

Factors affecting gaming experience

Views of game developers

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Bachelor's thesis

May 2018

Technology

International business

Author(s) Hooda, Himanshu	Type of publication Bachelor's thesis	Date May 2018 Language of publication: English
	Number of pages 55	Permission for web publication: x
Title of publication Factors affecting gaming experience Views of game developers		
Degree programme International business		
Supervisor(s) Saukkonen Juha		
Assigned by		
Abstract <p>Gaming industry is booming at an unexpected rate along with rapid technological advancements. E-sports viewership has increased many folds in past few years. Technological advancements and changing customer habits have influenced the reliability as well as the sustainability of the past researches which calls for the need for updated studies. Gaming has not only been limited to playing and recreation but now has become a source of Income for players as well as content creators on digital platforms like YouTube and twitch. Since much of the existing literature talks about user preference in a game, only a few relevant researches regarding demographic influence on the development process have been accounted for. Author's personal interest in the field and the opportunity to find new dimension to the existing findings was the reason to carry out the research.</p> <p>The research aims to find out whether there is any demographic influence on the developers while creating a game design. Also, what factors are crucial from the viewpoint of the developers while designing a game, whether their profession or liking for a game/genre affects their rating and designing process. The research was carried out by asking the respondent group to fill in a survey, which was passed on to several individuals and institutions related to game development. During the data collection process, a total of 72 people responded to the survey with a mixed group composition. Since the number of respondents was not large enough to qualify for a full scale statistical research only descriptive statistics of the results were presented. Any pattern observed was an indicative of what could happen if a large-scale research is done.</p> <p>Role playing games were a choice for both the gender groups whereas Educational games were a future choice of work by many respondents. Female group showed lot more compassion when asked about providing help to the player in a game. A notable conclusion was the lower rating for social connectivity as both the gender groups saw this factor as least important while creating a game design.</p>		
Keywords/tags Game design, Gaming engagement, design factors, Developers		
Miscellaneous (Confidential information)		

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1 Introduction

Video games have a long history, starting to emerge in the early 1970's the first arcade game, Computer Space by Nutting Association was launched in 1971. With no signs of slowing down in the near future, gaming industry has been exploding over the last few years (Loebbecke and Powell 2002). A large portion of global top 100 websites in terms of traffic are made up of gaming website (Takahashi 2000). Though games like OXO (1952) and spacewar! (1962) were the earliest of the games, they were only played by a few people, with very simple or no graphics. Since then the industry has seen a great explosion in terms of both the quantity and the quality of games produced each year. Defining game in the words of Bernard Suits- "Playing a game is a voluntary effort to overcome unnecessary obstacles". In simple words of Scott Rogers, "A video game is a game that is played on a video screen".

The gaming industry has seen many changes in the past years. From upright cabinets and cocktail tables to home consoles and handheld games. Not only the video and functional qualities have been improved but also the way the games are played has seen a drastic change. Technological advancements have led way for digital distribution and online gaming which facilitates greater opportunities for indie game studios. Gaming industry is now divided vastly with many genres, consoles, distribution platforms and budget allocations. Standardization and professionalism has led to the creation of large publishing houses. According to 'The Association for UK interactive entertainment' (ukie) "the global games audience is estimated between 2.2 and 2.6 billion people and the global software market is expected to grow from \$116 billion in 2017 to an estimated \$143.5 billion by the end of 2020."

User engagement has been a subject of interest for all of the entertainment industry. There is no strict definition of engagement as Chapman (1997) stated that "..."something that 'engages' us is something that draws us in , that attracts and holds our attention". Since Engagement can be taken in several forms, it is hard to conclude on one single definition and for that reason understanding what engages the gamers to a particular game becomes more of an interesting topic to ponder upon. Various studies have taken place to ascertain how people are hooked onto a game and how to effectively make them stick for a longer period of time. Such

researches have long helped developers to design their great game idea in accordance to the customer needs. But as said by Henry Ford “If I had asked people what they wanted, they would have said faster horses”, the same applies to the gaming community. And in words of Scott Rogers “...most gamers don’t know what they want until it is shown to them.” This delima of what users actually wants and what could be offered can create a serious problems for the developers. Mikki H. Phan and Barbara S. Chaparro of Wichita State University and Joseph R. Keebler of Embry-Riddle Aeronautical University designed *GUESS (Gamer user Experience satisfaction scale)* to gather feedback from players on nine subscales ranging from usability to Visual aesthetics. Since there have been little known in the research world regarding how a developer prioritize different aspects of user engagement factors and do demographic factors have any effect on game development, it is worth going deeper.

This research aims to find out whether the user expectations and the factors affecting user engagement are aligned with that of the developers while designing the great game idea. For this research purpose, 2 main research questions were formulated i.e.-

What is user engagement and factors affecting user engagement in video games?

How do developers rate different engagement parameters and is there any effect of demographic differences while rating the parameters?

User expectations and factors of engagement (research question 1) can be acertained from the previous literatures which becomes the basis for comparing developers view on the aforementioned criteria. Author’s personal interest in the field and the opportunity to find new dimension to the existing findings was the reason to carry out the research.

The research was carried out within the author’s organization (JAMK UAS) and the responses were collected from the Business information technology students. Also, researcher’s personal contacts were asked to fill in the survey which only constitute a

small percentage of the total respondent group. The link was also provided on local gaming industry facebook page IGDA Finland and PLAY Finland.

2 Game engagement theories

“In the past few decades, human-computer interaction studies have emphasized the need to move beyond usability to understand and design for more engaging experiences (Hassenzahl & Tractinsky, 2006)”. User engagement is not only confined to the interface of the application but to whole lot more factors which decides the process of engagement. Results found out by Heather L. O’Brien and Elaine G. Toms- “engagement is a process comprised of four distinct stages: point of engagement, period of sustained engagement, disengagement, and reengagement.”

2.1 Hypercompetition and Engagement theories

The concept of hypercompetition in gaming industry has led developers to compete in a market where a product life cycle is getting shorter and shorter. As mentioned in *Entrepreneurs and Growth: An Option, Obligation or Obsession* “... the supply of the games available at this moment (mid-2017) exceeds 1200 new games per day coming to the market via the two main platforms IStore and Google Play”. With much focus now on user engagement, it not sufficient for programs or devices to be just good at usability (Blythe, Overbeeke, Monk & Wright 2003). With factors like hypercompetition and cutting-edge technologies delivered in the markets on daily bases, users have now options and accessibility to ditch or ignore a utility they would need but can get an alternative which would suit their need exactly the same or in a better way. This availability of abundant alternatives has directed the markets and the developers to go beyond the boundaries of usability and functionality of the offerings.

Various studies related to engagement have described engagement according to different factors such as media presentation, perceived user control, choice, challenge, feedback and variety (Jacques et al. 1995; Said 2004; Webster & Ho 1997; Chapman 1997; Chapman, Selvarajah & Webster 1999). Describing Engagement as “a desirable—even essential—human response to computer-mediated activities” (Laurel 1993, 112). Chapman and colleagues (Chapman 1997; Chapman et al. 1999) related

engagement to flow theory (Csikszentmihalyi 1990). There are more previous theories related to user experience in human-computer interaction: aesthetic theory (Beardsley 1982) play theory (Stephenson 1967), and information interaction (Toms 2002).

Flow theory

Flow is described as “in which people are so involved in an activity that nothing else seems to matter; the experience itself is so enjoyable that people will do it even at great cost, for the sheer sake of doing it” (Csikszentmihalyi 1990, 4). Engagement has been described as “a subset of flow,” “flow in a more passive state,” and “flow without user control” (Webster & Ahuja 2004). Engagement comprises of system feedback, user control (Brown & Cairns 2004), attention, motivation (Chapman 1997), and the system’s ability to challenge the user according to their knowledge and skills (Skelly, Fries, Linnett, Nass, & Reeves 1994). Engagement and flow are considered to be different (O’Brien & G. Toms 2007). Flow requires continuous and relatively high degree of volunteer effort whereas engagement should occur “midst of today’s multitasking and dynamic computer environments” (O’Brien & G. Toms 2007).

Aesthetic theory

According to Jennings (2000), aesthetic experiences are intrinsically motivating, focused attention, invigorating curiosity, and are interesting and pleasurable. Two of the attributes mentioned above i.e. interest and aesthetics are associated with engagement (Chapman 1997). Defining aesthetics as the visual appearance of the interface “which conforms to the design principles” (i.e., symmetry, balance, emphasis, harmony, proportion, rhythm, and unity; Beardsley 1982). Software designers use aesthetics theories while developing interface design (Skelly et al. 1994; Lavie & Tractinsky 2004). “Aesthetics has been linked to usability and users’ skills and needs, as well as to the sensory aspects or format of the application” (Laurel 1993; Hummels 2000, as cited in Overbeeke, Djajadiningrat, Hummels, Wensveen, & Frens 2003). Though aesthetics relates to the engagement but are not the only defining characteristics of it.

Play theory

Playing is a physical activity that promotes learning and creativity while providing psychological and social needs, incorporating various aspects of collaboration and competition (Rieber 1996). The activity of playing has been associated with having an experience, example- reading news (Stephenson 1967) and browsing (Toms 1998; 2000), educational technologies (Rieber 1996; Said, 2004), video games (Pausch, Gold, Skelly, & Thiel 1994) and decision making on the web (Atkinson & Kydd 1997). Satisfaction of system use, and increased frequency has also been associated with play (Atkinson & Kydd N.d.). Play is also attributed to increased motivation, challenge and affect (Woszczynski et al. 2002). Thus, many of the aspects of play are core to the engagement.

