The Influence of Aesthetic Factors on Game Immersion through the Player Involvement Model

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Abstract—This study aims to identify the aesthetic factors that influence users or the players to involve and immerse themselves into computer and video games through the player involvement model of Gordon Calleja. Analysis of many related literature based on the six key points on the model –kinesthetic, spatial, shared, narrative, affective and ludic or tactical were carried out and concluded that game design, engagement and mechanics are key factors to keep gamers immersed in the computer and video game and that player and video games interaction are the main factors in the involvement of the player.

Indexed Terms— Video Games, Player Involvement Model, Game Design, Human-Computer Interaction, Immersiveness.

I. INTRODUCTION

The important goal for computer games is the enjoyment of the player (Sweetser & Wyeth, 2018). There is no virtual game without the player who will interact, involve and immerse. According to the study of Federoff (2002), there are three focal aspects of the game that can affect the player's involvement. These are; (1) Interface – controls and display, (2) Mechanic – Interacting with the world, and (3) Game play – problem and challenges. One of the preferred qualities of a computer games is the immersion (Tanskanen, 2018). It is involving the player, making them dedicated to the game, and stimulating them to return and play it again. On the other hand, creating a game that is immersive will be an effort for those who are in game design. Based on Neupane (2015), game design is an important element in creating games. It is a form of art that interacts the player for fun, simulation, education and many more. In addition, it used in creating objectives, goals, challenges, rules game play. Moreover, game design is a solution to a problem for creating a game. The main goal of this process is to understand the systematic procedure of how the game

will be created and presented which involving the target user's interest (Lankoski & Holopainen, 2017). According to Rouse III, & Ogden (2004), the game design can determine what will be the choices for the player to be in the game world and what effects those choices will be on the game for the entire game. Furthermore, there are different elements of a game design which are identified on changing level of concept. The five levels of game design can be distinguished as; (1) Interface design pattern – a common, successful interactive design modules and design solution for a known problem in a context, including prototyping implementation, (2) game design pattern or mechanic – a commonly reoccurring parts of the design of the game that concern gameplay , (3) Game design principles and heuristic – an evaluative guideline to approach a design problem or analyzing a given design solution, (4) Game models – a concept models from the components of games or game experience, and (5) Game design methods – game design specific practices and processes. (Deterding, Dixon, Khaled, Nacke, Additionally, in interface design a game designer must create an attractive but functional interface, the designer will be deciding what will be the game look like on the screen, how the player will get the information, what are the player's control, what are the platforms that the designer will be using for the user. These interfaces need to be tested and evaluate and not just the opinion of the designer (Bates, 2004). Moreover, ease and elegance for the user are more important than functionally. In relation to this, one of the successful applications in terms of interactive systems are computer and video games as part of evolving technologies platform (Nyugen, 2012). Since the games focus on system performance over consistency, the game environment does not have a place for restricting the look and the interaction for its user. Instead, it does strongly reward innovation and performance. In addition, a game design has a driving force to its user in terms of performance, satisfactions,

and novelty. Therefore, games have an adopter of new HCI technologies as well as innovators in HCI Interaction design (Dyck, J. et al., n.d.). Therefore, using digital involvement model of Gordon Callejaa for understanding game involvement and immersion, the researcher will be looking to the aesthetic factors that influence that users or the players to involve and immerse themselves into the computer and video games. In addition, uses of different related literature and sources will also be an aid to further see different concepts that should support the researcher discussion.

