What Do Deep Statistical Analyses on Gaming Motivation and Game Characteristics Clusters Reveal About Targeting Demographics when Designing Gamified Contents?

Alireza Tavakkoli, Donald Loffredo, Mark Ward Sr.
School of Arts and Sciences, University of Houston – Victoria
Victoria, TX 77901, USA

ABSTRACT

This paper presents the comprehensive results of the study of a cohort of college graduate and undergraduate students who participated in playing a Massively Multiplayer Online Role Playing Game (MMORPG) as a gameplay rich with social interaction as well as intellectual and aesthetic features. We present the full results of the study in the form of inferential statistics and a review of our descriptive statistics previously reported in [46]. Separate one-way independent-measures multivariate analysis of variance (MANOVA)'s were used to analyze the data from several instruments to determine if there were statistically significant differences first by gender, then by age group, and then by degree. Moreover, a one-way repeated-measures analysis of variance (ANOVA) was used to determine if there was a statistically significant difference between the clusters in the 5 gaming clusters on the Game Characteristic Survey. Follow-up paired samples t-tests were used to see if there was a statistically significant difference between each of the 10 possible combinations of paired clusters. Our results support the hypotheses and outline the features that may need to be taken into account in support of tailoring gamified educational content targeting a certain demographic. Sections 1, 2, and 3 below from our pervious study [46] are included because this is the second part of the two-part study.

Keywords: Gamification, Educational Technology, Serious Games, Sensation Seeking, Statistical Significance

1. INTRODUCTION

Our study concerns the fusion of two fields of research. On the one hand, scholars in game studies are researching the burgeoning world of video games, a genre that has penetrated two-thirds of United States households and now constitutes a $10.5 billion industry [1]. On the other, many educators are exploring pedagogical uses of "serious games" [2][3][4] and even prospects for Gaming Across the Curriculum [5], guided by Gee's [6] dictum that "games are potentially particularly good places where people can learn to situate meanings through embodied experiences in a complex semiotic domain and meditate on the process." Game studies scholars have given much attention to the question of why people play video games and, in fact, have developed typologies [7][8][9] and scales [10][11] to gauge players' motivations. Drawing from these two conversations may help answer questions that are fundamental to each. For educators, the question is: What would motivate students to play serious games? For game designers, the question is: What motivates players to learn the game?

This paper presents a comprehensive analysis of our findings on a large-scale study of several factors that might have a significant impact on why different groups of people participate in playing video games. Our goal is to find common factors that contribute to human enjoyment, satisfaction, and continued interest in playing video/computer games. Such factors could, we believe, potentially be utilized in developing effective educational games.

2. LITERATURE REVIEW

Juul [17] addressed the fundamental question—what is a game?—by holding that a game must have rules and variable outcomes which are quantifiable as positive or negative; and that players must expend effort and then experience real-life attachment to and consequences from the outcome. Liebman [18] further suggested that games can be used four ways in education: as vehicles to convey course content; as "texts" that students "read" and analyze through gameplay; as media in which students create their own games; and as an overall approach to pedagogy that incorporates "game-like motivational systems" into course and assignment design.

While the literature in composition studies focuses on games as "texts" [19][20][21], as media for student compositions [22][23][24], and as an approach to course design [5][6], the education and technology literature centers on use of games to convey course material.

For example, researchers in [25] conducted a mixed-methods study with education major university students. Participants were able to detect embedded learning skills within the games and found the element of motivation important. However, while motivation was not found as a sufficient reason to use games in a classroom, teachers found positive responses and peer modeling to be good factors in using game-based technology to deliver course contents.

A 'Deal or No Deal' game was used in [26] in an introductory statistics course with the goal of entertaining students' understanding of the expected learning outcomes from the course. This alternative activity proves to enable instructors to introduce multiple concepts while efficiently

assessing students learning and retention of the materials. Furthermore, repeated play of the game with which the students are familiar benefits students without making the activity tedious as perceived by students performing such tasks with traditional paper and pencil methods.

As part of a larger project financed by the Social Sciences and Humanities Research Council of Canada (SSHRC) from 2008-11, researchers in [27] "examined the impact of an online educational game on cognitive learning". Starting from the popular board game Parcheesi, an online game was created for a senior secondary school health education program. In comparing the subscale and total scores between males and females, no significant differences were found. This confirms that males and females can learn equally well in this setting.

