Proceedings of the 5th International Conference on Literature, Language, and Culture Development
DOI: 10.54254/2753-7064/2026.32673

The Correlation Between Visual Complexity, Information Presentation and Game User Experience

Zining Jin

College of Science, Mathematics and Technology, Wenzhou-Kean University, Wenzhou, China
1308244@kean.edu.cn

Abstract. With the growing market in the field of games and the accelerating polarization in game design towards little and a great deal, the theme of game UI design has become dual-sided and experienced two extremes, both of which are problematic, but in different ways: one causes harm to the player experience through over-visualization, and another through over-simplification. This paper identifies the joint impact of visual complexity and information presentation on three levels of game user experience based on a systematic literature review of a game UX body of research, game user interface design, and visual cognition research bodies, and augmented with case studies of Arknights and Deep Palace Melody. The results show that interfaces that are too complex lead to cognitive overload and thus hinder functional and hedonic experience whereas simplified interfaces lead to poor emotional investment and meaningful experience by not providing them with adequate visual expression. Both the information presentation and the visual style consistency make up a unified design system that regulates the experiential coherence. It is summed up that a successful game UI design is in a dynamic equilibrium between the visual richness and information visibility - and that this equilibrium depends on the type of game and the audience, and there is no single standard that can be universally applied. Game UI design can thus be identified as an essential layer within the development of full experiences of players.

Keywords: game user experience, user interface design, visual complexity, information presentation, game design.

1. Introduction

As the digital game market is growing continuously, the types of games and the audience are now getting more diverse. It is against this backdrop that effective first impression between players and games has assumed a fundamental research concern that ought to be researched intensive research in the game design arena. User interface (UI) refers to the most direct interface device between players and the game world and its quality defines the first impression of players and their retention intentions to a large extent. Nevertheless, in the modern game UI design, two tendencies of one extremism are interesting. On the one hand, the heavy visual presence of certain domestic commercial mobile games is targeted at drawing the attention of the players due to its visual appeal. Second, some indie games have been too simplified and thus they lack the visual language to

DOI: 10.54254/2753-7064/2026.32673

accompany the world of the game. Despite the fact that the two tendencies appear to be polar opposites, they allude to the same issue which is that the UI design is not effective to address the user experience requirements of the players.

The paper is interested in the growing popularity of extreme UI design inherent to the game market and explaining how the UI design influences the experience of the game played by the user. It has importance in informing design of a game and boosting its retention and satisfaction. To conduct the study, the researcher uses a literature review approach, which allows one to sift through and to analyze related literature in the spheres of game UX, the UI design, and the visual cognition. The usefulness of this approach is that it allows incorporating the current literature, which gives the research a stable theoretical basis to examine the case and enable the comprehensive development of the research. To this end, two sample cases, namely, "Arknights" and "Deep Palace Melody" are picked in this paper. Their former is the general propensity of over-visual layering in the Chinese commercial mobile games, and the latter is the over-simplification issue in the independent games. By comparing these two radical approaches to design, this paper shall specifically discuss the role of the lack of balance in terms of visual complexity and improper presentation of information in terms of experience levels which include, functionality, hedonic, and meaningfulness, that players present. It will then discuss the implication of this balance measure on the general experience of games by the user. The outcomes of the present research are expected to present a type-specific, theoretically based reference framework of game UI design practices; it is hoped that, the findings will lead to a reevaluation of and a specialized focus on the UI as a fundamental layer design in game design.

2. Concepts and background

2.1. What user experience in games means

The overall concept of user experience (UX) is usually focused on the perceptions and responses that users have when they are using the product, focusing on usability and functional satisfaction. Nevertheless, in case the concept is extended to the game design, its connotation should be essentially enlarged. However, as opposed to general software, the essence of games is not to assist users in efficiently attaining a particular task, but to provide quality and integrity to the whole experience.