II. METHODOLOGY

Figure 1
The Digital Game Experience Model
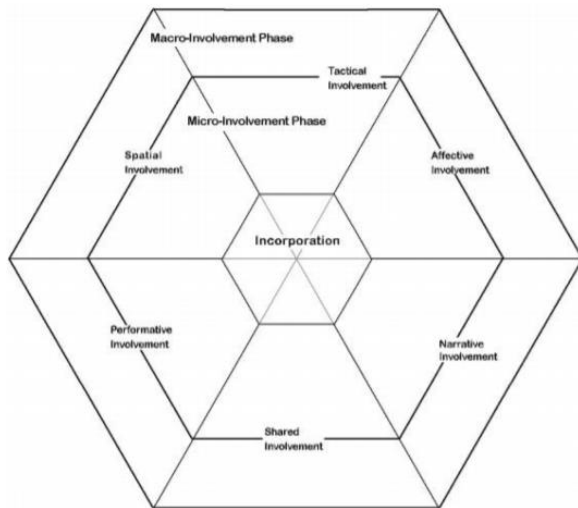
- *PLAYER INVOLVEMENT MODEL*

Player Involvement Model is used to analyze the different dimensions of immersion of the player in a video game. This model has six dimensions of involvement, these are: (1) kinesthetic – involvement that covers the control of the game character. (2) Spatial – involvement that has relation to the games environment and spaces as well as the navigation and the exploration of the game. (3) Shared – involvement that is concern with the interaction and the awareness of other mediators in the game. (4) Narrative – Involvement that deals with the element of the game which is the story. This narrative can be scripted which emerge in the gameplay. (5) Affective – involvement that is cover different forms of emotional arrangement, and (6) Ludic or Tactical – involvement which discuss the player choices that was made in the game and their

impacts. Furthermore, these six dimensions are pondered relative to 2 phases of temporal: the macro and micro. In relation to this, Micro involvement includes the parts that involve the player in the moment of gameplay. Macro involvement on the other hand, comprises by different factors that influence the player to go back to the game after stopping it (Calleja, 2014).

- *Immersion in Video Games*

To allow the player to be immersive in terms of playing experience, a game designer will be providing a setting in a multiple and different options. This in a way the game designer will be emphasizing the player's immersion, therefore the player will be increasingly engaging to the games. Immersive experience on the other hand, can make these players have their moment in personal as well as emotional. Thus, the experience of immersion is very helpful to the players dealing with stress (Baek, 2013). Once the player and the game system interact, what so called immersion is being created. In this, players are highly active which taking a large part in building the playing experience together with them are; personal experiences, eagerness and need (Emi & Mayra, 2005).

- *Interactivity*

While technology is expanding, traditional media now takes a different medium. Interactivity is one of the factors of this change which video games set this factor as key element. This interactivity provides a video games a different opportunity to the player and giving them a foundation for causing strong emotions and experiences. In addition, immersion is a developing quality that is produced from the player and the game interaction (Christou, 2013).

Based on Bryant & Gigilo, 2015 a narrative of a game can cause a player to develop a further emotional attachment to the game environment which are the main factor of the player to coming back to the game. In addition to Bryan & Gigilo, games with a good storyline can validate the player's action, making the player a clear goal and aid the game to present more organized and systematic. Moreover, there are three characteristics of a game narrative. These are; (1) Interactivity, (2) Nonlinear structure, and (3) Interplay between gameplay and the story (Qin, et al. 2009). On

the other hand, there are study that introduced four types of narrative immersion. These are; (1) Spatial, (2) Temporal, (3) Emotional and (4) Epistemic (Ryan, 2009).

- *Scripted Story*

This scripted story can be a tool which is influential in doing immersive experiences in video games. Cut scene, is an example of scripter story is a direct and is the most powerful way of telling a story that can be visually appealing and striking to the player. This cut scene can be the player break for the player who experience's intense moments in the game. However, cut scenes can be a breaking point from the flow of the game and have a probability to affect the experience of immersion (Sylvester, 2013).

- *World Narrative*

It is not really required in a game to have a massive navigable environment, though this is a factor for the player for a game to have an involvement. However, World narrative composes both visual and auditory narrative data and information from within the game environment. It is a good example that utilizes for the player involvement (blizzard, 2014).