Teoh in [28] examined the potential of simulation using Second Life (SL) in teacher education. It is worth noticing that simulations could be particularly relevant for special education teachers with students who have autism, Down's syndrome, or ADHD —to help pre-service teachers identify and be more empathic toward inclusive teaching in their future classrooms [29].

Simulations such as SL provide a rich platform for learning and exploration that could be used as an extra credit option, a supplementary tool, or an enhancement to teaching because it is hands-on, visual, experiential, individualized, adaptable, and customable; all principles of effective learning that parallel the simulated environment. In addition, SL has also led the way to other simulations development, such as Open Simulator [30], Open Cobalt [31], Kaneva [32], and Open Wonderland [33].

Means to enhance learning outcomes from playing serious games through the use of scripted collaboration in the game play are examined in [34]. As suggested in [34], "Gameplay for complex learning inherently is complex, and development requires expertise from both domain experts, pedagogical designers, text writers and software developers, [35] and [36]".

The work conducted in [37] presents a simple interactive toolkit to deliver assignment contents to a class of biology students. This work showed that while an easy to use game could benefit students to interact with their coursework in a convenient, and efficient way, a successfully gamified content should take into account ways of communicating with the audience in such a manner that the course content is not overwhelmed by the pervasiveness of the game features.

We initiated a large-scale study of several factors which might have a significant impact on why different groups of people participate in playing video games. Our goal is to find common factors contributing to human enjoyment, satisfaction, and continued interest in playing. Such factors could potentially be utilized in developing group-specific or group-agnostic games to deliver educational materials and to improve participation and enjoyment while delivering needed services.

3. GAME CHOICE

The market based categorization of game genres in the current state of video games defines products into loosely organized categories which stem from similarities, in form, to prior well known releases [38]:

- **Simulation:** games are effectively "soft real-time simulations" [39].
- **Strategy:** divided into two categories of Real Time (RTS) and Turn Based (TBS), this genre targets player's ability to approach a complicated scenario by strategizing solutions to achieve a desirable endgame by combining aggressive, semi-aggressive, and diplomatic means.
- **Action:** as the name suggests, this genre is the most performative [38], and require the player's physical and mental ability to coordinate effectively his/her sensory input with the mapping of actions available through the game's User Interface (UI).
- **Role-playing:** closely tied to the literary genre of fantasy [38], this genre gives the player control over their alternate self in the game by presenting a myriad of potential character transformations.

Based on the above categorizations of the video/computer games, and with the goal of finding suitable mediums for gamifying educational content, we selected a Massively Multiplayer Role Playing Online Game (MMORPG) called the Lord of The Rings Online [40] as the target game for this study. LOTRO is produced by Turbine Inc. and Warner Bros. Entertainment Inc.

4. RESEARCH METHOD

The research design implemented in this study was quasi-experimental. The quasi-independent variables were gender, age group: 18-25 vs. Over 25, and degree: undergraduate vs. graduate. The dependent variables were the 54 game characteristics survey questions and the 18 Gaming Motivation Scale (GAMS) [44] items and 5 identified cluster questions of the Game Characteristics Survey [46].

In [45], we presented some priliminary results of our investigation including a sample set of 50 participants. Since then, we have doubled our sample size from both undergraduate and graduate programs, for a more reliable descriptive statistical analysis. In [46] we reported the descriptive statistics that include the larger sample size.

The demographics and in information about the participants of this study are discuseed in [46]. This information is described below for the reader's convenience.

Participants

A large number of graduate and undergraduate students were recruited among students at the University of Houston-Victoria and were tasked to play the Lord of the Rings Online ™, over short, medium, and long durations of time. The participants in the study were 72 (76%) male and 23 (24%) female students.

These students were both from undergraduate (80%) and

graduate (20%) programs actively enrolled at the University of Houston—Victoria.

Participants' ranged in age from 18 to 59. Sixty percent of the participants were 18-25, 19% were 25-30, 16% were 30-39, 4% were 40-49, and 1% were 50-59.

The sample was diverse with 11% African American, 9% Asian, 25% Hispanic, 1% Native American, and 54% Caucasian.

57% of the participants spent a relatively short amount of time in the LOTRO game, while 22% spent a relatively large amount of time (over 10 hours per week) in the game. 21% of the participants were assigned to play LOTRO with a medium amount of time spent in the game.