2.2 Information Interaction

“Interaction is the communication between the user and the computer interface” (Schneiderman 1997). The interface acts as the medium of exchange of information “enabling user experience” (O’Brien & G. Toms 2007). Interface facilitates interaction design (whereby information presented describes a story), information design (i.e. how the data is categorized, presented and understood to the user) and sensorial design (i.e., “the techniques employed to stimulate and utilize the five senses”; Shedroff 1994). Information interaction is the “process that people use in interacting with the content” (Toms 2002, 855). To make the events occur, user is required to use the system (Wright, McCarthy, & Meekison 2003) and is subject to change depending on the abilities of the user, system operated/usability, environmental characteristics (Hassenzahl & Tractinsky 2006), task (Marchionini 1995) and content (Toms 2002). “Information interaction provides the connectivity for engagement” (O’Brien & G. Toms 2007). To make the user engagement possible it is essential to make the flow of information is in accordance to the ability and capability of the both the system and user’s understanding. An engaging experience require the free flow of information and interaction between the two corresponding entities.

Attributes from the theories	Theories				Attribute of engagement?
	Flow theory	Aesthetic theory	Play theory	Information interaction	
Aesthetics		✓	✓		Yes
Affective appeal		✓	✓	✓	Yes
Attention	✓	✓			Maybe
Challenge	✓	✓	✓	✓	Yes
Feedback	✓		✓	✓	Yes
Goal-directed	✓		✓		Maybe
Meaningfulness	✓	✓			Maybe
Motivation	✓	✓	✓		Yes
Perceived control	✓			✓	Maybe
Sensory appeal		✓	✓		Yes

Figure 1 Theories in relation to engagement (O'Brien & G. Toms 2007)

Figure 1 takes flow, aesthetics, play and information interaction theories and evaluates the similarities and scope of each theory in relation to Engagement. Hypothetical evaluation is done of the characteristics to find out which of them are intrinsic to engagement. And in words of O'Brien and G. Toms (2007), "engagement is conceptually a holistic framework for understanding the integration of user and system variables, and how they combine to push the boundaries of user experience from merely perfunctory to pleasurable and memorable."

Attributes of engagement	Applications			
	Video games	Educational applications	Online shopping	Web searching
Aesthetic appeal ^a		✓	✓	✓
Attention ^a	✓			
Challenge ^a	✓	✓		
Endurability		✓	✓	✓
Feedback ^a	✓	✓	✓	✓
Interactivity	✓	✓	✓	✓
Perceived user control ^a	✓		✓	✓
Pleasure ^b	✓	✓	✓	✓
Sensory appeal ^a		✓		
Variety/Novelty		✓	✓	✓

Figure 2 Application areas to the presented theories

It can be observed from figure 2 that the attributes of engagement can be expanded to field other than just gaming and how they contribute in the overall engagement.

According to O'Brien, Cairns and M. Hall, 2018, "UE (User experience) is highly context dependent and each digital environment features unique technological affordance that interact with users' motivations to achieve some desirable ends". With different reasons and motivations to interact with a system, the parameters of evaluating UE varies. Each motivation to interact with a technology/interface creates a unique problem of designing a compelling UI (User interface) and a sustainable UE. Personal desires of a user might be a reason for his/her engagement but "content generates situational interest, which in turn fosters engagement" (O'Brien and McKay 2016). It can be illustrated that different users interact with the intention of different results/experience on the same content. "User engagement is affective, cognitive and behavioural in nature" (O'Brien 2016a; O'Brien and Toms 2008). Having such a variation in UE with an application/system, it is hard to define which parameters impose maximum engagement or are indicative of UE.

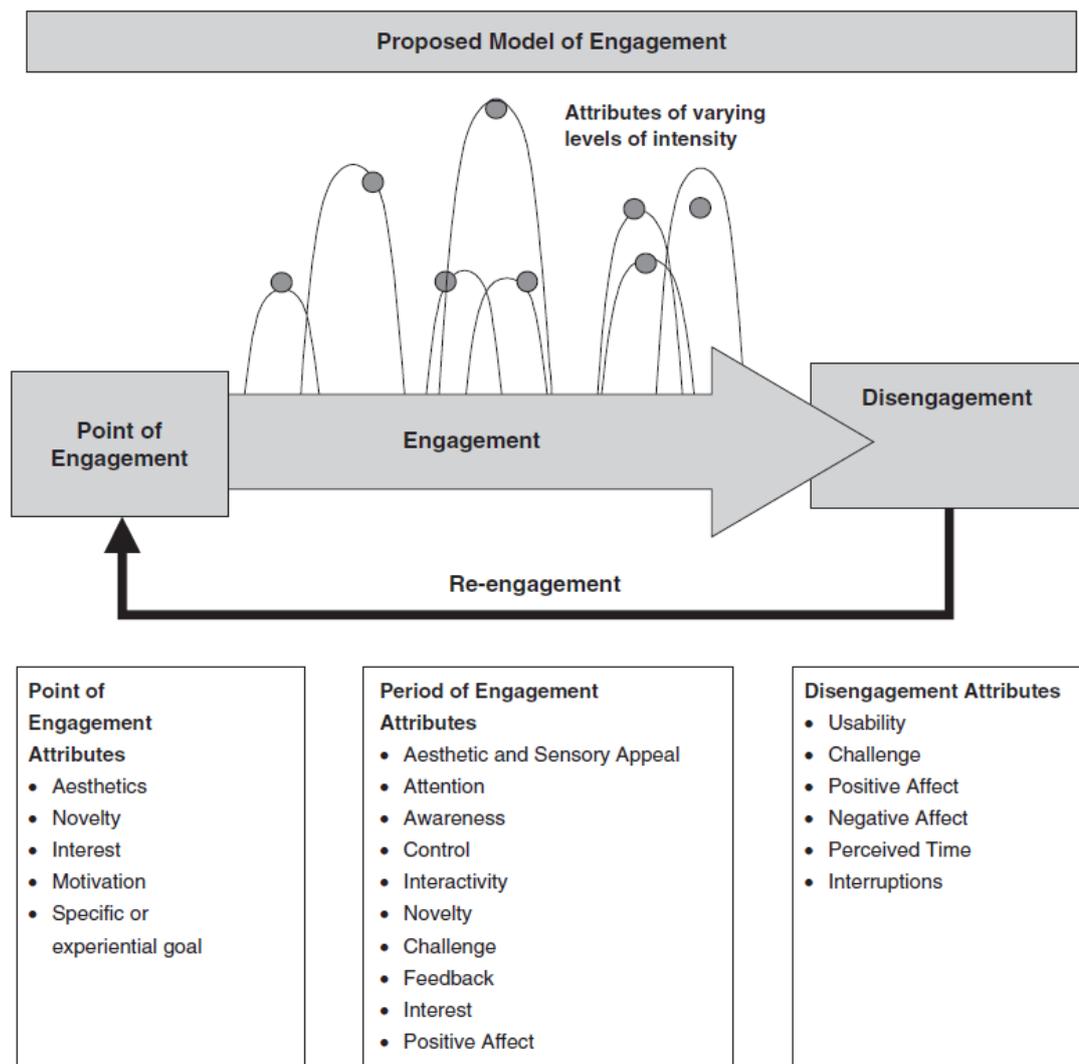


Figure 3 O'Brien and Toms, 2008 proposed Model of Engagement

The figure 3 represents attributes of different engagement periods where a user starts from the point of engagement to disengagement and then re-engagement. This can be seen through the presentation in the figure 3.

2.3 User Experience (UE) and player experience (PE)

According to Huizinga (2013), playing games has a different meaning in different cultures. Games user research (GUR) is a process having a set of techniques aimed at finding the desired experience for a game together with the design team. Games have to be evaluated strongly on the bases of human factor i.e. the player. Player experience (PE) has become a core subject of GUR and thereby, "PE describes the qualities of the player-game interactions and is typically investigated during and after the interaction with games" (Nacke et al. 2009). Playability and game usability ensures a

good experience for the players which in turn serves for the purpose of creating good user experience.

Brown and Cairns (2004) suggests that player play a game according to their mood and choose those which produce appreciated emotional response. So, it is necessary to know the player and their needs as in what motivates them, how they play or what creates aversion towards certain games (Mäyrä 2008a, b). Gerling et al. (2011) describes player experience as perception of an individual on the interaction process between a player and the game. According to Lazzaro (2008), UX and PE are not same as UX is the ``experience of use'' i.e. when a player uses a system and how well it is suited to accomplishes the desired tasks whereas PE is the ``experience of play'' i.e. how a game can satisfy the expectations held by the player. According to Lazzaro (2008), UX is studied to find out what prevents a player from playing and `` PE looks at what prevents the player from having fun''.

2.4 Psychologies of player experience

Human factor affects the user experience and engagement, and gaming being a personal experience, requires psychological factors to be considered when understanding engagement. Psychological models can be divided into two categories namely, Generic models and domain specific models (models developed especially for game domain) (J. Wiemeyer 2016).