- *Emergent story*

Emergent story, which also known as the player story, is different to each player in creating the gameplay and the game system interaction. An emergence of player stories can boost a game design by delivering game mechanics that accept, or support emergent stories to take place (Sylvester, 2013). However, emergent story does not take part on advancing that or aiding in the achieving of the game's goal. Rather, this is a best way to ease the emergence of player stories. Thus, there are some games without specific win condition that use emergent storytelling to create stories.

- *Characters*

A game character can be the most considerable influence in a game narrative. Games that have player-controlled characters can be an appreciated by the player. The idea of this is, the more the character is relatable to the player the more emotions that the story is able to produce (Skolnick, 2014). In addition, if the game has a lot of character customization which refer as an "avatar". It provides a strong relationship from

the player and the game and a motivation to play the game again. Whereas those players who enjoys the narrative elements of a game probably practice a further emotional involvement while playing as a pre-created character.

- *Aesthetics in Gaming*

In game design, the designers decide on what to focus when there are only limited resources in their games. There are various Aesthetics elements in each game such as: sound effects, animations, rendered images (are believed to be crucial elements in gaming experience). (Andersen, 2011) Schell (2008) argued that, good aesthetics makes the player somewhat tolerate imperfections in the game design and draws the player into a game that they ignored in the past. In the gaming context, "aesthetic" has multiple meanings. It is mostly concerned with content that adds style and artistic depth to the player and experience (this can also create a sense of theme as well). (Niedenthal, 2009) There have been various studies on the effects of aesthetics on user behavior & interfaces; (Kurosu & Kashima, 1995) found that the aesthetic quality of an interface can affect how the usability of the interface is perceived.

- *Rule Consistency*

Consistency is an aesthetic virtue and has been an aesthetic value in (western art for decades) (Vihma, 2003 & Eco, 2004). Under this aesthetic, the rules of the game need to be consistent in order to achieve an effective immersion of the user to the game itself. Hofstadter, D.R. (1999).

- *Simplicity*

To make a game more accessible to its user, the rules should be well-defined and easy to understand, it should not make the thinking capacity of the user enter a complex state wherein they have to go to different terms into understanding rules; if this is not achieved then it may not be easy to play, leading to less interaction with the game (Lundgren, 2009).

- *Integrated Theme*

In the gaming world, games adapt their styles from various explicit themes, in some cases the gameplay experience is affected by how well the themes are integrated from the visual style, rules and theme map.

Themes help gamers understand and remembers rules they can improve by seeing the consistency that is within the game, e.g. rectangle pieces (representing boats) cannot go into green spaces (representing land). (Lundgren, 2009)

• *Accurate Simulation*

In some games, the explicit design goal usually have accurate simulation. In this context, it's an exact version of Integrated theme focused on the gamer's choice and outcomes. These outcomes must be believable in the end because this would be the breaking point of the game into attracting the gamer and influencing the choices he would make. (Lundgren, 2009).

• *Facial Animation Analysis in Gaming*

Facial analysis is an approach by which computer vision is able to detect the emotional state of players while immersed in a game and without any interruptions. This has been a more effective way of detecting their emotional state than the usual questionnaire and physiological measurements that cannot be done while the player is in the game and might restrict the player's movements, respectively. Automatic detection of facial expression has been correlated with game experience (Tan, Bakkes, Pisan, 2014) and this can be used to further enhance it. Additionally, the study of Bevilacqua et al, (2018) revealed a significant difference in the values of the facial features detected outer mouth, corner of the mouth, eye area, and eyebrow and face area during the boring and stressful part of the game.