Materials and Procedure

Students participated in the study as part of computer science research project. Participants completed a 54-item Game Characteristics Survey based on game characteristics identified by Wood et al. in [42] and by Yee et al. in [43]. Participants also completed the 18-item Gaming Motivation Scale (GAMS) [44].

The GAMS is comprised of six subscales of 3-items each – Intrinsic motivation: desire to perform an activity for itself, Integrated regulation: engaging in an activity out of choice that is now a coherent part of the organization of self, Identified regulation: behavior emitted out of choice based on its perceived meaning or its relation to personal goals, Introjected regulation: regulation of behavior through internal pressures like anxiety and guilt which implies partial internalization, External regulation: corresponds to extrinsic motivation, and Amotivation: similar to learned helplessness [44].

Research indicates that the GAMS has adequate levels of validity and reliability [44]. The Game Characteristics Survey contained a 5-point Likert scale from "not important at all" to "extremely important" for each question and the GAMS contained a 7-point Likert scale from "I do not agree at all" to "very strongly agree" for each question.

Research Design

The research design implemented in this study was quasi-experimental. The quasi-independent variables were gender, age group: 18-25 vs. Over 25, and degree: undergraduate vs. graduate. The dependent variables were the 54 game characteristics survey questions and the 18 Gaming Motivation Scale (GAMS) items [44], and 5 identified cluster questions of the Game Characteristics Survey [46].

Research Hypotheses

- H1: There will be significant differences on the 54 Game Characteristics Survey questions by gender, age group, or degree.
- H2: There will be significant differences on the 18 Gaming Motivation Scale (GAMS) items by gender, age group, or degree.
- H3: There will be significant differences between the 5 game clusters of the Game Characteristics Survey.

Statistical Analyses

To analyze the data from the Game Characteristics Survey, the 54 questions were divided into 3 sets: 1-18, 19-36, and 37-54. For each set of 18 questions, a separate one-way independent-measures multivariate analysis of variance (MANOVA) was used to determine if there were statistically significant differences first by gender, then by age group, and then by degree.

To analyze the data from the 18 items of the Gaming Motivation Scale (GAMS), a separate one-way independent-measures multivariate analysis of variance (MANOVA) was used to determine if there were statistically significant differences first by gender, then by age group, and then by degree. To analyze the 5 gaming clusters on the Game Characteristic Survey, a one-way repeated-measures analysis of variance (ANOVA) was used to determine if there was a statistically significant difference between the clusters.

Follow-up paired samples t-tests were used to see if there was a statistically significant difference between each of the 10 possible combinations of paired clusters.

5. RESULTS AND DISCUSSIONS

In [46] we have reported the descriptive statistics from a number of significant questions taken from Game Characteristics Survey. We are presenting the structure of the different grouping on the Game Characteristic Survey questions below.

Table 1. Game characteristics questions relevant to our study

No.	Question
Q1	How important to you is multiplayer communication in a game?
Q2	How important to you is multiplayer option in a game?
Q3	How important to you is multiplayer Local Area Network (LAN) option in a game?
Q4	How important to you is solving puzzles in a game?
Q5	How important to you is fulfilling a quest in a game?
Q6	How important to you is skill development in a game?
Q7	How important to you are skill levels in a game?
Q8	How important to you is character development over time in features such as dexterity, strength, and intelligence in a game?
Q9	How important to you are speaking characters in a game?
Q10	How important to you is it that a game is based on a story?
Q11	How important to you is rapid absorption in a game?
Q12	How important to you is narration in a game?
Q13	How important to you is collecting things in a game?
Q14	How important to you is sophisticated AI in game?
Q15	How important to you is rapid advancement of player in a game?
Q16	How important to you are realistic sound effects in a game?
Q17	How important to you is background music in a game?
Q18	How important to you are sound and graphics settings in a game?
Q19	How important to you is the ability of the player to customize the actual physical properties of a character in a game?
Q20	How important to you are high quality realistic graphics in a game?
Q21	How important to you are cartoon-style graphics in a game?

The questions are categorized into Social Interaction (Q.1-3), Intellectual Interaction (Q. 4-8), Mediation (Q. 9-12), Gameplay Dynamics (Q. 13-15), and Aesthetics (Q. 16-21) and shown in Table 1. The scale of the ratings on these questions were "not important at all", "somewhat

unimportant", "neutral", "somewhat important", "extremely important", and "I don't know". For our analysis, the "not important at all" and "somewhat unimportant" answers are grouped as "Unimportant", the "somewhat important" and "extremely important" answers as "Important" and the other two answers as "Neutral".

