

GLIMPSE

A Conceptual Framework for Evaluating UX in Games

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ABSTRACT

The gaming industry has grown considerably in the last decades, designing experiences and interactive platforms through games, an entertainment media from the popular culture. With the advancement of technologies and user experience design methods, a challenge is faced for the constant improvement of the characteristics of a game aiming to improve the enjoyment and immersion perceived by users. To face this challenge, we designed a conceptual framework named GLIMPSE based on constructs used to evaluate user experiences with games. GLIMPSE brings together concepts of presence and interaction, goals, learning, context, and immersion used to evaluate experiences with games. Its applicability was tested through a questionnaire answered by 241 users from gaming forums and communities. The results provide insights revealing the GLIMPSE conceptual framework to be a useful tool for evaluating experiences in games by assessing the main UX elements and their existing overlap.

KEYWORDS

User experience, games, games user research, conceptual framework, evaluation.

1 Introduction

Games predate from ages where humans have come together to socialize and articulate fun into their environments [20]. Amongst talks and intellectual exchanges, rolling dice, or crafting pins to symbolize characters and carving board on the ground would make for the first civilization's games [20]. Obstacles would make up for challenges in which the game would condition its users and thus draw its line of progress toward victory. Games have been known to enhance motor, and cognitive skills as users train and develop their abilities through trial and error [3,4,9]. Recognizing shapes, decision-making processes, crafting, and testing mental models

have helped draw a learning curve from game newbies to masters [3,4,9].

Despite being an old cultural feature [20], games have evolved to embrace much more control from users and to give back much more than just pure observational real-world inquiries [4,9,20]. Video game consoles have created and are sustaining a growing entertainment market delivering complex and intense games as a commercial solution provisioned by businesses such as Nintendo, Microsoft, and SONY.

Although games are built for entertainment, it does not always render pleasing situations. Obstacles are game design propositions to drive the experience, yet it is not what causes unpleasantness. Games can fail users when, for instance, they do not aid them to recover from their mistakes or portray poor visual and auditive feedback by not readily giving users relevant information to aid in their experiences [9]. These faults can often frustrate users and drive them out of the designed experience, increasing the chances of potentially losing their interest.

Game design studios have taken advantage to evolve their development methods and approaches in creating state-of-the-art gaming experiences [5,6,9] on top of video games technology advancement. Consoles have helped game design studios to grown exponentially in popularity by allowing studios to deliver experiences on users homes while reproducing sustaining business models to ensure future development and content updates through micro-transactions [9]. Comparatively, video games have evolved and adapted to users and the market's needs, but users themselves have not evolved as much, regarding cognitive and cerebral capabilities, being the constant studied and used as a basis to design games. As such, a thorough understanding of the user's needs and capabilities has had to be studied, as the Human-Computer Interaction (HCI) field specializes in [5,6]. Neuroscience field specializes in cognitive and psychological aspects users engage while playing games [5,6,9]. The outcome is assessed through playtests, formally known as usability tests, deriving methods from the User Research (UR) field [5,6,9]. The mentioned fields study and develop solutions to design compelling gaming experiences and approach usability problems originating from the game playtests.

The objective of this paper is to define and organize the elements of game interaction design that can be used in a UX evaluation process. Specifically, we aim to: Understand constructs indicated for the design and evaluation of user experiences;

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Propose a conceptual framework based on the studied elements and; Evaluate the conceptual framework from users' perception of their experiences with games.

A literature review was conducted to study the UX constructs used to identify experiences with games having its basis founded through reading periodical articles, papers, and books. No studies were found that tackle triple A games and the elements pertaining to player experiences with triple A games. Triple A games are a common classification used among the gaming industry to name projects with high cost and time demand [22], aiming to develop a game to be nominated as the best of the year, amongst its competitors [9].

In sight of the lack of deepened studies, we defined and organized constructs derived from frameworks applied to other areas such as learning, usability, and game design. The conceptual framework proposed in this paper, GLIMPSE, comprises of the following elements: Presence and Interaction, Learning, Goals, Context, and Immersion.