III. CONTROLLER AND GAMING EXPERIENCE

• *Player Performances in Game Controllers*

According to Natapov et al. (2007) which in his study, the researcher compared the Nintendo's Wii Remote and the classical controllers for the user's performances in terms of pointing using fit's Law. In this, a standard mouse was used as baseline condition. Thus, both consoles that compared to the mouse were performed inadequately in relation to the context of speed, throughput and error rate. In addition, to compare the speed and velocity of the Xbox gamepad and a standard Pc mouse. Klochek and MacKenzie

(2006) used in their study an environment with three dimension and track the acceleration of a moving target over a several seconds. the result of the study was both devices are equally performed in terms of tracking the velocity of the target. However, the user can allow the mouse to accelerate faster in order to position the error accurately. Furthermore, according to the study of Iskoski and Martin (2007), the use of mouse in terms of aiming in an FPS target games are much better the the Xbo369 gamepad. Thus, comparing to a standard mouse and a joystick. Participant performed a high scoring targeting task with the use of mouse rather than the joystick.

• *Player experience in games*

This involvement of the player in the video game can be described as a perception of an individual through the process of interaction between the player and video games. Based on the Gameflow model of Sweetser and Wyeth (2010), the idea of flow where the player has an enjoyment experience for the game. It is also describing the evolvement of the experience from the optimal alignment between the two ideas of challenge and personal abilities. In addition, the player and video games interaction are being describes as challenge, skills and immersion is related with the idea of enjoyment in the games.

In addition, a game metric data cannot only be used for bug tracking and balancing. It is also defining the persona of the game which are representing the player interaction through game and can give a greater understanding for the player's experience Tychsen, A., & Canossa, A. (2008). Moreover, based on Gerling et al. (n.d.), in measuring player experience, there are sets of questionnaires that can be used either individually or combined with another method. And these are; (1) Game Experience Questionnaire (GEQ) and (2) Game Engagement Questioner (GEnQ). This questionnaire was used from the study of Nacke & Lindley (2009) which the researcher compared the controls such as; Wii Remote and PS2 gamepad from the game Resident Evil 5. As a result, the player plays the game equally with both controllers without any problem. Similarly, to Limperos et al. (2011) which the researcher studied the Wii Remote's and PS2 gamepad impact from the player experience in Madden 2008. The result was PS2 controller was more enjoyable than the Wii controller. Thus, these two

studies indicate the significant correlation between the psychophysiological arousal and self-reported gameplay experience while interaction with different FPS games.

IV. ANALYSIS METHOD

For the analyzing process the researchers decided to structure the process with inspiration from the 9 grounded theory methods, because some of the steps of grounded theory came naturally during the process and not necessarily in the right order when managing the interviews, which resulted that some of the steps of grounded theory were redundant. These steps were microanalysis, theoretical sampling and theoretical saturation (Patton, 2002). This is motivated by the demonstrated potential when grounded theory has been utilized during game research studies (Brown and Cairns, 2004). The first stage of the analysis is called open coding, where we analyzed our collected data to identify important and interesting themes, these themes were then compared with each other to find similarities and differences. When the themes had been identified they were labelled so similar themes could be grouped together and form categories (Corbin & Strauss, 1990; Patton, 2002; Pace, 2004). With the categories defined they were linked and structured with the corresponding sub-category, this stage is called axial coding (Corbin & Strauss, 1990; Patton, 2002). During selective coding we identified categories that were poorly developed and didn't fit our core category (Corbin & Strauss, 1990)

V. RESULTS

1. Player Involvement
Game design
Based on the results of the study, when there was a discussion on what makes a good game, the first obvious answer from the developers were gameplay. This is the important aspects of different games, if the gameplay is not entertaining or clear that will never be a good game.

Another important element that was brought up in this result is, when you are the player playing the game, this must be engaging due to the fact that those game that that player wanted to play is something that they want to do. There is no other motivating factor or purpose beyond the game. It is the type of engagement that is important to motivate the player and to involve it from the game.

In addition, it is also important that in a game, everything is connected and working together. As stated, routing through a central pillar is what makes a truly great game (Charile, 2018). This will make sure that the mechanics will be connected to the game play in its objective or goals.