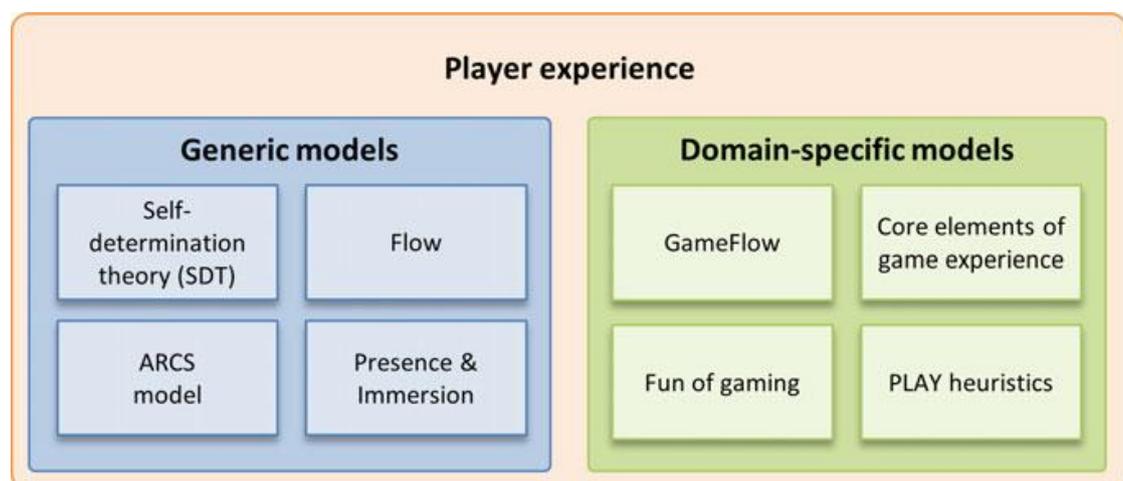


Figure 4 Models relevant to player experience (J. Wiemeyer 2016)

Figure 4 explains the player experience according to their desire to do an activity. Within these models there exist theories which guide the user according to their approach to a game.

Self determination theory (SDT)

Proposed by Ryan and Deci (2000), people have 3 basic needs: competence, autonomy and relatedness. As the word competence suggest it is the feeling of being able to complete the task/requirements they want or have to. Such engagement pertains to one's own attributes or talent. Such intrinsic motivations can be sourced through intrinsic rewards like success (J. Wiemeyer et al. 2016). But such intrinsic motivations can be undermined by all forms of extrinsic reward like money or praise (Decie-tal.1999; J. Wiemeyer et al. 2016). People want autonomy when selecting objectives/targets, paths and assessing failure condition for an intrinsic motivation. Relatedness creates a sense of associativity and a sense of security to maintain exploratory behavior (J. Wiemeyer et al. 2016). For a player it is important that he/she is competent in achieving the goals, autonomous in selecting his/her achievements and results, and relatedness to the subject of interest (collaboration and communication to the gaming community), in order to maintain intrinsic motivation. Ryan et al. (2006; see also Rigby and Ryan 2007) extended the SDT to the Player Experience of Need Satisfaction (PENS) model which encompasses five dimensions: PENS in-game autonomy, PENS in-game competence, PENS in-game relatedness, PENS presence and PENS intuitive controls. The first three of the PENS model are related to the earlier model and the dimensions added i.e. presence which is again subdivided into three dimensions as physical, emotional and narrative presence, and intuitive controls which signifies the easiness to remember the control keys for a game (J. Wiemeyer et al. 2016).

Attention, Relevance, Confidence, Satisfaction (ARCS)

A model was developed by Keller (1987, 2009) which includes four main strategies to incite and maintain motivation, they are: Attention, Relevance, Confidence and satisfaction (ARCS). As per human behavior, attention has an important role when processing any information. With the varying continuum of extremely high and ex-

tremely low attention, a balance is required in order to process the complete information. Unattended information will not be processed and goes unrecognized. This phenomenon of human behavior is widely accepted when talking about intrinsic motivation. When considering games in question, a sudden sound effect, event or pause screens can generate attention towards the in game happening. (J. Wiemeyer et al. 2016)

Relevance is when the player feels that the activities done in the game are purposeful and would help the player achieve the objectives. Each activity in the game must have some functional value according to the player's perspective. Confidence/expectancy of success is defined as the engagement shown by the player when he/she recognizes that with little more efforts and engagement they can be successful in achieving their objective (J. Wiemeyer et al. 2016).

Satisfaction is when people "feel good about their accomplishments" (Keller 1987, 6). "Intrinsic satisfaction and personal enjoyment can decrease if the activities are externally controlled" (J. Wiemeyer et al. 2016).

Flow

Flow is a state, emerged when people perform intrinsically motivated activities which have rewards within themselves (J. Wiemeyer et al. 2016). "The state of flow has the following characteristics (Nakamura and Csikszentmihalyi 2002): Increased and focused attention on the current activity, merging of action and awareness, loss of reflective self-consciousness, sense of control over one's actions, distortion of time experience, and experience of the activity as intrinsically rewarding" (J. Wiemeyer et al. 2016). Jackson and Marsh (1996) pointed out nine dimensions for the flow experience: Balance of challenge and skill level, merging of action and awareness (i.e., things happen automatically), clearly defined goals, unambiguous, i.e., clear and immediate, feedback, concentration on task at hand, sense of control, loss of self-consciousness, transformation of time, and autotelic experience.

Gameflow

The concept of flow is added to the games in order to explain enjoyment and satisfaction in games. (Sweetser and Wyeth 2005). The concept of GameFlow (Sweetser

and Wyeth 2005) has eight elements: “concentration, challenge, skills, control, clear goals, feedback, immersion, and social interaction” (J. Wiemeyer et al. 2016). To take an example a player should feel challenged by the difficulties and objectives to achieve in a game which would create immersion when complemented with the control of the game (here control is the sense of control over actions of the character and the interface environment).

GameFlow element (Sweets and Wyeth 2005)	Flow element (Jackson and Marsh 1996)
Concentration	Concentration on task at hand
Challenge	Balance of challenge and skill level
Skills	
Control	Sense of control
Clear Goals	Clearly defined goals
Feedback	Unambiguous, i.e., clear and immediate, feedback
Immersion	Loss of self-consciousness
	Transformation of time
Social Interaction	–
–	Autotelic experience
–	Merging of action and awareness

Figure 5 Maps out the elements of GameFlow and Flow

Figure 5 shows the comparison between the GameFlow elements and Flow elements, and flow theory can be applied to gaming engagement.

Presence and immersion

Presence is closely related to flow experience and immersion. Presence can be felt in media-controlled environments like virtual reality (VR) or digital games which have a feeling of being there (J. Wiemeyer et al. 2016). Presence is regarded as a personal experience whereas immersion is suggested as an umbrella by Nacke (2009a, b), which incorporates presence and flow as stages. The word presence has several connotations (Lombard and Ditton 1997). Physical (i.e. spatial) and social presence (Schultze 2010) are distinguished when talking about presence as a phenomenon.

Takatalo et al. (2011) integrated presence and flow, with their Presence-Involvement-Flow Framework (PIFF) they state that the way a player interacts with a game influences his/her presence and involvement in a game. It also states that “the level

of flow influences the cognitive evaluation and the emotional outcomes of playing” (J. Wiemeyer et al. 2016).

J. Wiemeyer, L. Nacke, C. Moser & F. `Floyd´ Mueller distinguished ten subcomponents of player experience as: Skill and competence, challenge, emotions, control, autonomy and freedom, focus and concentration, physical presence, involvement, meaning and curiosity, story, drama and fantasy, social interaction and interactivity, controls, and usability (J. Wiemeyer et al. 2016).

Fun of Gaming (FUGA)

A seven-factor model of player experience was developed by Poels et al. (2008) based on focus groups, expert interviews, and questionnaire studies. Seven-factors are as follow: Sensory and imaginative immersion, tension, competence, flow, negative affect, positive affect, and challenge (J. Wiemeyer et al. 2016).

Core elements of the gaming experience (CEGE)

Calvillo-Gómez et al. (2010) proposed the “theory of the Core Elements of the Gaming Experience (CEGE).” The model identifies two factors affecting immersion, flow and presence when playing digital games: puppetry and video-game perception. Puppetry is defined as the player’s interaction with the game. The interaction is influenced by player’s “sense of control, e.g., operating controllers and memory load, and ownership, e.g., personal goals, actions, and rewards” (J. Wiemeyer et al. 2016). The term video game perception denotes how a player feel about the game depending on the factors like graphics, sound design, gameplay rules and scenarios.

Play Heuristics

A framework was proposed by Desurvire and Wiberg (2009) evaluating the playability of the games. Heuristics for evaluating playability (HEP) falls into four categories: Game play, Game usability, Game Mechanics and game story (Desurvire H, Wiberg C 2009). HEP had its limitation as the game industry is vast with numerous game genres, game delivery, game improvement and new game development. A broader list of heuristics was developed, PLAY, which could be used as a generalized foundation and could be modified according to needs and specific games. PLAY was developed for three kinds of genre: Real-Time strategy (RTS), Action adventure and First-person

Shooter (FPS). A complete list of question related to the usability principle of the game design can be seen in appendix 1.

2.5 Synthesis of the theoretical background

It is assumed that the theories related to the user experience and player experience are the focal point in designing any game and it is by the knowledge of these theories and heuristics that the game developers make their decisions on. It can be assumed that demographic difference does not play any role when deciding game design factors as, user experience is psychological based and universal. And since games are designed considering the end users, developer's personal background plays no significant role in deciding which factors to choose and implement. Also considering the hyper competition in the industry, developers have little to no choice when considering which genre and which factors should be given importance while developing a game as the development process acts to the demand and supply curve.

3 Research approach, Design and Data collection

3.1 Research Approach

The topic of the research has influence on the research approach taken. The idea of the research is to induce whether there are any patterns in the developer's viewpoint regarding the factors of a game and whether their personal background affects the game design process. The factors rating can also be compared depending on the demographic variables. Since the gaming industry has a lot of professionals working in it for example- Programmers, designers, artists and more, it was decided to take a quantitative approach so that the results can be formed based on a large group of samples. According to Winter (2000, 8), quantitative research aims to separate phenomena to measurable and "common" categories that can be generalized to more wide and similar situations. It can be said that quantitative research helps in making the results more generalized based on a sample. The idea behind using the quantitative research was that it brought out the information more accurately and precisely.