This paper contributes by presenting GLIMPSE as a conceptual framework intended to evaluate how games sustaining pleasurable player experience. GLIMPSE is put to the test through a questionnaire that inquires participants to responder their likeness to a set of sentences. The results prove ties between the elements as well as their existence in most player experiences.

Our questionnaire was built to collect participant's opinions regarding each GLIMPSE element, presence and interaction, learning, goals, context, and immersion with experiences in games. Consisting of sentences and the user's likeness to each, assessed through a LIKERT scale, the questionnaire aimed to understand the links between the elements. The questionnaire was organically distributed online in gaming communities through social networks like Facebook, Twitter, and Reddit, being Reddit believed to be the most efficient mean.

Our questionnaire's responses were mostly based off of industry triple A titles, being the top five mentioned games: Overwatch (17.5%), The Sims (12.7%), Destiny (9%), Grand Theft Auto (8.2%) alongside Fortnite (8.2%), and League of Legends (7.4%), as we asked participants to mention games they had in mind while answering our questionnaire.

Our results also show how GLIMPSE elements are tied and impact each other through overlapping, producing and sustaining immersive gaming experiences. For instance, participants agree that playing with a group of friends, regardless if they're physically or virtually present, impacts the context in which they're inserted, as 77.5% participants have agreed. Participants also agreed that completing goals increase their sense of immersion as they become authors of impactful changes and get to learn and become more and more immersed into the game's virtual environment, as 93.4% participants have agreed.

2 Understating UX in Games

2.1 User Experience

The UX concept has become prominent within the HCI field, accounting for experiences made during the interaction between the user and a product [16].

Humans always live experiences, often motivated through personal, contextual, and social objectives [4], and capture the world's aspects through their perspective in the given moment. An experience is defined by considering cognitive abilities [6,9], the context and the environment the user is [4,19], how aesthetically pleasing the experience is perceived by the user [1] and social influence with relatives [4,18,19]. These elements guide developers to design pleasurable and enjoyable experiences to their customers.

Developers must delve themselves into the frustrations and necessities the customers face to grasp what issues the user is facing, as thoroughly as possible. Not just cognitive, environmental, and contextual elements are taken into consideration; much more must be evaluated to testify the product's core values [14]. The core values represent the product's purpose as to what it has been built to solve. Games and interactive experiences are built upon the premise of delivering outstanding virtual worlds depicting the most varied genres and stories to the hands of the user while enabling users the sense of being the protagonist [3,4,9].

2.2 GUR

UX relies on research, fieldwork, interviewing, and data gathering [6] to founding the basis used in designing and developing games. Not all game development studios have the money and time to invest in lengthy and thorough research to aid their decision-making process [9]. This is where GUR acts, characterized by adapted methods and processes to evaluate the UX specifically with games. Cognitive psychology [6,9], as mentioned in this work, is one great source for foundationing game experience evaluation approaches. Elements such as internal user elements [10] to wholly external and involuntary elements gathered from the location the experience is happening [7] are considered during evaluation.

Studios have a separate installation and team to run GUR tests and collect determinant data. Known GUR methods applied during tests are behavioral observation, A/B testing, surveys and questionnaires, focus groups, interviews [5,9]. These methods measure user psychological aspects while interacting with the game. Often, the game does not represent a complete version. Usually, it is a specific part representing what the developers are focusing on researching.

Usability tests are conducted to evaluate the game's abilities in exerting and sustaining pleasurable experiences with users, to identify potential defects related to iconography, language, and usability in general [9], before the game is set to launch.

2.3 User Experience in Games

Games are a cultural feature and popular media found in many contexts and devices such as tabletop games with dice and character pieces, a game played on consoles, Personal Computers (PC), and smartphones [4]. Depending on the contexts and devices, all taken actions by the user influence the outcome and the unfolding of the experience [3]. The experience users have while playing games is often called gameplay.