Thus, this paper considers user experience (UX) of games as a multi-dimensional subjective emotion of the players in their interaction with the games system and breaks it down into three levels of progressiveness. The first one is functional experience, which is equivalent to the usability concept on the classical UX, or it defines whether users can comprehend the game rules, works properly, and provide feedback in time. As the analysis of several games indicates, simplicity, directionality, and informativeness in the UI design are the important contributors to the interaction, and understanding of users [1]. Usability is another basic dimension of design quality listed as such in the User interface quality framework [2]. The second tier is hedonic experience which is the initial special dimension that allows game UX to stand out of general software UX because it is more focused on directing players through attaining pleasure in the game process than the more mundane software UI. Experiments have demonstrated that hedonic experience has most in common with gameplay aspects and the gratification of the sense of mastery and self-sufficiency [3]. The objective performance of players will not directly lead to the pleasure being experienced but will undergo the mediating process of being converted to subjective pleasure experience due to the stimulating effect on the self-efficacy of the game being played [4]. It suggests that the influence of the UI design on hedonic experience is not the fact that it makes the players better or worse, but

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rather that it makes players feel that they are better. Furthermore, it means that the effect of the UI design on the hedonic experience does not concern exclusively the visual factor, but also includes the question of whether it allows creating an environment where the players can freely explore it. The third tier is meaningful experience, which, however, does not appear to be related to UI but can be related to it. The fact that the game engages the players into the story and evokes reflection is primarily influenced by the fact that it engages players immensely in the story and reinforced by the seamless expression of the interface, outlook, and use of audio design [5]. This demonstrates that meaningful experience is indirectly influenced, and positively affected by the consistency of the interface style with the narrative environment of the game world, a UI with a style break will deprive players of the immersion and emotional engagement; in contrast, the higher the ability to create a meaningful experience, the lower the ability to create meaningful experience.

2.2. How the UI design affects the experience in the game

An integrated analytical framework is required to comprehend the impact of the three above layers of experience by the way the UI design influences them. The outcome of complex interaction between narrative content and interactive situations is the production of a useful user experience in digital games [6]. UI design affects both narrative and scenario aspects in this three part construction at once.

In narrative terms, the graphics of UI influences the perception of the world presented in the game by the player, and the excessive functionality of the elements of the interface can interfere with the visual immersion of the narrative. Scenario-wise, some interface prompts may have too much information density, which may interfere with the player's game state, and lower the level of their involvement into the scenario.

In other words, at the visual aesthetics level, the effect of the beauty is usable can presuppose that the perceived aesthetics and functional experience of an interface are strongly positively correlated, and users are more likely to evaluate visually appealing interfaces as more usable [7]. In the meantime, Experimental research showed that various visual themes can lead to improvement of levels of competence and sensing immersion in players, being important to visual design decisions in experience terms, rather than the aesthetic ones alone [8]. Based on the above reading, it may be concluded that aesthetic decision-making in UI design is not only a style preference, but has a direct impact on how the players of the game system would evaluate the relative functionality and meaningfulness of the entire system.

In brief, game UI design influences the user experience on a multi-layered and multi-mechanistic level. Quantitative data on 367 games demonstrates that initial negative feedback to game aesthetics may manifest itself in a long-lasting negative feedback initiated by users, and these initial impressions are hard to overcome [8]. The outcome is that the quality of current experience of the players depends not only on the way they are designed but also whether they make a decision to repeat the use of time and emotional engagement. The designers of the games cannot adopt the UI design as a byproduct that can be easily stacked or glossed over but taken as a fundamental part of the design to create a whole player experience.

3. Case analysis

A too complicated UI can impair the fluency of the operation of the players with the visual distraction and an overly simplified one can aggravate the players with the absence of feedbacks and guidelines.

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3.1. Overly complicated: an analysis of some event pages in arknights

Over the past few years, Chinese commercial mobile games typically tend to follow more sophisticated design and seek to follow extreme visual effects in their UIs, with the goal of attaining visual stimulation through overpowering visual effects on the first glance. The pages of events of Arknights are classic illustrations of a trend. Instead, they tend to cram a lot of decorative objects, multi-layered visual effects and multifaceted information pop-ups to the same interface and make it very complex to look at. Nevertheless, the fact whether this design approach is really beneficial to players should be looked into more closely.

In terms of functionality, visual components of the decorative and functional UI features cannot be processed fast in a player when they belong on the same visual plane and their visual features do not distinguish between an interactive element and a valid information imparting one [9]. The mixed up hierarchy of information has a direct negative influence on the orientation and understandability of the interface. Evidence of visual clarity also demonstrates that the visual design of interfaces is not merely an aesthetic consideration. Visual noise significantly impacts users' overall perception of system usability because the accumulation of visual noise imposes cognitive load on users and reduces their assessment of the functional experience [10]. In the meantime, the interface readability and the way the navigation is implemented has a direct influence on the perception of the difficulty of the game and the degree of immersion in the game by the players. In case the interface data cannot be easily determined, in operational experience, the players will be greatly disrupted, which, in its turn, influences their evaluation of the overall functional experience of the game [11]. Providing the cognitive overload to a new member of the game, it often translates into the initial impression of the game as being high enough to be psychologically feared, which, in turn, would repress their motivation to learn more about the game.