With many factors affecting the game design process, it was effective to use quantitative data technique as that would help in determining the factors ranking and rating more accurately. Also, with many different factors, a more varied and inter factor analysis could be done between the demographic structure of the respondent group and their ranking for a factor. Since it was to compare how different factors affects the game design process, it was necessary that the respondents rate each factor on the same scale. To bring out a pattern from the studies, it was to be that the respondent group is large enough to validate any conclusion made, which could only be possible through a quantitative study.

The research has used both the primary and the secondary data to get information. Since a part of the research idea is relatively new and unexplored, it was hard to find any concrete secondary data that could help in benchmarking the research findings. Though by the help of existing literature, many aspects of the research were known. An adaptation of existing literature was done to suit the needs of this research. Most of the secondary data was collected through open sources and authorized access. A couple of articles which required author's permission for access were contacted through research gate. The scope and budget of the research limited the amount of secondary information collected.

Secondary data

With the abundant related information to the topic, it was up to the researcher to select and make choices regarding which information to be included in the research process. Considering the scope and available resources to the researchers, the most relevant and up to dated articles and research papers have been selected. Though the decision to include any of the prior literature is subject to the researcher's own perception and method of selection. The availability of secondary data has helped the researcher to go deeper into the topic and enhance the quality of the research findings. Authorized access and open sources have proven to be economical in getting the desired information. The data and findings available from the secondary data has helped the researcher to formulate the knowledge required to gain primary data. It gave access to what has been already done and what could be found out in the field of the researched topic. Secondary data also helps the researcher understand the topic more thoroughly. (Vartanian 2011, 13-17)

As per the limitations of the secondary data as mentioned above, it is deeply dependent on the researcher's view point of the topic and how he/she ascertains which information is related and which can be skipped in order to maintain the affordability of the research. Also, it is important to note the credibility of the sources used while formulating the research background. It is important for the author to beware of the fact that some of the facts and findings of the previous literature might be outdated and no longer validate to the current scenarios (Brodeur, D. Israel & D. Graig 2017). This fact was kept in mind while selecting the information of the research background as most recent and relevant articles were selected in order to keep the validation of the research intact. Since technological advancements have taken place and the way games are played has gone far beyond the traditional usability, so is the psychological validation of player's response to games have seen a drastic change. In order to select the validated data, author has selected only those articles which have been written or revised after year 2000. Within this classification, articles which were related to technological aspect of the research were kept strictly above year 2010. For the purpose of this research, articles related to engagement theories, flow theories, structural video game characteristics (SVGCs) and PLAY heuristics were searched to get hold of the prior researches and for research background. Since a number of studies have been carried out in the field of user experience on a video game and books which guides on creating a great game design, author couldn't find out any research relating to developer's mindset when creating a video game.

Primary Data

Primary data is defined as gathering data for the purpose of own research. Primary data can be classified into two types: Qualitative and Quantitative.

	<i>Solicited</i>	<i>Spontaneous</i>
Quantitative	Experiment	(Passive) observation
	Interview survey	Monitoring
	Mail survey	Administrative records
	Structured diary	(e.g., statistical records,
	Web survey	databases, Internet archives)
Qualitative	Open interview	(Participant) observation
	Focus group	Existing records (e.g.,
	Unstructured diary	ego-documents, images, sounds, news archives)

Figure 6 Primary data examples (Hox & Boeijs 2005)

The figure gives examples of the ways by which primary data can be collected. Research aimed at people's opinion, behavior and past experiences should seek out at going for direct questions to the response group (Ghuri & Grønhaug 2005). It is important that the correct method/s are selected in order to answer the research questions. This could also result in distortion of results as the methods selected by the researcher may or may not carve out the actual results.

Primary data collection technique helps the researcher to customize the design of the questions asked to the responding group in order to get the result which would answer the research questions. This also gives the researcher the opportunity to collect the data in the way which would suit the needs of the research objectives. And since there is more control over the research design, the researcher can define the timeline and goals more effectively. There is also the chance of fault even though the data collection technique is highly effective and efficient (Lamb, Hair & McDaniel 2011, 299). The credibility of the technique is up to the researcher. Researcher may try to fit in the responses according to the initial hypothesis which would mislead the results and objective of the research. Also, primary data requires a large number of samples to become credible. And since there are a number of options to choose from and how the design for the research is made, the results become more susceptible to researcher's decision and knowledge. The time consumed, and the required efforts may create hindrance in a proper execution of the research. It is also evident that the researcher had some of the above mention hindrance during the research process.

Plan of research quality and ethics

Research quality depends on the standards, principles and ethics used by the researcher. A research needs to be neutral and risk-free to the respondent. Anonymity and consent of each respondent is necessary to make sure that the researcher follows ethical practices while executing the research. Each respondent must be aware of the purpose of the research and needs to have voluntary participation. To maintain respondent's anonymity, confidentiality and privacy is the way to act ethically in a research execution. (Eriksson, & Kovalainen 2008, 62, 64-65, 70-74; Ghauri, & Grønhaug 2002, 18-20; Holloway 1997, 55-57.)

Researcher is also morally responsible for avoiding any practices related to plagiarism. Proper accreditation and giving credits to other's work is an ethical practice that should be followed at all times (Eriksson, & Kovalainen 2008, 74-75). Researcher needs to give special attention to any form of adaptation or modification to existing works which have been used in the research.

Ethics and researcher's responsibilities are kept in mind at all times during the execution of the research. Every aspect of respondent's anonymity and privacy is kept in mind during the data collection process. Proper citation of any quoted and adapted material from previous researches have been done to the author's best capabilities. The questionnaire was strictly concerned only to get the responses for research questions, no personal or private information was asked from the respondents. The survey had every question described in the simplest of vocabulary and language to avoid any misinterpretation or confusion. Since no information regarding identity of the respondents were asked for, the chances of exposing any identity or information regarding the respondents were minimized.

The data was collected by the help of an online tool, Webropol. The link was only shared to those groups which were strictly related to the gaming industry and had a role in game development. It could be questioned that there might be multiple response form one single respondent but that must be kept to the morality and ethics of the respondent as author had no control over the limitation to which a respondent can give response to a survey. Also, there was no way that the researcher could find out the exact number of responses made by a respondent. The results were only formed from the available data and in no ways was any part of the result misrepresented or changed to represent any pattern.

3.2 Research methods

The data was collected using both primary and secondary sources. A questionnaire was designed to get the primary data. The questionnaire contained both closed and open-ended questions. The survey was distributed to JAMK UAS's department of business information technology where students were asked to fill in the survey. Also, researcher reached the local gaming industry EXPA for their responses. The survey link was also posted to Finnish gaming webpages (IGDA and Neogames). Researcher's personal contacts were also asked to fill in the survey. During the survey distribution, it was kept in mind that people related to gaming industry could only fill up the survey. The Survey was created using Webropol, a complete website enabling questionnaire design, data collection, report generation and link distribution. The validation of the survey was done by getting opinions and suggestions from the research tutor and the content tutor. Only after reviewing the survey thoroughly, the link was sent to the respondents.

The population sample of the research is a mixture of professionals and students, with a large portion of the sample response being students. With technology being constantly changing and new trends coming into the market, students were the best response group as they had the latest knowledge and were one the group that would be developing games in the future. Considering the scope and limited reach of the researcher, a total of 72 responses were collected by the closing date of the link. The data collection took a huge chunk of time as the respondents had to be reminded frequently. Also, festive holidays and exam timings may have affected the response rate as the survey was rolled out during the crunch time of the semester where students were busy in their studies.

Task	Estimate	Start Date	End Date	Time taken
Topic selection and discussion	5 days	15 .02.2018	09.03.2018	22 days
Literature review	10 days	05.03.2018	15.03.2018	10 days
Questionnaire Preparation	2 days	16.03.2018	19.03.2018	4 days

Survey roll-out and responses	7 days	20.03.2018	17.04.2018	29 days
Data analysis and reporting	15 days	17.03.2018	04.05.2018	18 days

Table 1 Data Acquisition Timeline

The table show the time planned and actual time taken to collect the data. To get the responses, a questionnaire was constructed constituting 30 questions in total (Appendix 2). Total of 6 questions were asked relating to the demographic background of the participants. The survey questions were adapted from Heather Desurvire and Charlotte Wiberg “game usability heuristics (PLAY)” which helps in evaluating and designing a better game with respect to user’s feedback. However, there is always a risk that the respondents may misinterpret the questions (Wilson, 2014). All the questions relating to factor ratings were measured using Likert scale type, ranging from 1 to 6 using radio buttons.

7. Enjoyment *

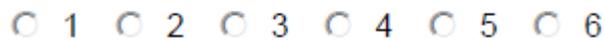


Figure 7 Example of Questionnaire Scale

The choice of keeping the scale from 1 to 6 was to remove the neutral factor from the choice as that might have resulted in inconclusive results. Now on a scale of 6, a respondent must either go up the scale i.e. 4, 5, 6 or remain down the scale 1, 2, 3. The questionnaire also constituted an open-ended question which enabled the respondents to add any other factor which they see as important. The data from this qualitative form could be transferred using quantitative analysis. “This kind of quantification of the qualitative data is regarded as a basic characteristics of a quantitative research approach (Bryman, 2006)”.

4 Research results

The results are found out by analysing the data collected through distribution of an online link which directed respondents to the questionnaire. The responses are stored and expressed into Excel sheets by the help of an online tool, Webropol.

During the data collection process that lasted for almost 29 days, a total of 72 responses were collected before the closing of the link. The questionnaire consisted of demographic and game design related questions. Four of the respondents did not fill their age which was an optional question.