Social Interaction: An important component of enhancing student performance is to facilitate students' social nature in engaging them with the educational content. There have been studies on the role of social media tools in learning to promote a more student-centered course [47].

Intellectual Interactions: To evaluate how users intellectually interact with a game, we selected questions which relate how users consider advancing their persona and their ability to interact with the game world as well as challenging their critical thinking and problem solving skills. These questions evaluate how important users consider things such as solving puzzles, fulfilling quests, developing useful game skills, advancing their skills throughout the game storyline and character development in game. The importance of these aspects of a game could prove useful in educational games by including these concepts and aspects alongside the contents of the educational materials to increase student engagement.

Mediation: To engage participants in a fulfilling and satisfactory gameplay requires elements of conveying a coherent and appealing storyline. This will be an important aspect in a gamified educational application as most educational content can be easily formatted into a game-like medium of delivery. In this category, we asked the participants about how important they rate speaking characters and narration, storyline, and speed of absorption.

Gameplay Dynamics: An important difference between a gamified educational application and the traditional pen-and-paper or even the current state of online education is the fact that the students' experience could be developed and modified in a non-linear format. Games have the ability to engage the player sensory and cognition in a number of layers. As such these factors could be potentially interesting to investigate if an educational content is to be integrated into a game for delivery

Aesthetics: With recent advances in both hardware and software technologies, computer/video games have the ability to engage and to draw players to the game world like never before. Game aesthetics is also an important feature to explore, from visual and auditory design perspectives.

1) Inferential Statistics- Game Characteristic Survey

Due to the large number (54) of game characteristics in the Game Characteristics Survey, a separate one-way independent-measures multivariate analysis of variance (MANOVA) was used to analyze 18 game characteristics at a time.

For Game Characteristics Survey questions 1 through 18, a one-way independent-measures multivariate analysis of variance (MANOVA) by gender was statistically significant, F (18, 63) = 2.76, p = .002, η_p^2 = .44. While Males did not score significantly higher than females on any of the first 18 Game Characteristic Survey questions, females scored significantly higher than males on 9 questions as indicated below.

Female participants scored significantly higher (M = 4.68, SD = .48) than male participants (M = 3.75, SD = 1.09), F (1, 80) = 13.17, p < .001, η_p^2 = .14 on the question "How important to you is narration in a game?"

Female participants scored significantly higher (M = 4.52, SD = .84) than male participants (M = 3.97, SD = 1.08), F (1, 80) = 4.29, p = .041, η_p^2 = .05 on the question "How important to you are high-quality realistic graphics in a game?"

Female participants scored significantly higher (M = 4.11, SD = .87) than male participants (M = 3.21, SD = .97), F (1, 80) = 13.09, p = .001, η_p^2 = .14 on the question "How important to you are cartoon-style graphics in a game?"

Female participants scored significantly higher (M = 4.47, SD = .61) than male participants (M = 3.71, SD = 1.13), F (1, 80) = 7.87, p = .006, η_p^2 = .09 on the question "How important to you is full motion video (FMV) in a game?"

Female participants scored significantly higher (M = 4.42, SD = .90) than male participants (M = 3.60, SD = 1.13), F (1, 80) = 8.34, p = .005, η_p^2 = .09 on the question "How important to you are realistic settings in a game?"

Female participants scored significantly higher (M = 4.42, SD = .61) than male participants (M = 3.63, SD = 1.07), F (1, 80) = 9.34, p = .003, η_p^2 = .10 on the question "How important to you are fantasy settings in a game?"

Female participants scored significantly higher (M = 3.58, SD = .96) than male participants (M = 2.22, SD = 1.16), F (1, 80) = 21.60, p < .001, η_p^2 = .21 on the question "How important to you is it that the game be based on film or TV?"

Female participants scored significantly higher (M = 4.16, SD = .50) than male participants (M = 3.46, SD = 1.01), F (1, 80) = 8.33, p = .005, η_p^2 = .09 on the question "How important to you is the use of humor in a game?"