Hedonically speaking, too complicated of a visual environment may cause chronic visual fatigue as well. As it has been stated above, the essence of hedonic experience is the idea that players have their own perception of the personal power and free will, and a misunderstanding in the information presented in the interface disrupts this process [4]. In case players are just in the state of being not able to read information on the interface efficiently long enough, their self-efficacy in games will be constantly undermined, which will have an impact on their willingness to play in the long run. It is also the reason why in some cases the criticisms of such games in the evaluations of players tend to follow an estimated trend of feeling attracted at the start and getting tired of the games when continuing. Due to the fact that too complicated UI design can produce a perception of a visual novelty in the short-term, but it is challenging to help the players to develop a consistent feeling of game pleasure and motivation to retain the game in the long-term.

3.2. Too simple: analysis of the page for the indie game "deep palace melody"

When confronted with the issues mentioned above, the idea of minimalist design, commonly referred to as less is more, might be a fair solution to the perceived issue - the concession of clarity to ease of use by cutting-edge principles of visual design. Nevertheless, the experience of Deep Palace Melody demonstrates that it is also hard to reach a perfect player experience when they take this way. The ills brought about by being too simplistic are not any less important than those brought about by being too complex, but they affect a different level of experience.

Another one, related to the meaningful experience, the most immediate rental of an oversimplified UI is that players cannot easily connect with the game world, on an emotional level. As noted in the introductory part, meaningful experience is created by synchronizing narrative

DOI: 10.54254/2753-7064/2026.32673

involvement and visual mood. This synergy cannot be stimulated when the interface does not have a visual look that corresponds to the game world. Survey on first impressions indicate that interfaces that are visually minimalistic cause potential users to be lost at the point at which they make first impressions, which is very consistent with the conclusion made in the introduction that first negative impressions are hard to change [12].

Secondly, according to the notions of hedonic and functional experiences, excessively simplistic interfaces tend to not have visual hierarchy. This is because giving information without good hierarchical separation would leave players difficult to find useful information amid the large number of similar things and this prevents players in the transition between understanding the rules and gaining a sense of control. Mediocre non interactive visual ornamentation may work well towards increasing general appealingness and emotional acceptability of the interface. The fact that it lacks completely renders the game world pale, and the players might struggle to elicit emotional resonance [13]. Meanwhile, it has also been experimentally established that when the game interface design is excessively reductive and unstructured, it will constrain the impact of usability in the interface on individual feelings of accomplishment by the players [14]. The absence of feedback may make the players lose interest in playing at a very early stage.

Last but not least, a streamlined UI undermines the visual differentiation of the game as well. An individual visual style is a valuable transmitter of a game in defining a differentiated perception. Too close minimalist interfaces cause the game not to have memorable functions as compared to the comparable products, which additionally undermines the overall impression and emotional bond of the players to the game world [9].

4. Discussion

4.1. Effects of information presentation on user experience of games

One of the fundamental variables that influence the quality of the experience of the player is the way in which information is displayed in the design of the UI.

Cognitively, cognitive overload can be caused easily since an interface can receive a lot of information and show it to the player in a short time. Before the player forms an emotional attachment to the game world, he or she has to digest a lot of visual and functional information thus it becomes hard to digest the information in a successful way. An example of the typical case of this issue is the some set of activity pages in the game "Arknights"; excessive congestion of visual objects and lack of a clear information structure within the interface design compel players to consume more cognitive resources to find the kind of information that can be considered valid. The rhythm, hierarchy as well as the order of information presentation are the important variables that ascertain whether the interface can be easily understood by the user, not merely the amount of visual items [1]. The reasoning behind this has been established by an experimental study that showed that interface design does affect the cognitive load of the user - the more the interface is able to describe information in a more user-friendly manner the lighter user cognitive load is taken and the more it makes the user think that it works smoothly [15].

The lack and the overload of information presentation on the interface create equally destructive damage to the user experience. The former handicaps the skill of players in streamlining and interacting with systems in a game, and the latter leaves players with an insufficient number of cognitive resources until a meaningful involvement has been managed [1,10]. This is also the reason why "Deep Palace Melody" was still performing poorly despite its implementation of a conservative minimalist interface.