Initial comparison starts within the demographic factors and inter-relation among factors are found out. Later a more diverse analysis is made between the demographic factors and game design factors. The questionnaire also consisted of an open ended question which allowed respondents to fill in what according to them is important in a game design document (See appendix 2). The questions are based on the adaptation from Heather Desurvire and Charlotte Wiberg “game usability heuristics (PLAY)” and flow theory by psychologist Mihaly Csikszentmihalyi.

From a total of 72 responses, 54 were males and 18 were females. Table 2 shows the demographic status of respondents.

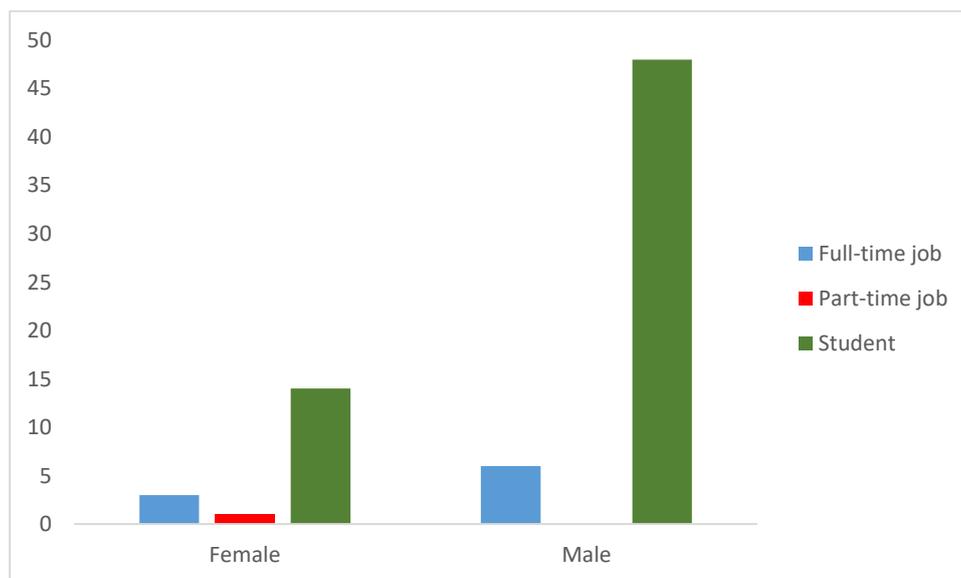


Table 2 Demographic analysis

Majority of the respondent group consisted of students as 86% of the total responses were from students with full-time employment and part-time employment being at 13% and 1% respectively. Since a large group of respondents belong to students, there isn't much age variation. The age varies from 18 years to 38 years with almost 53% of response group being between 18 to 23 years of age with an average age of 24 years and the maximum and minimum being 19 and 38 respectively. Table 3 describes the age group pool of the respondents.

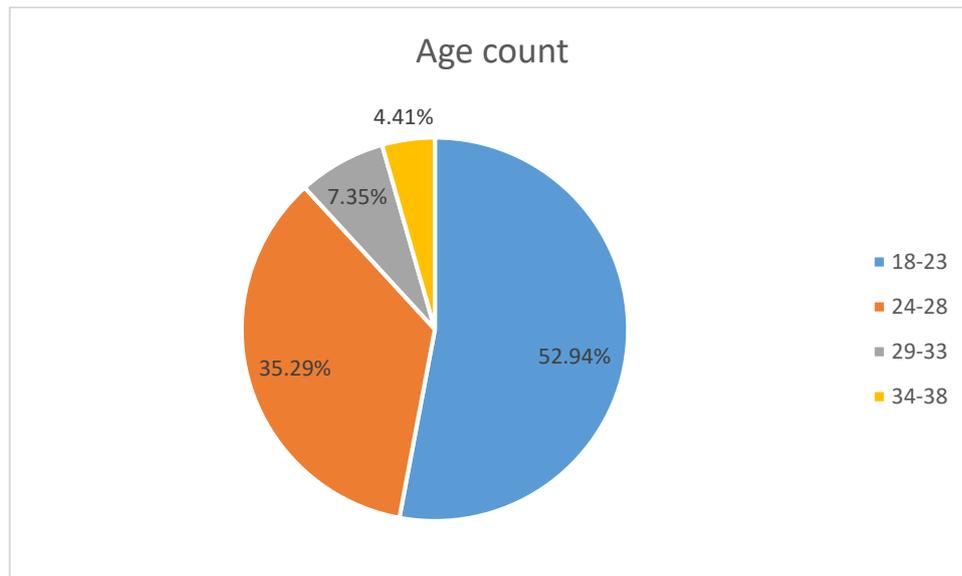


Table 3 Age pool of the respondents

The most liked genre by both the gender groups was RPG (role playing games) with 54 respondents liking the genre. One also noticeable result that came out was that even when looked at individual group counts, both male and female had the highest votes for RPG games with 13 for females and 41 for males. The least favored genre was Educational at only 8% of total respondents liking it. The following Table 4 shows the percentage of respondents liking a particular genre. A respondent could fill more than one genre he liked or have played. The percentage shows the total votes by the total number of respondents. When analysis was done with respect to gender groups, females were more interested in Puzzle games than males. Also, both the gender group were almost equal in terms of choosing RPG (role playing games) as their favored genre, both being at 72% and 76% for females and males respectively.

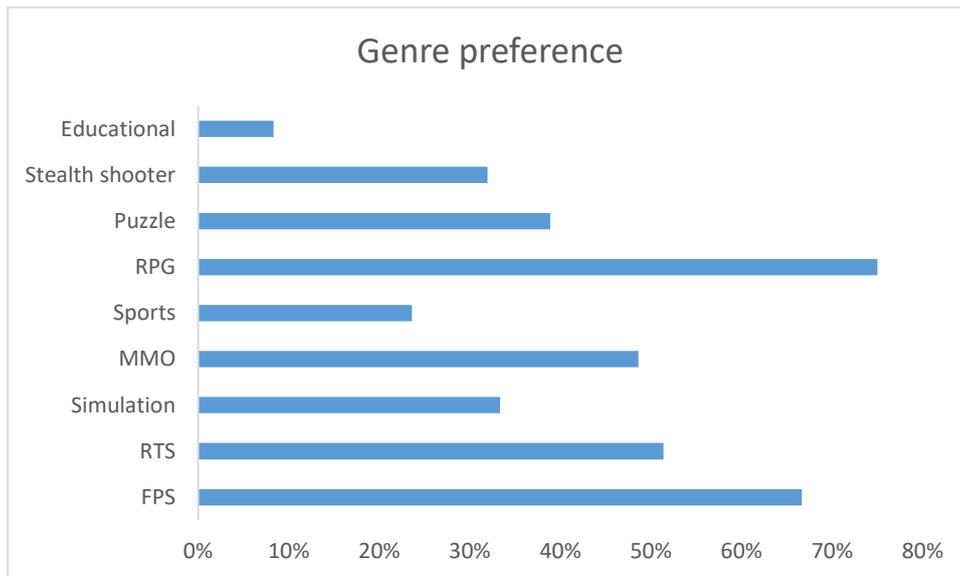


Table 4 Genre preference by total respondents

The questionnaire consisted of two questions which asked the respondents to mark their liking for the game genre and what would they like to develop in future respectively. As mentioned above, RPG and FPS are two most liked genres whereas Educational games are least preferred. With this result, a comparison is made with what the developers would like to develop in future. Table 5 shows the percentage difference between developer’s liking for a genre and their future work intentions/possibilities. As seen in the graph, the two-major difference in the genre preferences are marked in the red circles. Genre for educational games is higher by 20% whereas sports games is lower by 16%.

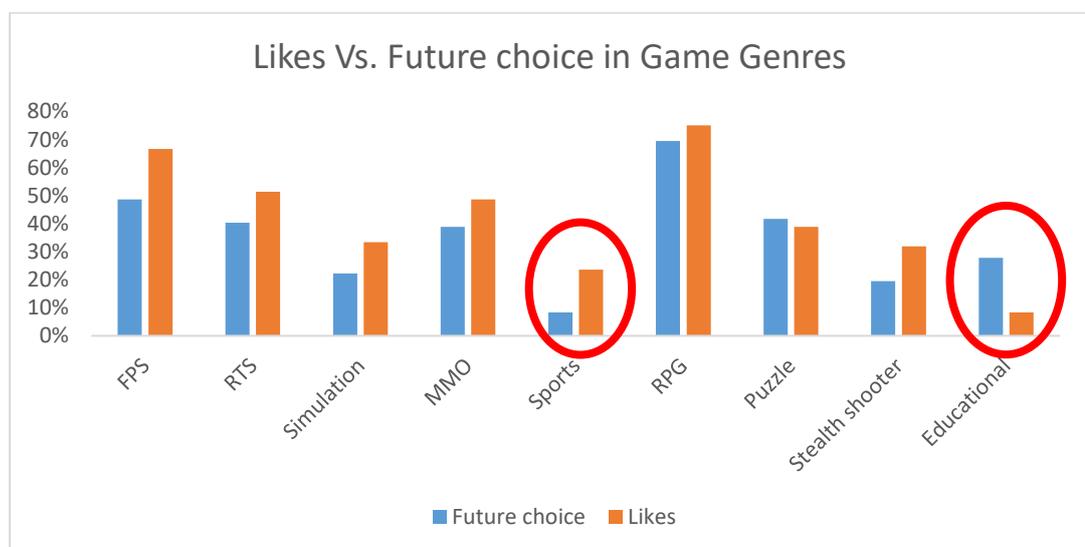


Table 5 Likes Vs Future choice in game genres

The respondents were also asked in which role they would see themselves or are working right now. From a total of 72 respondents two of the respondents did not see themselves or aren't working in any role in game development. The role categories were defined based on literature review and from internet sources. The results show that 38% of respondent were either programmers or saw themselves as programmers. Out of 18 female respondents, 50% of them aspired to be or are working as an artist. More than 80% of the respondents were either programmers, artist or designers. Also, 45% of the male respondents were programmers.