Female participants scored significantly higher (M = 2.37, SD = 1.26) than male participants (M = 1.60, SD = .91), F (1, 80) = 8.60, p = .004, η_p^2 = .10 on the question "How important to you is celebrity endorsement of a game?"

For Game Characteristic Survey questions 19 through 36, a one-way independent-measures multivariate analysis of variance (MANOVA) by gender was statistically significant, F (18, 69) = 1.77, p = .047, η_p^2 = .32. While Males did not score significantly higher than females on any of the second 18 Game Characteristics Survey questions, females scored significantly higher than males on 8 questions as indicated below.

Female participants scored significantly higher (M = 4.75, SD = .45) than male participants (M = 4.33, SD = .72), F (1, 86) = 5.78, p = .018, η_p^2 = .06 on the question "How important to you is rapid absorption of a player in a game, i.e. how quickly you can get into a game?"

Female participants scored significantly higher (M = 4.25, SD = .72) than male participants (M = 3.47, SD = 1.04), F (1, 86) = 9.76, p = .002, η_p^2 = .10 on the question "How important to you is rapid advancement of a player in a game?"

Female participants scored significantly higher (M = 4.80, SD = .41) than male participants (M = 4.19, SD = .80), F (1, 86) = 10.77, p = .001, η_p^2 = .11 on the question "How important to you are sound and graphic settings in a game?"

Female participants scored significantly higher (M = 4.65, SD = .75) than male participants (M = 4.13, SD = .86), F (1, 86) = 5.90, p = .017, η_p^2 = .06 on the question "How important to you are skill levels in a game?"

Female participants scored significantly higher (M = 4.55, SD = .83) than male participants (M = 4.06, SD = .91), F (1, 86) = 4.67, p = .034, η_p^2 = .05 on the question "How important to you are choice of control method (e.g. keyboard, joystick, etc.) in a game?"

Female participants scored significantly higher (M = 4.15, SD = .93) than male participants (M = 3.51, SD = .95), F (1, 86) = 6.92, p = .010, η_p^2 = .07 on the question "How important to you physical feedback in a game?"

Female participants scored significantly higher (M = 4.50, SD = .51) than male participants (M = 4.01, SD = 1.04), F (1, 86) = 4.01, p = .048, η_p^2 = .04 on the question "How important to you is fulfilling a quest in a game?"

Female participants scored significantly higher (M = 4.15, SD = .58) than male participants (M = 3.51, SD = 1.23), F (1, 86) = 4.99, p = .028, η_p^2 = .05 on the question "How important to you is finding things (e.g. Easter eggs) in a game?"

For Game Characteristics Survey questions 37 through 54, a one-way independent-measures multivariate analysis of variance (MANOVA) by gender was statistically significant, F (18, 59) = 1.90, p = .034, η_p^2 = .37. While Males did not score significantly higher than females on any of the third 18 Game Characteristics Survey questions, females scored significantly higher than males on 12 questions as indicated below.

Female participants scored significantly higher (M = 4.11, SD = 1.41) than male participants (M = 3.46, SD = 1.03), F (1, 76) = 4.62, p = .035, η_p^2 = .06 on the question "How important to you is shooting enemies (targets, etc.) in a game?"

Female participants scored significantly higher (M = 4.06, SD = .75) than male participants (M = 3.39, SD = 1.07), F (1, 76) = 5.78, p = .019, η_p^2 = .07 on the question "How important to you is different endings (ending options) in a game?"

Female participants scored significantly higher (M = 4.41, SD = .62) than male participants (M = 3.74, SD = .87), F (1, 76) = 8.84, p = .004, η_p^2 = .10 on the question "How important to you is having different modes of transport in a game?"

Female participants scored significantly higher (M = 4.35, SD = .70) than male participants (M = 3.66, SD = 1.11), F (1, 76) = 6.01, p = .016, η_p^2 = .07 on the question "How important to you are collecting things (e.g. objects, keys, chalices) in a game?"

Female participants scored significantly higher (M = 4.53, SD = .51) than male participants (M = 3.85, SD = .91), F (1, 76) = 8.59, p = .004, η_p^2 = .10 on the question "How important to you is solving puzzles in a game?"

Female participants scored significantly higher (M = 3.82, SD = 1.18) than male participants (M = 2.87, SD = 1.17), F (1, 76) = 8.73, p = .004, η_p^2 = .10 on the question "How important to you is beating times in a game?"