DOI: 10.54254/2753-7064/2026.32673

In brief, efficient presentation of UI information must adhere to the principle of presentation on demand, not conceal itself or act easy to be mistaken as the information that the player requires, or simply hiding it in a pool of text. The ideology is very similar to the logical design of narrative-based guidance: placing information within the context of the game, so that learning and game behavior are cohesive (in fact, synergetic, and not mutually exclusive) and structured as one.

4.2. The overall impact of visual complexity and presentation of information

In the event that the presentation of information is the primary factor influencing the functional and hedonic levels of the player experience, then the consistency of the visual style has an additional effect on the meaningful level of the experience. The developed effect of the two is what determines whether the game UI design will be able to attain a full user experience.

This joint impact can be theoretically explained with the assistance of the three-dimensional framework of narrative-mechanism-situation [6]. It is also important that UI design simultaneously influences both the narrative component and the situational component in this model: a style-inconsistent interface design, e.g. a pop-up guide that has a graphically unrelated visual language, will move a player out of the game situation, breaking the image of the coherence of the narrative world; at the same time, in narrative-based games it is specifically the visually inconsistent interface design that will ruin the experience of immersion by forcing the player to leave the game situation.

The above effects of beauty is usable and the mediating quality of visual clarity also demonstrates the point further, indicating that the visual style is not just an aesthetic factor; it has a direct effect on overall perceptions of the users towards the usability of the system [7,10]. When the visual style of UI is in alignment with the game world then the visual consistency is seen as an indicator that the system is credible by the player and therefore less guard is taken on in the cognition and it fits into the game experience more naturally. On the other hand, style break also alienates the players and in the case where the functional information is presented correctly, a seamless experience is challenging to achieve.

It is interesting to say that that is the primary value of visual complexity which is not to enhance the operational efficiency, but to preserve the emotional investment that players have in the game world, in other words, safeguard the generation space of meaningful experiences. Over-visual embellishment will render this ornamental role ineffective and rather create distraction, whereas a user interface with no visual expression whatsoever will turn the game world white and it would be hard to build emotional resonance in the players. They both are violations of this peace.

Thus, the dynamic equilibrium between visual complexity and the clarity of information is the best context of the UI design. This ratio does not remain the same but depends on the type of game. The acceptance of various design orientations will be moderated by personality characteristics and cognitive styles of players [16]. One does not guarantee that the increase in the visual richness will result in the overall positive experience. To develop effective UI, the design should aim at achieving a specific dynamic balance between immersion and usability, but not pursue either of the extremes unilaterally [17]. As an example, in games based on narrative, the players tend to require more graphics, whereas, in games based on strategies, the interface may need to be based on high information density and visual restraint. Games possess the individual style of graphic design, therefore, an objective color standard could not be accepted to standardize UIs in the mobile games [9]. In addition, there is no single evaluation approach that can effectively assess the mobile game UI, diverse genres, to support the point of context-sensitive approaches in designing effective UI instead of universal ones [18]. These evidences point the practitioners of game UI to the understanding that the research in the area should not pursue some universal single standard but aim

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to find a certain balance solution depending on the knowledge of the target group of players and the peculiarities of the game type.

To draw a conclusion, game UI design has an interrelated multi-level influence on user experience. Relevant practitioners cannot separate the variables that are information presentation and visual complexity since they constitute the entire design system enabling the consistency of the player experience. The game UI design must be put in place in various aspects to enhance a complete multi-level user experience.

5. Conclusion

The influence of game UI on experience in the player is not unidimensional and requires not to be ignored. Both an excessive level of complexity (the existence of some event pages within the Arknights) and an excessive level of simplicity (such as Deep Palace Melody) will inflict significant harm on the functional, hedonic and meaningful experience of the players - albeit the amounts and reasons of harm may vary.

Presentation of information, plus the complexity of the visuals, are the two fundamentals of the UI design. They do not operate Yin and Yang but collaborate and co-exist together in a total system that influences player experience. Head of information presentation primarily affects the functional, hedonic experiences whereas the consistency of visual style indirectly influences meaningful experiences.

The dynamic balance between the visual richness and the clarity of the information is the key to the effective game UI design. This is not a standard balance but depends upon the nature of the game and the intended player, the narrative-based game needs a better sensory of immersion and the strategy game has more towards the design of high information-density and visual austerity.

That is why game UI design must not be viewed as a field where a decorator can impose whatever he wants, and, moreover, should not be viewed as a sort of secondary area, which can be condensed and made simple. Rather, it can be regarded as a fundamental building block of constructing a whole player experience. According to an in-depth analysis of the target audience and the nature of the type of game, an approach that would provide a unique balance solution must be sought.

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