The questionnaire asked 23 questions in total related to game design factors which were all compulsory questions. From all the 23 questions, 2 of the questions (Tutorials and Controls) were to be rated from a number of given options which are described in table 6. The rest 21 questions were to be responded on a radio button scale ranging from 1 to 6 where 6 meant highest importance and 1 meant lowest. The analysis starts with an average of each GD factor and then delves into more inter related and intra related analysis. Table 7 shows the mean response and standard deviation for the GD factors.

Controls rating options	Tutorials rating options
1 = Consistent with standard conventions	1 = No need for tutorials
2 = Easy to remember controls	2 = Quick tutorials (<1 min)
3 = Complex controls	3 = Lengthy tutorials (>1 min)
	4 = Long manuals/description

Table 6 Rating options for Controls and Tutorials

These factors are then divided into group which have been adapted from the existing literature, which helps in easy classification and presentation. The factors are divided into 5 broader categories based on PLAY heuristics and flow theory mentioned in the literature review. Though the group designing has been done by modifying the existing sources. The five main categories are Engagement/Immersion, Social connectivity/recognition, Player's in-game control, Challenges and difficulties and Game response and interaction to the user. This classification can be seen in more details in Appendix 3.

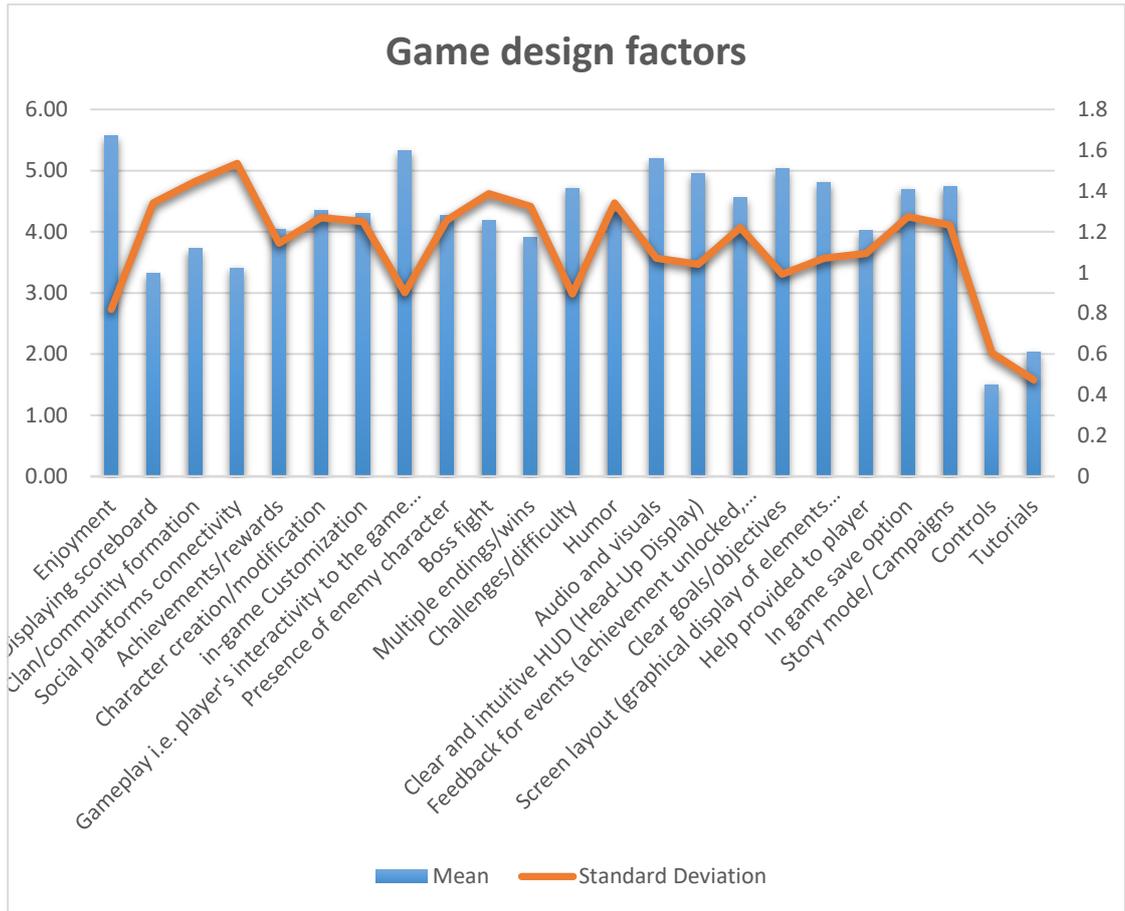


Table 7 Response for factors and their variation

To ascertain that each factor divided in to groups were related to each other, correlation was found out to make sure that each factor belongs to correct category. The following figures shows the correlation between the game design factors within the group.

Engagement/Immersion	<i>Enjoyment</i>	<i>Multiple endings/wins</i>	<i>Humor</i>	<i>Audio and visuals</i>	<i>Story mode/ Campaigns</i>
Enjoyment	1,00				
Multiple endings/wins	0,09	1,00			
Humor	0,20	0,51	1,00		
Audio and visuals	0,37	0,36	0,58	1,00	
Story mode/ Campaigns	0,34	0,43	0,52	0,48	1,00

Table 8 Engagement/Immersion factor correlation

Social Recognition	<i>Displaying scoreboard</i>	<i>Clan/community formation</i>	<i>Social platforms connectivity</i>	<i>Achievements/rewards</i>
Displaying scoreboard	1,00			
Clan/community formation	0,46	1,00		
Social platforms connectivity	0,42	0,73	1,00	
Achievements/rewards	0,34	0,39	0,22	1,00

Table 9 Social Recognition factors correlation

Player's in-game control	<i>Character creation/modification</i>	<i>in-game Customization</i>	<i>Clear goals/objectives</i>	<i>In game save option</i>
Character creation/modification	1,00			
in-game Customization	0,63	1,00		
Clear goals/objectives	0,15	0,17	1,00	
In game save option	0,32	0,28	0,14	1,00

Table 10 Player's In-game control factors correlation

Challenge and difficulty	<i>Boss fight</i>	<i>Challenges/difficulty</i>	<i>Presence of enemy character</i>	<i>Help provided to player</i>
Boss fight	1,00			
Challenges/difficulty	0,15	1,00		
Presence of enemy character	0,64	0,28	1,00	
Help provided to player	0,17	0,04	0,26	1,00

Table 11 Challenge and difficulty factor correlation

Game's response/interactivity	<i>Screen layout</i>	<i>Feedback for events</i>	<i>Clear and intuitive HUD</i>	<i>Gameplay</i>
Screen layout	1,00			
Feedback for events	0,52	1,00		
Clear and intuitive HUD	0,55	0,47	1,00	
Gameplay	0,11	0,17	0,19	1,00

Table 12 Game's response factors correlation

The positive relation between factors of group represents that the group division is proper, and each factor is influenced by the other or vice versa. The correlation for controls and tutorial is .05 which is positive which is indicative that if the controls are complex for a video game, there is a greater need for lengthy tutorials.

<i>Game design factors</i>	Gender	
	Female	Male
Displaying scoreboard	3,67	3,20
Tutorials	2,00	2,04
Multiple endings/wins	4,33	3,76
Controls	1,61	1,46
Clear goals/objectives	5,39	4,91
Story mode/ Campaigns	4,89	4,69
In game save option	5,00	4,59
Help provided to player	4,61	3,81
Feedback for events	5,00	4,41
Humor	4,61	4,22
Screen layout	5,33	4,63
Clear and intuitive HUD (Head-Up Display)	5,28	4,85
Audio and visuals	5,50	5,09
Enjoyment	5,72	5,52
Challenges/difficulty	4,61	4,74
Boss fight	4,28	4,15
Presence of enemy character	4,00	4,35
Clan/community formation	3,56	3,78
In-game Customization	4,56	4,20
Social platforms connectivity	3,39	3,41
Gameplay i.e. player's interactivity to the game environment	5,33	5,31
Character creation/modification	4,94	4,15
Achievements/rewards	4,50	3,89

Table 13 Design factors according to the gender groups

Table 13 display the average rating for each game design factor in response to different gender response group. Gameplay and social platform connectivity has been rated similarly by both groups at an estimate of 5.30 and 3.40 respectively whereas help provided to player and Character creation/modification shows significance difference in ratings by both gender groups. Also, it is interesting to see how low social recognition has been rated by both the groups (see table 14).

<i>Social connectivity/recognition</i>	Gender		Grand Total
	Female	Male	
Clan/community formation	3,56	3,78	3,72
Social platforms connectivity	3,39	3,41	3,40
Achievements/rewards	4,50	3,89	4,04
Displaying scoreboard	3,67	3,20	3,32

Table 14 Social connectivity/recognition in respect to gender groups

To get a more detailed analysis of the developers rating behavior, respondent group was divided into four categories based on their age. Since much of the respondent group consisted of students, the range for age was from 19 to 38. In order to divide

the groups proportionately, four classes were made as 18 to 23, 24 to 28, 29 to 33 and 34 to 38. Table 15 describes the average rating for each factor in response to the age classes.