Female participants scored significantly higher (M = 4.06, SD = .90) than male participants (M = 3.43, SD = 1.06), F (1, 76) = 5.06, p = .027, η_p^2 = .06 on the question "How important to you is avoiding danger in a game?"

Female participants scored significantly higher (M = 4.11, SD = .70) than male participants (M = 3.37, SD = 1.10), F (1, 76) = 6.92, p = .01, η_p^2 = .08 on the question "How important to you is building environments in a game?"

Female participants scored significantly higher (M = 4.06, SD = .83) than male participants (M = 3.15, SD = 1.06), F (1, 76) = 10.67, p = .002, η_p^2 = .12 on the question "How important to you is linear game format in a game?"

Female participants scored significantly higher (M = 4.24, SD = .56) than male participants (M = 3.69, SD = 1.04), F (1, 76) = 4.31, p = .041, η_p^2 = .05 on the question "How important to you is accumulating points in a game?"

Female participants scored significantly higher (M = 4.18, SD = .73) than male participants (M = 3.54, SD = .98), F (1, 76) = 6.22, p = .015, η_p^2 = .08 on the question "How important to you is earning bonuses (bonus points) in a game?"

Female participants scored significantly higher (M = 4.65, SD = .70) than male participants (M = 3.77, SD = .99), F (1, 76) = 11.64, p = .001, η_p^2 = .13 on the question "How important to you is the ability to start levels again in a game?"

There was no significant difference on any of the three sets of 18 gaming characteristic questions (1-18, 19-36, or 37-54) by age group or degree.

Table 2. Means and Standard Deviations

Gaming Clusters	Mean	Standard Deviation (SD)
Social Interactions (Q.1 – 3)	11.70	2.68
Intellectual Interactions (Q.4 – 8)	21.05	3.31
Mediation (Q.9 – 12)	16.31	2.66
Gameplay Dynamics (Q.13 – 15)	11.93	1.95
Aesthetics (Q.16 – 21)	29.93	3.39

2) Inferential Statistics – Gaming Motivation Scale

There were no significant differences on any of the 18 Gaming Motivation Scale (GAMS) items by gender, age group, or degree.

3) Inferential Statistics – Gaming Clusters

For the 5 game clusters of the Game Characteristics Survey (shown in Table 1) a one-way repeated-measures analysis of variance (ANOVA) indicated significant differences between the clusters, F (4, 83) = 658.213, p < .001, η_p^2 = .97. Means and standard deviations for the 5 game clusters are indicated in Table 2 below. Paired samples t test results comparing the game clusters are indicated below in Table 3.

Table 3. Paired Samples t -tests

Pair	t	df	Sig
Social Interactions & Intellectual Interactions	-27.06	92	P < .001*
Social Interactions & Mediation	-4.00	93	P < .001*
Social Interactions & Gameplay Dynamics	-1.03	91	P = .304
Social Interactions & Aesthetics	-35.77	90	P < .001*
Intellectual Interactions & Mediation	14.73	91	P < .001*
Intellectual Interactions & Gameplay Dynamics	35.67	91	P < .001*
Intellectual Interactions & Aesthetics	-7.77	88	P < .001*
Mediation & Gameplay Dynamics	18.203	90	P < .001*
Mediation & Aesthetics*	-26.06	89	P < .001*
Gameplay Dynamics & Aesthetics	-44.37	87	P < .001*

*: Statistically significant difference below .001 alpha level

df: Degrees of Freedom

Sig: Level of Statistical Significance

6. CONCLUSIONS AND FUTURE WORK

This paper presented the comprehensive data and the results of a study which investigates gameplay factors that impact immersion and satisfaction perception of video/computer games on a target student population. Our goal is to identify contributing features in drawing students to participate in the gameplay and to establish guidelines in effectively developing gamified educational content.

Based on our findings, we targeted five major aspects of engaging gameplay to help with efficient, and satisfactory delivery of educational contents in gamified educational application pertaining to mediation, gameplay, aesthetics, and social and intellectual interactions.

A limitation of this study was the sample size difference between male and female participants which is a frequent occurrence in gaming studies.

A future direction for our research is to study the contents of the participants' interaction within the game with other players as well as the Non Player Characters (NPCs). Furthermore, we will plan to perform ethnography and discourse analysis to investigate the development of communities and cultures in game, qualitatively, to establish guidelines for development of successful gamified educational contents.

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