Games can convey learning principles, social interactions, goal elaboration, virtual ambiances, narratives, sounds, instant feedback, and embedded systems to immerse the user into the game itself [4, 9,15]. This immersion concept is often allied with the flow concept [10] where the users find themselves in a flow state where their abilities match the faced in-game challenge, representing the optimal experience as defined by Csikszentmihalyi [10]. However, not only it can be coupled with the flow concept, but it also addresses numerous other aspects to polish the experience.

3 Related work

As previously discussed, there are fields which foster design and evaluation of games. They are the users' cognitive, psychological and cerebral capabilities in cognitive science and neuroscience fields; the users' needs and interaction design aspects studied in HCI and; several research methods from the GUR field. This section aims to present the relation between studied constructs while exemplifying their characterization within games.

3.1 Using games as a powerful learning tool

Games can also be used for educational purposes aligning fun and learning to overlap during the experience exertion. Games are a powerful tool to insight learning by establishing systems that gradually empower the user as they evolve on their gameplay. These systems, such as an ability tree, influence the game's mechanics. Known for defining most game interactive aspects, the mechanics include a great set of possible means of interaction. Interactions and embedded systems can be designed to aid the experience and go beyond the definition of fundamental interactions such as movement (walking, jumping, climbing) while striving with more complex systems to provide vivid and lifelike interactional complexes [3,15].

Learning principles refers to the mental models' users adhere when going through experiences and how users process their learnings while going through challenges [3,15]. The learning process can be aided by several principles as Desurvire and Wiberg [3] define within Game Approachability Principles (GAP). They are the following: amount of type of practice, amount of type of demonstration, reinforcement, self-efficacy, scaffolding, being in control, good design guidelines (Heuristic Evaluation for Playability - HEP), clear game goals, information on demand, and self-mastery.

Desurvire and Wiberg [3] defined GAP to outline the main characteristics when evaluating experiences with games. It addresses most abilities games have to generate immersion while constructing and sustaining experiences such as the user's perception of belonging to the game's virtual environment and connectedness to other entities within the game, and the game's ability to aid users through visual interfaces in achieving the feeling of self-efficacy.

Games can accommodate new users to learn at their own pace from basic mechanics to most advanced ones, characterizing the onboarding process: the first hour the user plays the game and gets familiarized with its rules and mechanics [9]. This ties to the approachability concept: the game's ability to be approachable by newcomers, so as the game must not be too hard either too easy to eventually lose user's interest as they felt strongly challenged or have fallen into boredom for the lack of challenge [3,9].

In another work, Desurvire and colleagues [2] define HEP by joining guidelines of game usability, game mechanics, game story, and gameplay to guide develop reducing repetitive punishment due to repetitive failure, together with varying available activities and pacing to minimize user's fatigue or boredom. Clear game goals evaluate the game's ability in enabling the users' success in achieving their goals, and to attract and retain their interest. Information on demand evaluates how useful learned action and skills are perceived to the user throughout the game. At last, self-mastery outlines the game's ability to lead users onto mastery of the rules and mechanics of the game.

Games are often packed with tutorials to introduce the user to the core mechanics, such as walk, jump, interact, rotate the camera, and so on, making for the very beginning of the learning process to game mechanics. These mechanics are a set of choices, goals, and rules games have [7], and tutorials can address contextual in-game situations. For example, when a user is trying to make the character reach the second floor of a building, but the user is unaware of how to do so, the game portrays a contextual tip through the Heads-Up Display (HUD) hinting an actionable command that allows the user to complete the given objective. Figure 1 shows a screenshot from Fortnite, a game developed by Epic Games, showing the HUD in action as the user approaches an item, prompting the HUD to show further information about it.



Figure 1: HUD prompt is shown in Fortnite.