- Core immersive games

To become fully immersed in a particular game, the game design may need to pay full attention into the perspective of the player. This is not limited to the complexity of the mechanics but also can be existing in other facets of game design. Such as "story and character development". Moreover, an important aspect of the game immersion will be in the idea of consistent, it is whether in the visual style, the game art or the concept of the game world and the environment. This game world must be presented consistent as the player explore and interact with the game. In addition, the game should not be realistic but must have a consistency with the kind of realism that the rules of the game world manage to shape. Thus, if the game has an option that can allow to player to do an action. This must be consistent until the end of the game and at the same time making a good sense within the specific world that being created since the player will find themselves in.

There are facts from the player that when they start to encounter things all over again, immersion become affected in a negative way. Repeating different assets of the game such as textures will cause the player to think that they will just playing a video game and this will break the possible for immersion to appear.

- Impact on immersion

This is often done to allow the players to see the information necessary regarding the condition and status of the game. This is the needed for the player to be able to go beyond the game immersion without feeling that they have no idea what is going on.

- Customizing Avatar or Pre Character

If the character can customize by the player will be more kin of immersed in the character. However, if you give them already a pre made character it can tell kind of stronger stories or bolder ones. Since the character is further away from the player. In addition, both approaches should be done and can give a sense of immersion. However, it is harder with the pre made character since the game design rely on the player empathy.

- Losing immersion sense

While achieving immersion is essential for the game experience. It is equally as important to make sure that the immersion is not lost throughout. Like the studies stated, the rule of the game is important to achieve. This makes you allow the player to do different things which make sense inside the context of the game in important. If the player does not feel good in terms of the context of the game world, then the immersion can be lost anytime.

In addition, aggravation can also be an immersion break down. When it states to work against the player's intentions inside the parameters it create a big problem for immersion.

- Motivation

There are a lot of factors, a few of them clearly stated and well-defined goals that can be achieve, also a game must have a sense of progress throughout the entire game. In each point of the game, the player can do something, feel something, and achieve something. Making progress and what more. Since, players gradually learn while playing. Therefore, the game design must be improving and should advance from the time the player is playing.

In addition, there is a common covenant by a game design this should have a difficult obstacle and that's a good thing for the player to try the game many times. It feels satisfying when the player finally succeeds, goes completely crazy, and when the player finally manages to end the worlds.

- Player engagement: immersion, presence, and perceived realism

The literature of this study presented that player engagement may be involving throughout the game play. This involvement is connected to the motivation level presented to the player of the game. However, this engagement is not related to addiction since it is a pathological behavior. In addition, there are other factors for player involvement in video games. And these includes; immersion, presence, and perceived realism. Players experience this in different contexts of HCI, especially when the digital environment is being displayed. Furthermore, one of the characteristic of player interaction with video games that connect thru other HCI context is engagement, yet these video games are supposed to be entertaining. Thus according to the literature, enjoyment can be used at least as a parameter for in characterizing the player and video game interaction. Therefore, game immersion influences HCI by which the more immersive or enjoyable the game is, the higher the HCI.

- Aesthetics

The results under aesthetics shows that the ideals of aesthetics is seen as a counter model to those who describe user preferences into how and why the player is attracted to the game. (Bartle, 2006) These ideals provide results that explain why some players grow bored within a game. (E.g. lack of consistency, limitations etc.) (Koster, 2004) But overall, one appreciates the gameplay's aesthetics and is always based on how the game is being played if it is considered fun or not. (Lundgren, 2009) In addition, individual ideals and its properties can be built upon and be explored for further studies necessary to help develop a further discussion regarding the aesthetics in gameplay.

2. Player Involvement in HCI
Player enjoyment, flow, and emotion
The literature presented that the player may experience enjoyment through playing a video game. This concept is connected to a reaction of player which is positive while they are in the game session which could be linked to an emotional experience.