<i>Game design factors</i>	Age distribution			
	18-23	24-28	29-33	34-38
Number of respondents	36	24	5	3
Enjoyment	5,58	5,46	6,00	5,67
Tutorials	2,06	1,92	2,20	2,33
Controls	1,61	1,42	1,20	1,33
Clear and intuitive HUD (Head-Up Display)	5,03	4,96	4,40	5,00
Help provided to player	3,75	4,42	4,20	4,00
In game save option	4,58	4,75	5,40	4,33
Screen layout	4,64	5,04	4,80	5,00
Clear goals/objectives	5,00	4,96	5,20	4,67
Feedback for events	4,61	4,42	4,60	5,00
Boss fight	4,11	3,88	4,80	4,67
Challenges/difficulty	4,86	4,75	3,80	4,33
In-game Customization	4,31	4,00	4,60	4,33
Presence of enemy character	4,19	4,25	4,80	3,67
Gameplay i.e. player's interactivity to the game environment	5,47	5,17	5,60	4,33
Achievements/rewards	4,19	3,88	3,40	3,67
Character creation/modification	4,36	3,96	5,00	4,67
Displaying scoreboard	3,11	3,58	3,20	3,67
Social platforms connectivity	3,42	3,33	3,00	3,33
Clan/community formation	3,78	3,67	3,20	3,67
Multiple endings/wins	3,97	3,88	3,60	4,00
Humor	4,36	4,25	4,20	4,00
Audio and visuals	5,28	5,00	5,40	5,67
Story mode/ Campaigns	4,81	4,25	5,80	5,33

Table 15 Design factors with respect to Age groups

5 Conclusions

As the initial result reports are regarding the demographic constitution of the respondent group, a representation of the actual scenario in the gaming industry can even be seen in the respondent group as the percentage of male respondent is way higher than its counterpart. This unbalanced representation is evidently present in the actual game industry as it is mainly dominated by the males. The data also represents that even though the majority of the respondents are students, the gender ratio is highly imbalanced. This low representation of females in gaming industry could be due to various factors ranging from personal choice to societal prejudices, conventional norms related to gaming interest and lower exposure of females in the past towards gaming activities.

We can also see how unanimous were the two gender groups while rating the genre they like to play. It is hard to explain from the data available that why both the gender groups rated RPG as the most liked which calls for a further study to verify the assumptions. Also, it can be seen that educational games were only favoured by 8% of the respondents which when compared to its counter parts is the lowest. A number of factors may be the reason for that as educational games are seen as a tool for teaching and games have traditionally been a mode of recreation. Also, a variety of factor may have contributed to that rating such as low number of games produced in the genre, age specific games (mainly for kids) and low overall demand resulting in low budget productions. Though it is interesting to heed upon the fact that today games have become a source of teaching in some form or the other but educational games still don't find the response of the masses There could be a number of reason for such unfavourable rating which calls for a futher study to ascertain the reasons for low popularity of educational games.

An interesting result that came out from the analysis was the liking for puzzle games by the female respondents. From a total of 18 female respondents 50% of them favoured playing puzzle games which is higher than their counterpart which only registered for 35% liking from a total of 54 respondents. It is hard to know from the available data that why there is such a high response from one group or is it due the imbalanced respondent group. Another comparison was made between developer's liking for a genre and their future ambition to work in a particular genre. This comparison represented a contrasting result as educational games were the choice for many developer as their future projects whereas sports genre saw the maximum dip as the preferred choice of future work. This is a possible representation that the sports genre has become exhaustive and much of the popular themes have been already published. As for the rise in educational games being the preference for future work could be due to the scope of this genre in the field of education as well as in recreation. As of present, delivering of knowledge has shifted from tradtional methods to high tech methods and with more focus on student's learning and practicing, practical and influential methods are deviced to support the learning process. Though the spike in interest is not significant but it could represent the

future trends and the direction where the developers would like to create something.

Developers were asked to mark their role in their project, a list of options was given and they were to put their choice. The list was prepared based on literature review and internet sources. 80% of the respondent group consisted of programmers, designers and artist which can indicate to the requirement of the current industry. Also, the reason for this could be that these three role are key in any team and can hardly be outsourced which creates the need for larger number of people involved in these roles. Since the data cannot validate the reason behind this factor, a detailed research can be done in order to find out the reason for such loop sided preference for some roles in gaming industry.

A total of 23 factors were asked to rate by the developers individually. And according to the data collected, these factors leaving the 2 (controls and tutorial) were grouped into 5 broader categories based on PLAY heuristics and engagement parameters. Since players have certain parameters to judge a game and whether they want to play a game and continue playing it, the factors were constructed to represent those parameters but from the perspective of a developer. These factors broadly covered 5 categories, namely: Engagement/immersion, social connectivity/recognition, Player's In-game control, challenges and difficulties and Game response/interactivity. To group the factors into these categories, it was important to ascertain their correlation. Table 8 to 11 represents the correlation between the factors of each group. But since the sample data is not large enough to make definite results, only an indication of positive correlation among them can be taken. Each factor describes some properties of the group and can help in generating representative result of that category. Though the list is not exhaustive and more factors as well as categories can be added to it, the listed factors and categories are key representers of user engagement parameters.

Engagement/immersion is considered a top priority by many of the producers and developers as it is important in retaining the interest of the players. Engagement is also based on flow theory which makes the player more addictive and engaged to the game. Each factor rating can be seen from table 7, and considering how important engagement is to the user, it is surprising to see how low multiple endings

for immersion has been rated. Also, there is a substantial difference among the two genders while rating this factor. While females rated it higher, males rated it with an average of 3.76 compared to 4.33 to their counter-parts. Also, while considering the age groups, all the group responded to the same level of rating. It is difficult to say why such low rating have been provided by the respondent group since giving options to the player and ending based on their decision enhances the engagement of a user, providing him with more control over the course of his/her action.

Another important factor is the social connectivity and recognition, players tend to play the game for social connection and to make it to the leader's board. Game specific communities have begun to rise and players are making a name for themselves in these communities. It is though interesting to see how developers differ on this as all of the factors for social connectivity have been rated under 4, with both the gender and different age groups rating the factors similarly on the chart and not considering it as an important factor in game design process. With social connectivity on the rise whether it be mobile gaming or PC gaming, it is contradicting to observe the differing opinions of the developers. It could be ascertain by a further study to examine this unusual rating.

Since the interaction is between a player and the game interface, it is important that the player feels his/her control over it. Though the average rating for this category was around 5, the difference in the rating for gender groups was evident as this category saw the highest rating difference among the two gender groups. This could be ascertained to fact that females are more empathetic than males making them to rate higher for certain factor in the category. Also a few surprising ratings were noticed for few factors when considering the age groups but since the respondents are not spread equally on the age groups, it is difficult to say that anything can be taken as an representative of the actual findings.

Game difficulty can make or break a players interest towards the game, it is always debatable to how much challenging a game should be to the user. Some games have come up with an idea of adjusting the difficulty in response to the player's capability whereas some allow the user to input a particular difficulty level for themselves. It was hard to conclude any results based on gender or age groups as the difference in the rating was minor and couldn't be considered a significant one to make any

conclusions. Though the average rating for challenge and difficulty remained high for the entire respondent group. The interface of the game is another parameter which aids the user in playing. It is important for the player to know everything he/she needs to know with an effective and easy way. Since it is a necessity in every game, the responses were high and unanimous among the different demographic factors.

It can be concluded that the developers had different views while rating the factors and much of the difference did come through the demographic differences among the respondents. It was also important to note that social connectivity wasn't given any substantial preference by any of the group which is contradictory to the initial finding. Also, none of the factor was considered not important to the game design. It could also be said that females showed more compassion while dealing with the support provided to the players.

6 Discussion

Considering the scope of the research and the time available to the researcher, the reliability of the research couldn't be considered accurate but it is a representative of what would be possible if such research is carried out in a detailed and genre specific manner. It is indicative of possible response when individual topics are taken in a more detailed way. Due to time and source unavailability, the author couldn't take the task of individual genre analysis as that would have put on the requirement of interest specific respondent pool. Since the research covers a wider scope when discussing game design process by the developers, it paved the way for in depth search on individual genre which could lead to more credible and definite result when concluding which factors affect the most in a game design process from the perspective of the developers. Another major finding was the difference in the UX rating by the gender groups and since this was not taken into account initially, a further study is needed to ascertain any validated effects of the effects of gender differences in game design process. This could be an important issue as some factors might be affected in a game due to the higher efficiency and natural competency by one gender group. This could be used in game development process in a way that helps in designing a better game, and some factors in game which could be designed in a better way by one gender group. Also, gender issues can relate to specific game

genres as some gender might be more competent towards a specific genre which calls for a further indepth study.

Also, the respondent group consisted mainly of students, which on one hand is positive as they are the one who are connected with the latest trends and technology to build the future, but at the same time affects the overall results in a significant way as they haven't had the actual experience of developing a game. This also gives an opportunity for further studies which could focus on more mature group for their response. Also a more balanced demographic research with respect to gender could be done in order to maintain the adequate ratio among the respondents.

The research results were able to answer the research questions defined earlier but since the respondent pool wasn't varied enough to take all the parameters of demographic difference into account, causing severe lacking of accuracy and validity of the conclusions and the results. This can be removed if a similar study is carried out on a larger scale consisting of a balanced and demographically varied respondent group. Also, some factors might be added or deleted, when studies are carried out related to a specific genre. But as seen from the results and conclusion, demographic differences do play a part when rating for a factor even though the respondent pool wasn't large enough for a statistical analysis.