As the user progresses over time, more and more mechanics are revealed and enhanced just as how humans go through with learning new things in life. The advancement will ready the user and make them feel efficient as their in-game level, and sense of self-efficacy will increase accordingly. The game must provide opportunities for enough practice of skills and mastery, and reinforce this aspect within each action, provided alongside feedback: a congratulating message or a properly given achievement [4]. The learning process though may not evolve through positive outcomes but negative ones instead. Failure must be assigned and addressed so long as the game balances punishments to accurately convey the message that doing such action is not appropriate to the given context, which refers to feedback [4]. This entire conception of the learning process is also tackled as onboarding, as said by Takatalo and colleagues [7] and Hodent [9].

3.2 Presence and Awareness in virtual environments

A game also portrays a virtual environment that the user interacts. It can be a vast and big forest with a character roaming through it, or it can just be a two-dimensional Tetris game. It is based on the concept of presence [7,19] which employs "the sense of being there" even if the said environment is entirely virtual, consequently reinforcing user's sense of immersion. The connection can be inferred as to the granted ability games give to users to take part and influence the environment according to their actions, for example: moving a character forward and backward at their will. The same applies when an expectable outcome fulfills in terms of communication between the user's will and the game's acceptance to it. Although presence and immersion seem to be connected, they do not automatically mean the user is having an enjoyable experience [1].

Presence relates to awareness, as it stands for the user being conscious of their surroundings. It not only encompasses the ambiance the user is physically located, but it goes beyond it by also tackling a sense of identity, activities, and neighbors as well in the virtual ambiance. Notably, awareness can be addressed by three different types, as described by Cohen and Fernando [19]: presence, telepresence, and co-presence. As the name suggests, presence defines one's feeling of being part of the virtual environment. Telepresence defines the feeling of being in control of remotely located systems, which the user is fully aware such system is located elsewhere. Moreover, co-presence represents the shared sense of presence among a group of people, conveying interactions, and the current virtual environment this group is located. This last type mainly addresses gaming environments for multiplayer activities where users connect through their devices to interactively play games as they act to influence their experience.

Games are often backed up by Non-Playable Characters (NPCs), who are virtual entities controlled by the game, either responding to commands prompted by users or controlled by

Artificial Intelligence (AI). These entities are programmed to mimic real user behavior, enabling users to feel their presence as the experience goes on, tackling the concept of co-presence coined by Cohen and Fernando [19]. In figure 2, a screenshot from the game *Destiny 2*, shows an NPC named Lord Shaxx is approachable to interact with the user.



Figure 2: The NPC Lord Shaxx.

The concept of "being there" describes the connection between the user and the game has become strong enough to sustain faster decision-making resolutions during fight or flight situations [9]. The virtual ambiance can replicate real ambiance characteristics through audiovisual channels, closing in the definitions and the user's relatedness perception between both ambiances.

"People and objects may have locations in and relationships to both physical space and one or more virtual spaces, and these different spaces together interact to constitute overall system behavior and user experience." [19]. Both real and virtual environments can coexist and have their characteristics overlapping in many situations.

3.3 The importance of context

Experiences have agents that influence the stories that shape their backgrounds and define their outcomes. At all times, the context plays a vital role in defining how the experience is impacted [7]. Real and virtual environments each play their respective roles in influencing context as they both hold ambiance, presence, and interfaces that tailor the experience. That said, contextual factors can originate from a series of sources. Elements such as the location users are in and its momentary aspects such as temperature, lights, sound, and smell [19], the interfaces and devices they're using to output their outcomes on the experience, the people they're interacting with either through real or virtual conditions [15], are essential to evaluate the overall impact the context has in the experience.

Cohen and Fernando [19] suggest that both the physical ambiance and the game's virtual ambiance can coexist and overlap its elements. Thus, context pertained to the virtual ambiance is also accountable and can impact the experience. Additionally, multiplayer games connect many players from different locations around the globe through the Internet, connecting to the multiple

spaces and multipresence concepts defined by Cohen and Fernando [19].