- Input and Output Characteristics for the Player Video Game Interface

Input and Output methods are important parts of player and video game interaction. In relation to the information of output, the quality of visual display and the characteristic such as; background (motion and color), displays (screen location), virtual world representation (Camera point of View), and audio display (background music and sound effects), can be a factor to influence the performance of the player, emotional state and flow. Input on the other hand, which the game control; tactile, motion, tangible by graze or brain activity can influence the performance of the players, presence, involvement, perceived realism and enjoyment.

• Game Content

Literature presented that video games feature; narrative, challenges, and gameplay that can influence the experience of the player. This concept of challenge can be identified in working difficulty level with steady or active variation. In addition, the balance in games can be a factor to influence the immersion, presence, enjoyment and emotional estate of the player. Exactly, dynamic difficulty is more influent in terms of the player experience. Narrative design in games such as fantasy level is used to influence the immersion and presence of the player. And at the same time, game play design such as navigational affordances.

• Multiplayer Games

There are different ideas that are presented in relation to multiplayer games that can influence the player involvement. First is motivation of the player to play and the involvement to the game are different even there are completive or collaborative rules. Next is, playing with the other players outside the room or from different countries can give a higher emotional response, immersion, presence, and enjoyment to the player while playing the games. In addition, the level of these two ideas; presence and emotional responses are increasing higher when they play against a friend rather than a stranger. Lastly, social interaction is the main motivation on playing online games.

• Approaches to player and video games interaction

There are several different ideas to characterize the general interaction between player and video games. First is the playability concept with two different definitions. The first definition can be the adaptation of usability for playful context. And the second definition is, a model that is based on the preference of the players which bring the key aspects together for a game design. In addition, the player and video games interaction could be experienced in terms of values. This is agreed to the specific objective or anticipated result for the player during the game play. Thus, even though these ideas seem mixed and rather remote to a classic user experience or usability, the method used to evaluate this interactivity between the player and the video games are adapted thru testing.

3. Controllers and Player Involvement

The player experience as the result of this study based on the analysis and different literatures, suggest that players who involve in games within the comfort platform can have a high frequently rate for player and video games involvement. In contrast to this, a player who interacts with changes in their platform can affect the perceived usability of the player. It is because the player can feel the lack of familiarity with the interaction paradigm on various gaming platforms or apparently the player giving more attention to the game interface can result to interacting to the platform that is not familiar.

Furthermore, in choosing the controllers within this study allows definite limitation in regards to the implications for the development of games in the future. As a result, in designing a multi-platform game. It is important to know the right controllers that the player will be using to interact within the game. Since, this controller can become a challenge that is associated on the whole-body interaction in a game design.

VI. DISCUSSION

Through the Player involvement model of Gordon Callejaa which involves 6 different points: kinesthetic, spatial, shared, narrative, affective, ludic or tactical; this research found aesthetic factors that influence users or the players to get them involved and immersed into computer and video games and literary evidences to support them. These said factors are game design, engagement and mechanics. Without these three concepts, the game would not be proven effective or enjoyable to play. Other notable factors also include

consistency of the game and the ability to customize a character.

Additionally, the present result objective is to provide a methodical review of experimental evidence of current ideas of interaction between the player and the video games which was taken from different, studies, articles and journal. Summarizing the result will allow the researcher to have a clear definition of player and video games interaction. In which, player and video games interaction are the main factor in the involvement of the player. Additionally, findings presented that it has a player aspect (the engagement and enjoyment), aspect of the video games (output and input information, content, and multiplayer techniques) which serve as the frame for different details sub ideas that can be assessed independently or in combination. Thus, result also discussed that can have a global approach on analyzing the interaction between player and video games in related to playability.

Furthermore, this study shows how the player involvement from the game affected by the gaming controller. In relation to this, the most interesting result for this study is that even though the players are significantly challenged by the game without using the comfort platform, positive affect for GEO ratings remained high for all the groups while the ratings in negative affect were low.

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