user to interact with others.	Relationships
Interaction Modes			
Select game element	Feedback and Status Information	Allow the user to understand what is going on, what they must do next, what they have done recently and perhaps over the entire course of their engagement.	Rescores
			Progress
			Social

### III. PROPOSED METHOD

Next, we would like to explain the proposed methodology of this study. We tried to develop a method which provides steps and a selection method of the game elements. Therefore, the 4 steps to gamification have been taken from the generic gamification framework by other researchers. Meanwhile, the gamification categories and elements have been taken from the taxonomy of gamification elements by D. Robinson and V. Bellotti (2013). Our game element selection method can be divided into 4 steps.

#### A. Identifying Objective

The early step is to identify the objective of the user. The objective is basically the desired outcome which we expect from the user to achieve at the end of the activity, such as completing all online exercises, weekly login, or watching new VDO in MOOCs. Furthermore, the objective should be clear to understand. The game category for this step is a general framing, which is a motivational content for participation. The developer has to select only 1 game element to create the content matching the objective.

- Context: the content of objective is based on a real situation, such as a workplace environment.
- Background: the content provides objectives and motivational information such as the introduction and the background of objective and why the user needs to participate.
- Narrative: the content of the object can be fictional or non-fictional information.

Thus, the first step is to list down all the objectives. Then, the game element for the content should be selected and a clear objective needs to be explained.

#### B. Identify behavior and measurement

The second step is to identify behavior and measurement for the user. This step is related to the General Rules and Performance Framing which describes in general what the expected user behavior is, such as watching all VDO or passing the test. Moreover, the developer needs to determine

the normative of user performance for example 80 scores achieved is “good” or below 50 scores is “bad”. The developer needs to select the game element following the steps listed below;

- Guidance: guideline, instructions, explanations for the user how to perform a particular task.
- Objective/targets\*: the exact action for user. (select only 1 game element);
  - Correct answers
  - Choices
  - Task executions
  - Missions or quests
  - Beat other players
  - Etc.
- Renewal/regeneration: the chance to play again or defining how many times the user can repeat the test.
- Template/set for completion: for example answering all questions.
- Normative: definition of good or bad performance, for example the average score is 50, the high score is 80.

#### C. Identifying the activity

Since the developer had already defined the objective as an outcome and the expected behavior, the third step is to identify the activity. The game categories which are used to gamify a non-game activity are constraints, incentives, and social features. Constraints are the bounds within which the user needs to act and participate. The developer can select game elements from the lists depending on their purposes.

- Game accomplishments: the exact activity that the user needs to follow. (select only 1 game element)
  - Collect
  - Find
  - Create
  - Combine
  - Etc.
- Specific rule: required actions to accomplish objectives, for example, the user must complete all tasks within a specific duration.
- Limit of resource: for example only 100 points are provided.
- Limit of time: determining the duration of the activity, for example the activity must be completed within 30 days.
- Level of difficulty: the activity difficulty can be dynamic such as linear, or exponential, or it can be unpredictable to maintain user attention.

The incentive is a thing that motivates or encourages the user to participate or do something. The developer can provide appropriate incentives for the users when they achieve a certain activity.

- Intrinsic incentive: psychologically motivating, anticipated real-world outcomes.
  - Personal returns from gamified behaviors (e.g. wealth, health, longevity, achievements, avoidance of negative personal consequence)
  - Social reward/peer pressure
  - Societal returns from gamified behaviors
- Extrinsic (Material)
  - Deals or discounts
  - Financial
  - Goods/services
  - Break time/Holiday
  - Lottery/draw/bet
  - Etc.
- Extrinsic (Virtual)
  - Currency
  - Virtual Goods
  - Powers or abilities
  - Etc.

Social feature is an element which allows the user to interact with others, at the very least outside the experience.

- Relationships (select only 1 game element)
  - Friend feature
  - Team and guild
- Interaction Mode (select only 1 game element)
  - Commerce
  - Gift giving
  - Commendations, voting
  - Collaboration/helping
  - Competition

#### D. Game element selection

The final step is to select the game element which is used in the activity. The purpose of the game element category is to provide feedback and status for the user. Thus, the users are able to see their progress and can track information. The categories of game elements: the developer can select only 1 game element from each of the following types:

- Rescores (select only 1 game element)
  - Point
  - Score
  - Coin
  - Etc.
- Progress (select only 1 game element)
  - Badges or trophies

- Progress bar
- Level
- Status
- Avatar
- Checklist
- Performance gauge
- Social (select only 1 game element)
  - Leaderboard
  - Record of achievement
  - Discussion forum

For a better understanding, we have demonstrated examples of how to use the gamification element selection method in the MOOC context. According to the table, the main purpose is to encourage the user to pass the exercise in MOOC. Thus, we selected “context” as the game element to identify the objective. Then, we selected “Choices/quiz” to identify user behavior, which is “Correct answers in the quiz” and selected “Renewal/regeneration” to note that the user can re-submit the answers. Moreover, we selected “normative” to determine an achievement level of 70% for each chapter to be passed.

The next step is to identify the activity. We created the activity by selecting “collect” from the game accomplishment. Thus, the main activity is to collect scores from the quiz. Then, “Specific rule” is selected as a game element to determine the conditions which are “user got a score from the correct answer” and “pass first chapter exercise to unlock next”. We also selected “time-limited” for the user to attempt the quiz which is “Able to fail only 3 times a day (24 hrs.)”. At the end of the activity, “Social reward/peer pressure” is an incentive element which we selected for the users. They can earn social status which is represented in the leaderboard.

The final step is to select the gamification element. “Score” is selected as the resource which the user receives throughout the quiz. Meanwhile, we selected the “checklist” for the user to see their progress. Checklist represents the total score in each quiz session and the conclusion (Pass or Fail). Then, the total score from every user who did the quiz is ranked on the leaderboard. The leaderboard is an element by which the user can compare his or her scores with the scores of other users.

TABLE IV. AN EXAMPLE ON HOW TO USE THE GAMIFICATION SELECTION METHOD

Step to Gamification	Game Element	Detail
Identify objective	Context	Complete all task activities in the subject.
Identify behavior and measurement	Task executions	1. Watch VDO. 2. Do exercise.
	Normative	The user should complete 100% task of activities in subject.
Identify activity	Submit	The user submits task activity.
	Specific Rules	1. Press “submit” to complete each task. 2. The user got progress in percentage form complete the task. 3. The user must compete all task within specific duration.
	Limited of resources	Total is 100%.

Step to Gamification	Game Element	Detail
	Limited of time	Within 30 days.
	Personal returns from gamified behaviors	The user will get all information in chapter.
Select game element	Progress bar	Progress bar will represent in percentage according to task complete.

#### IV. CONCLUSION

In this paper, we proposed a method which provides steps and a selection process of the game elements. The generic gamification frameworks have been reviewed and compared before being concentrated in 4 steps; Identifying objective, identifying behavior and measurement, identifying the activity, and selecting game elements. At the same time, the gamification categories and elements were taken from the taxonomy of gamification elements which consists of six categories; general framing, general rule and performance framing, constraint, incentive, social feature, and feedback and status information. The developer needs to follow the step to create gamification in a non-game context and needs to select appropriate game elements from each game category. Finally, an example was also provided for a better understanding. Nevertheless, we aim to implement this method in MOOCs in works of the near future.

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