3.4 Giving power to the players

A clear definition of the gaming experience stands in the one-to-one relationship established between the game and the player and portraying this and only this connection [1], leaving aside from any external factors to the average gaming scenario. Calvillo-Gómez et al. define the concept of puppetry, a set of characteristics applied in games to evaluate the interaction players have over the game's virtual environment and how well the connection between the two is when the game creates an experience the outcomes actions of the player [1].

Puppetry subdivides into three subsets, namely control, ownership, and facilitators. These three can easily overlap to influence any gaming experience. Control applies to the activities and actions the game has in store for the player, letting them manipulate the available resources while responding to their desired actions, enabling the player to own the game as they feel capable of influencing the outcomes. Small actions represent actions player perform, such when pressing buttons on controllers while understanding how to control the game through its mechanics. Small actions make up for big ones as they are coupled to complete goals and reward the player for their progress. It establishes a connection that is unique to the player as they feel entitled for the actions they made, while retaining their interest to play the game further, defining the ownership concept. Facilitators consist of aesthetics aspects, overall invested time, and previous experiences players had. These mentioned elements have existed to prepare the player to what is ahead.

Commonly, playing games is often backed by a goal on a personal level prompting the player to invest their time into playing such game for the mere need of entertainment. Many and varying sources can form a goal: the game itself can instantiate it as a prerequisite to complete an activity, namely objectives, it can also originate from the player themselves, depicting their personal projection onto the game, and ultimately it can be impacted by social and contextual factors surrounding the experience [1,3]. Goals originated from games must be left clear and use contextual in-game factors to aid the player as needed.

Rewards are an efficient way of gratification as a response from the game to players for their completion of objectives or missions, as Desurvire and Wiberg [3] define reinforcement. Figure 3 shows a screenshot from Destiny 2 game depicting a mission completion and rewards, as observed to the right side of the figure.



Figure 3: Mission completion and rewards.

3.5 Understanding player behavior through Cognitive Psychology

Understanding the links on the interactions between the player and the game requires a further understanding of how one behaves while going through experiences. For this purpose, cognitive psychology evaluates the cognitive abilities and capabilities of the player when coupling overlapping elements such as perception, attention, memory, emotion, and motivation [6,7,9].

Perception is the first step for enticement as it is a mind construct allowing players to realize and understand the aspects of games and benefit the feelings of presence, awareness, and immersion through sensory and cognitive capabilities, namely spatial orientation, brightness, loudness. [7]. Coupling elements such as context, social interaction, and influence, it is known that every player is situated to have their own experiences, having clear distinctions when putting side-by-side that can be traced back to even cultural influential factors [19].

Games make use of the HUD, the most powerful tool a game can offer to aid the gaming experience [17]. The HUD is a dynamic and contextual interface that adapts to what the player is currently facing [9]. In tutorials, it can highlight hints and tips to help players progress further into the game.

Memory plays a significant role as being the most complex resource humans have [9], to remember the control bindings and store past experiences since our very childhood times. Hodent [9] mentions that memory is divided into three different components: sensory memory, working memory, and long-term memory. The sensory memory is part of perception and influences the attentional resources the player has to capture information for encoding, which is then passed onto the working memory responsible of retaining information while relying on substantial attentional resources that can be easily intercepted by any disruptive incident — following onward to the long-term memory where it keeps retained for further referencing.

The knowledge retained over time will improve the player's sense of self-efficacy and self-mastery, both held accountable for the player's sense of owning the game's mechanics [1,3]. For the memory to retain knowledge, the user must attentionally perceive

The **physical context** element evaluates the users' perception of the impact provided by the environment during their experience, for example, television as an output device connected to a PC or console with either a gamepad or mouse and keyboard as input devices. It also evaluates the impact the environment's characteristics have on the overall experience alongside the impact players sense when joined by other relatives.