Another possible addition to the research could be adding respondents from different countries as that would diversify the respondent pool and generate varying results. Also, since the factors considered in the research are author's own choice to include as well as modification from existing literature, a more varied and area specific factors can be added to get more problem specific data. The list given in the research is in no way exhaustive and additions/modifications can be made to any specific purpose. The research lacks the authenticity of appying the findings in a concrete manner as the results are not genre specific with much of the respondent pool located in one country, also consdering how dynamic and user oriented gaming industry is, applying general conclusions might not be the best strategy to choose.

Though the results are based on a broader genre of games, a few factors are present whatever the game genre is in question. So while discussing what factors might

affect the design process due to developer's biases, those factors can be taken special care of and some could be used in positive way during the development process. Which again opens the door for further research where a more diverse respondent group can be selected and results could be formed on the basis of how demographic differences affect the game design factors when considering various people from different backgrounds. Gaming industry is relatively old but there is still much to explore and research, as technology is advancing rapidly which always leaves the room for further development and new findings.

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Appendices

Appendix 1. Play Heuristics: Category, Heuristic and Explanation

I. Category 1: Game Play	
A. Heuristic: Enduring Play	<p>A1. The players finds the game fun, with no repetitive or boring tasks</p> <p>A2. The players should not experience being penalized repetitively for the same failure.</p> <p>A3. The players should not lose any hard won possessions.</p> <p>A4. Gameplay is long and enduring and keeps the players' interest.</p> <p>A5. Any fatigue or boredom was minimized by varying activities and pacing during the game play.</p>
B. Heuristic: Challenge, Strategy and Pace	<p>B1. Challenge, strategy and pace are in balance.</p> <p>B2. The game is paced to apply pressure without frustrating the players. The difficulty level varies so the players experience greater challenges as they develop mastery.</p> <p>B3. Easy to learn, harder to master.</p> <p>B4. Challenges are positive game experiences, rather than negative experiences, resulting in wanting to play more, rather than quitting.</p> <p>B5. AI is balanced with the players' play.</p> <p>B6. The AI is tough enough that the players have to try different tactics against it.</p>
C. Heuristic: Consistency in Game World	<p>C1. The game world reacts to the player and remembers their passage through it.</p> <p>C2. Changes the player make in the game world are persistent and noticeable if they back-track to where they have been before.</p>
D. Heuristic: Goals	<p>D1. The game goals are clear. The game provides clear goals, presents overriding goals early as well as short term goals throughout game play.</p> <p>D2. The skills needed to attain goals are taught early enough to play or use later, or right before the new skill is needed.</p> <p>D3. The game gives rewards that immerse the player more deeply in the game by increasing their capabilities, capacity or for example, expanding their ability to customize.</p>
E. Heuristic: Variety of Players and Game Styles	

<p>E1. The game supports a variety of game styles.</p> <p>E2. The game is balanced with multiple ways to win.</p> <p>E3. The first ten minutes of play and player actions are painfully obvious and should result in immediate and positive feedback for all types of players.</p> <p>E4. The game had different AI settings so that it was challenging to all levels of players, whether novice or expert players.</p>
F. Heuristic: Players Perception of Control
<p>F1. Players feel in control.</p> <p>F2. The player's have a sense of control and influence on the game world.</p>
II. Category 2: Coolness/Entertainment/Humor/Emotional Immersion
A. Heuristic: Emotional Connection
<p>A1. There is an emotional connection between the player and the game world as well as with their "avatar."</p>
B. Heuristic: Coolness/Entertainment
<p>B1. The game offers something different in terms of attracting and retaining the players' interest.</p>
C. Heuristic: Humor
<p>C1. The game uses humor well.</p>
D. Heuristic: Immersion
<p>D1. The game utilizes visceral, audio and visual content to further the players' immersion in the game.</p>
III. Category 3: Usability & Game Mechanics
A. Heuristic: Documentation/Tutorial
<p>A1. Player does not need to read the manual or documentation to play.</p> <p>A2. Player does not need to access the tutorial in order to play.</p>
B. Heuristic: Status and Score

<p>B1. Game controls are consistent within the game and follow standard conventions.</p> <p>B2. Status score Indicators are seamless, obvious, available and do not interfere with game play.</p> <p>B3. Controls are intuitive, and mapped in a natural way; they are customizable and default to industry standard settings.</p> <p>B4. Consistency shortens the learning curve by following the trends set by the gaming industry to meet users' expectations. If no industry standard exists, perform usability/playability research to ascertain the best mapping for the majority of intended players.</p>
<p>C. Heuristic: Game Provides Feedback</p>
<p>C1. Game provides feedback and reacts in a consistent, immediate, challenging and exciting way to the players' actions.</p> <p>C2. Provide appropriate audio/visual/visceral feedback (music, sound effects, controller vibration).</p>
<p>D. Heuristic: Terminology</p>
<p>D1. The game goals are clear. The game provides clear goals, presents overriding goals early as well as short term goals throughout game play.</p> <p>D2. The skills needed to attain goals are taught early enough to play or use later, or right before the new skill is needed.</p> <p>D3. The game gives rewards that immerse the player more deeply in the game by increasing their capabilities, capacity or, for example, expanding their ability to customize.</p>
<p>E. Heuristic: Burden On Player</p>
<p>E1. The game does not put an unnecessary burden on the player.</p> <p>E2. Player is given controls that are basic enough to learn quickly, yet expandable for advanced options for advanced players.</p>
<p>F. Heuristic: Screen Layout</p>
<p>F1: Screen layout is efficient, integrated and visually pleasing.</p> <p>F2. The player experiences the user interface as consistent (in controller, color, typographic, dialogue and user interface design).</p> <p>F3. The players experience the user interface/HUD as a part of the game.</p> <p>F4. Art is recognizable to the player and speaks to its function.</p>
<p>G. Heuristic: Navigation</p>
<p>G1. Navigation is consistent, logical and minimalist.</p>
<p>H. Heuristic: Error Prevention</p>

<p>H1. Player error is avoided.</p> <p>H2. Player interruption is supported, so that players can easily turn the game on and off and be able to save the games in different states.</p> <p>H3. Upon turning on the game, the player has enough information to begin play.</p> <p>H4. Players should be given context sensitive help while playing so that they are not stuck and need to rely on a manual for help.</p> <p>H5. All levels of players are able to play and get involved quickly and easily with tutorials, and/or progressive or adjustable difficulty levels.</p>
I. Heuristic: Game Story Immersion
I.1 Game story encourages immersion (If game has story component).



Appendix 2.

Game design factors

1. What is your age?

2. Gender *

- Male
- Female

3. Employment status-

- Student
- Full time employed
- Part time employed

4. What types of games you like or play?

- FPS (First person Shooter)
- RTS (Real time strategy)
- Simulation
- MMO (Massively-multiplayer online)
- Sports

- RPG (Role playing games)
- Puzzle
- Stealth Shooter
- Educational

5. What kind of game you are developing or would like to develop in future?

- FPS (First person Shooter)
- RTS (Real time strategy)
- Simulation
- MMO (Massively-multiplayer online)
- Sports
- RPG (Role playing games)
- Puzzle
- Stealth Shooter
- Educational

6. What is your role in your game development?

- Designer
- Artist
- Programmer
- Level designer
- Sound engineer
- Tester

Factors affecting game design process- rate each factor from scale 1 to 6, 6 being the most 1 being the least when creating a game design.

7. Enjoyment *

1 2 3 4 5 6

8. Displaying scoreboard *

1 2 3 4 5 6

9. Clan/community formation *

1 2 3 4 5 6

10. Social platforms connectivity *

1 2 3 4 5 6

11. Achievements/rewards *

1 2 3 4 5 6

12. Character creation/modification *

1 2 3 4 5 6

13. in-game Customization *

1 2 3 4 5 6

14. Gameplay i.e. player's interactivity to the game environment *

1 2 3 4 5 6

15. Presence of enemy character *

1 2 3 4 5 6

16. Boss fight *

1 2 3 4 5 6

17. Multiple endings/wins *

1 2 3 4 5 6

18. Challenges/difficulty *

1 2 3 4 5 6

19. Humor *

1 2 3 4 5 6

20. Audio and visuals *

1 2 3 4 5 6

21. Clear and intuitive HUD (Head-Up Display) *

1 2 3 4 5 6

22. Feedback for events (achievement unlocked, rewards, skills gained, maps unlocked, new items locked) *

1 2 3 4 5 6

23. Clear goals/objectives *

- 1 2 3 4 5 6

24. Screen layout (graphical display of elements needed by the player, like HUD, health bar, *

- 1 2 3 4 5 6

25. Help provided to player *

- 1 2 3 4 5 6

26. In game save option *

- 1 2 3 4 5 6

27. Story mode/ Campaigns *

- 1 2 3 4 5 6

28. Controls *

- Consistent with standard conventions
 Easy to remember controls
 Complex controls

29. Tutorials *

- No need for tutorials

- Quick tutorials (<1 min)
- Lengthy tutorials (>1 min)
- Long manuals/description

30. What in your opinion is important to the gamers?

Appendix 3. Game design factors- Groups and subgroups

Engagement/Immersion

- Enjoyment
- Multiple endings/win
- Humor
- Audio and visuals
- Story mode/Campaigns

Social Connectivity/recognition

- Clan/Community formation
- Social platforms connectivity
- Displaying scorecard
- Achievements/rewards

Player's In-game control

- Character creation/modification
- In-game customization
- Clear goals/objectives
- In game save option

Challenge and difficulty

- Presence of enemy character
- Boss fight
- Challenge/difficulty
- Controls
- Tutorials

Game response and interaction

- Screen layout
- Feedback for events
- Clear and intuitive controls
- Gameplay i.e. Player's interactivity to the game environment