The **learning** element evaluates the game's ability to establish a learning process involving the players and their journey to self-mastery of the game mechanics. It evaluates the onboarding process when the game introduces players to its mechanics. For instance, the HUD can aid the players in meeting the game mechanics and make them feel competent while completing the initial training, which what self-efficacy means. The sense of self-efficacy can be assessed using the scaffolding, information on demand, as proposed by Desurvire and Wiberg [3], and HUD sub-elements. After the onboarding process, the continued experience is evaluated with the influencers sub-element, including the facilitators standing for the overall invested time the player has after the onboarding process, the aesthetics presented by the game and the previous experiences the player had to date, and it includes the controls pertained to the game, the available commands, perspectives, and the game mechanics. Lastly, it represents the player's sense of owning the game through the self-efficacy and self-mastery sensations. This element was based on the Puppetry concept from Calvillo-Gómez *et al.* [1] and the GAP list from Desurvire and Wiberg [3].

The **immersion** element represents the overlap between all previous elements, with the given presence or absence of each element in the evaluated experience. For example, in one given experience, immersion can be obtained when coupling the learning and goals elements, but presence may not be as strong as other elements, so it is not considered as prominent as learning and goals in this case. Though, coupling all elements is also a possibility and thus characterizes an experience that offers a higher sensation of immersion. The contrary would not apply to be an immersive experience at all.

4.2 Putting GLIMPSE to the Test

As GLIMPSE came from the literature, we had a supposing it proposes elements and sub-elements found in most gaming experiences. To attest this, we created a questionnaire to test the potential GLIMPSE must be used for evaluation purposes, such as those studied through the GUR methodologies. The questionnaire aims to qualify each element with a diverse set of sentences coupling two or more elements. The sentences follow the understanding that elements should overlap in order to create immersion.

A questionnaire is a GUR method to collect large volumes of data simultaneously from many different players to get insights about gameplay moments [6]. The idea here is to question participants about their perceived values in the given sentences.

The sentences are then correlated with the framework's elements on further discussion and analysis of results.

Some players may play games using a PC with mouse and keyboard as input devices, others may play games using a gaming console on a living room with a gamepad as the input device, using television and often accompanied by peers. With that in mind, we do not limit the questionnaire to evaluate any specific scenario only. The sentences were written subjectively to prompt players to recall their own experiences.

4.2.1 Elaborating the Questionnaire

At the questionnaire's beginning, we request participants to recall their favorite games before submitting responses as we do not have any specific game but would instead let participants decide which game they would like to. Each section of the questionnaire was built accordingly to GLIMPSE elements, holding sentences that participants must choose how strong they agree or disagree with each sentence using the given Likert scale. Notably, in the immersion section, we ask how important the participants believe each component is to their perceived sense of immersion in the game experience, changing the available responses while maintaining the same Likert scale. Table 2 shows each questionnaire section and objective.

Table 2: The questionnaire sections and objectives.

Section	Objective
Demographic Data	Collect the participant's demographic data
Presence and Interaction in Games	Question participant's perception of interaction with other entities
Goals in Games	Question the participant's perception of game goals
Learning with Games	Question the participant's perception of the game's ability to stimulate learning
Context in Real and Virtual Environments	Question the participant's perception of physical and virtual environments characteristics
Immersion in Games	Question the participant's connectedness and involvement with the game
Mention of Games	Question which games the participants have felt inspired to answer the questionnaire

The questionnaire, as well as the sentences of the sections, can be accessed in full from Carvalho's monograph [21].

5 Results

The questionnaire collected 241 replies of which 115 (47.72%) were women, and 126 (52.28%) were men, with most participants (99) being aged between 21 to 25 years old (41.08%) (chart 1).

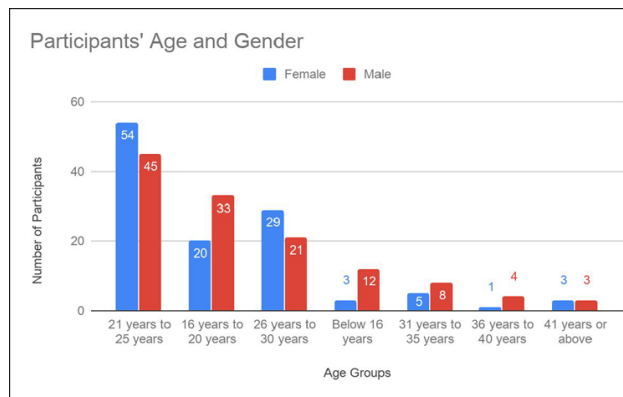


Chart 1: Gender and age groups.

According to participants' replies, the physical and virtual environments characteristics and sounds (92.12%), physically or virtually present peers (69.71%) have a considerable impact on their gaming experience. Participants have also deemed the connection between themselves and the game to be important and impactful towards their experience (87.5%). This connection is established through the presence of entities, which can either be NPCs or virtually located players (54.8%), game mechanics (87.5%), in-game character's control (87.41%) though answers were tied when asked if games gave users full control and allow players to play as they please and lastly realistic aesthetics (79.7%).

Participants believe goals should be completed at their will (80.1%), while portraying clear and well-defined objectives (80.1%) and reinforce their learning curve towards the game's mechanics mastery (81.3%). When questioned about their liking of having more players involved in goal completion, 49.38% of participants have agreed while 31.95% disagreed, the majority were women. Also, players believe games appropriately reward them for their invested efforts (65.15%).

Regarding the games' ability to create learning processes, participants like games to influence their mastery journey (93.4%), and 87.1% agree their past experiences also influence their learning experiences. The participant's learning process shows a link to the in-game character's progression as 77.6% agree with this. In their experiences, 25.7% of participants believe games disallow them to evolve the way they see fit.

The environment the player is physically located (67.6%) and the equipment being used to play games (80.5%) impact the user's experience. Physically present peers impact context as 77.5% of participants have agreed, creating emotional links between players, as 58.9% of participants have agreed.

Game mechanics (94.2%), video, audio, game and accessibility settings (94.2%), engaging narratives (92.9%), clear and flexible objectives (88%), audible and tactile responses (83.8%), liberty to evolve (80.9%), in correlation with the participants perception of immersion, are considered to be the most essential elements in

aiding this perception. Participants do not believe that first or third person cameras would impact their experience. Though 71.4% of participants believe NPCs impact their perceived sense of immersion rather than by a real player.

A more thorough description of the results can be found in Carvalho's monograph [21].

6 Discussion

Often, the presence of another in-game character does not require it to be a real player as it is known an NPC is capable of filling such a role. The results reveal that both female and male participants **can** interact and communicate with one another regardless of physical or virtual presence. This concludes that players have their sense of being connected with an entity to those who convey interaction through actual responses, which is a possibility for both real and virtual players or NPCs. Although we have not inducted our participants to respond the sentences regarding games that allow for single player or multiplayer game modes, it is noticeable that players are more inclined to play games that allow for the multiplayer game mode in a virtual connection only. This can be concluded as we observe the list of games mentioned by the users with top 5 being: Overwatch, The Sims, Destiny, Grand Theft Auto, and Fortnite. In their ways, these five games have players interact with other entities virtually, creating a connection that ties presence, interaction, and context even though most of the interaction is done virtually.

When questioned if the participants feel they evolve better when playing alone female participants majorly agreed while male participants felt neutral about it. The same pattern is observed in the results regarding if playing alone enables participants more interactions, as well as the observed disagreement by female participants when asked if they like games to involve more players to complete a goal. Though, female participants have deemed the presence of other in-game players to be important in aiding their sense of immersion. This points to female participants preferring to play alone instead of joining a group of players, while still feeling the virtual presence of other players who are not part of their group.

Many game abilities have been studied and tested through the questionnaire, especially the ability to introduce players to new content and guide them through the journey to self-mastery. Regarding the onboarding process, the results propose participants **agree** of playing games that introduce them to new content while enabling them to evolve during gameplay. Participants also feel that their past experiences can impact their gameplay as they have gone through different games with different mechanics and onboarding processes. The onboarding process of **the mentioned** games seems to fulfill its purpose as players agreed the game mechanics provide a clear connection between them and the game which can also be drawn from the high importance participants deemed to game mechanics and contextual tutorials to aid in their sense of immersion. This concludes the game mechanics are indeed a

component that requires careful design and implementation as it displays the rules and ways a player can pursue their journey within the game.

The sense of owning the game can also be drawn from coupling results of various components. Participants agree games allow them to complete goals in the order they want and how they want, though they would instead do it alone. For this last conclusion, the majority in disagreement are female participants. Being empowered to evolve within the virtual game world is also another point we can tie to this analysis, with a significant agreement demonstrated by participants. Clear game goals are also another component deemed necessary in aiding participant's sense of immersion. Designating goals are indeed a game mechanic that pushes players forward, promoting evolution and rewards for completing in-game activities. Results demonstrate participants' agreeing with being appropriately rewarded for the effort they invest when completing goals, **referring** to the reinforcement **sub-element** of the framework.

Goals are often tied to a narrative, and participants have deemed narratives to be of great importance in aiding their sense of immersion once it turns out to be engaging. It establishes a connection between the character and the player as if they were one entity. Playing together with a friend, being able to complete goals at will and however the player wants also contributes to their sense of owning the game experience as well as the sensation of being the protagonist in the game as their actions have impacted the game's ongoing state. The small actions and big actions **sub-elements** are connected to this result.

In terms of immersion, presence, and context with both real and virtual environments, participants have agreed most games allow them to be under control of their character as well as feel connected with its mechanics. Audible and tactile feedback do reinforce their sense of presence in-game environments, though they agreed that real and virtual environments do not seem to overlap during their experiences which goes against our initial thoughts pertaining the overlapping of physical and virtual environments. The used equipment, the physical presence of others, and the characteristics of the environment impact the participant's sense of immersion.

As it was designed to be, section 6 joined the four other elements from the framework and its **sub-elements** to infer the participant's perceived sense of immersion. Participants have agreed that realistic visual aesthetics impact their sense of immersion, a result that refers to the aesthetics **sub-element** from the Learning element. Being in control and deciding the order of goals in which to complete in a platform allowing players to evolve at their will is another connection this section establishes between the goals and learning elements from the framework, and participants have highly agreed with the impact these elements caused to their sense of immersion when joined together.

Lastly, the questionnaire asked participants to mention games they felt inspired by while responding the questionnaire. Most of the mentioned games are classified as triple A.

7 Conclusion

In this work, we collected elements of game design and user experience design from HCI disciplines that can be used in an UX evaluation process for games. These elements were collected after a thorough literature review. Afterwards, they were classified and organized to build the GLIMPSE conceptual framework.

Our findings demonstrate that the GLIMPSE conceptual framework joins elements to evaluate user experiences with games highlighting presence and interaction, learning, goals, context, and immersion elements, many of the available aspects experienced in triple A games nowadays. By providing useful insights between elements, it is possible to evaluate the game's design prior to launching to big masses.

Based on our literature review, we supposed our findings with the questionnaire would present connections between the conceptual framework elements. Those elements were designed based on different perspectives e.g.: usability, game design, learning, and context. The results show how the elements tie together to produce immersion, for instance, **presence and interaction** influence **context** when users play multiplayer games through online connection, and **goals** influence **learning** when users complete goals and acquire experience through its completion. These elements can either be drawn present or absent in one experience. Their presence and consequent overlapping take the user closer to a more immersive experience.

One outcome we had not expected is our results showed clear preference from female participants to either play alone or accompanied by in-game NPCs, instead of having to group up with other players at all. When put in perspective with male participants, the gap becomes clear.

However, we are aware that game experience evaluations tackle a greater number of elements than those considered in this work, thus it is our future objective to further extend and deepen our knowledge in further researching such elements through the GUR and UX disciplines and applying this work with evaluating games of all types.

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