



First Time User Experiences in mobile games: An evaluation of usability

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ABSTRACT

Unlike most other mobile applications, games are driven by their user experience rather than their functionality. No one wishes to play games that are either frustrating or difficult for the wrong reasons. Usability is an integral part of software development and is about maximizing the effectiveness, efficiency and satisfaction of the user. The delicacy of the user experience and heavy competition it can be argued render usability more important in games than it is in other software. Immersion and engagement are fundamental and core parts of the enjoyment of computer games, and both are dependent on usability. The focus of this article is around a framework for evaluating the usability of First Time User Experiences (FTUEs). Investigating two specific, off-the-shelf games, we demonstrate that the FTUE can affect an element of usability, namely ‘information quality’, when controlling for the guidance and information presented. Despite this, overall usability is unaffected by the presence of the FTUE.

1. Introduction

Design heuristics aim to create and establish a fundamental/native usable system, aiding the visceral and primitive nature of the users’ experience. However, beyond the fundamental design of an application, usability can be aided through effective guidance and teaching, often referred to as ‘onboarding’ [1]. In this article, we will be exploring the First Time User Experience and, specifically, the use of FTUEs embedded in games on mobile devices. This is towards discovering how, and indeed if, these are effective at increasing usability.

To achieve this goal, we show an evaluation of FTUEs in a mobile gaming context. In particular, this article considers the effect of usability across very distinct game genres and provides an analysis across various scales of usability. Specifically, we make the following contributions:

- We provide a framework for evaluating the usability of FTUEs of mobile games.
- We demonstrate that elements of usability are influenced by the guidance and information a player receives.
- We make suggestions for designers to adhere to certain usability heuristics as a result of this finding.

It should be noted that this article is an extended version of our conference paper, for this see Barnett et al. [2].

2. Related work

2.1. Usability and games

Usability, as defined by ISO 9241-11 (Guidance on usability) is termed as “The extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency, and satisfaction in a specified context of use” [3]. As opposed to tools and software, where production and user productivity is paramount, games are played for a variety of reasons, most of which are rooted in fun and enjoyment. This key distinction arguably changes the weighting of the three areas identified above by ISO 9241-11, from an equal weighting to a hierarchy. Satisfaction needs to be prioritised, with efficiency and effectiveness following. Sauro and Kindlund [4] concluded that effectiveness can be measured in completion rates and errors, efficiency from time on task, and satisfaction using any of a number of standardised satisfaction questionnaires. This facilitates numerical foundation to ascertain a weighted model under which to conduct usability studies. In the following passage, we contextualise the three areas defined by ISO 9241-11 (effectiveness, efficiency and satisfaction) for our interest in games [3].

First of all, on satisfaction; enjoyment and fun can be seen as the primary and sole motivation for an individual to engage in a computer/video game. Myers’ study of Game Player Aesthetics [5], identified “challenge” as “the most preferred characteristic”, highlighting balance as an important variable to tune regarding satisfaction. Myers’ finding

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supports and provides strong reasoning for the use of the widely accepted heuristic of creating an interface and control method that can be learned, used and mastered with as little resistance as possible, preparing and enabling the player to enjoy and utilise all available mechanics and, ultimately, strategies [5]. Optimising the complexity and interactions of an interface can aid escapism and support immersion [6]. As for effectiveness; in the context of games, this can be attributed to how accurately and effectively the players can express themselves via the available interface and interactions to achieve specific goals, achievements or desires. In a similar way, efficiency in games usability represents the relationship between the inputs and interactions, plus the success on specific goals, achievements or desires. The inputs may require considerable dexterity in order to enable the player to achieve success, or they may be achievable with comparatively little skill.

Several researchers have investigated the concept of a model-based approach to address elements of usability and suggest meaningful reform in game design. Sweetser and Wyeth [7] presented a model called GameFlow. GameFlow was designed to identify enjoyment within game play. It was shown to be able to successfully identify the elements of strength and weakness and can be used to more generally assess other games. This model was evaluated only on games of the real-time strategy genre. Nacke [8] suggested a hierarchical model of game usability. This model was designed to account for a range of measurable entities, from concrete to abstract. These entities can be described from theoretical construct to practical implementation. However, this model was not validated in its applicability to game development.

2.2. FTUEs and onboarding

With usability contextualised to our interest in games, we can begin to discuss the effects of usability in games. As represented in Adams' Story Engine Diagram, the interface is the source of both the input and output [9]. Furthermore, in the Mechanics, Dynamics and Aesthetics (MDA) framework, it can be noted that the aesthetics of a game are the first and foremost of its elements to be experienced by the player [10]. Usability affects the player's immediate and most intimate mechanism, allowing all of the game's elements to function and ultimately be enjoyed. Schell [6] describes and illustrates the importance of designing and building effective interactive systems in games. Schell's recommendations are also echoed in Google's User Experience Principles [1]. When considering FTUEs, the first few minutes of play are especially critical as these minutes of play typically evidence substantial churn rates for new players.

Petersen et al. [11] performed an analysis of the onboarding phase of several mobile games. This was conducted using a study to provide insights for evaluating the user experience of onboarding phases in mobile games. The research made use of objective metrics through the form of physiological measures and from these observations suggested recommendations for design elements that resulted in high arousal. No empirical link was established between high arousal and increased onboarding however. Additionally, the valence (either positive or negative) of a detected event could have been created by external factors, making physiological response data tricky to evaluate in this context.

3. Methodology

3.1. Design

The Independent variable for the research is the following; guidance and information via a first-time user experience, expressed or presented before or during gameplay. The Dependent variable (Outcome) is the Usability of the mobile game.

This research is to be tested with two groups, control and treatment. These groups represent, respectively, either the presence or absence of guidance via a FTUE in the two selected games (more on these in the next section of this article). The independence of the groups means a

participant placed in the control group will play both games with no guidance via a FTUE, and likewise for the treatment group. The approach of independent groups, and between-subject designs, where the participant is only exposed to one condition, was employed in response to the increased bias, and confounding factors presented in the alternative design of within subject design [12].

The null hypothesis is given as H_0 , that all conditions are equal under testing ($H_0: \pi_i = \frac{1}{2}$). The alternative being that not all the conditions π_i are equal. This is considered to be that guidance and information via a First Time User Experience does not affect the usability of mobile games. A number of alternative hypotheses were considered based on the literature:

H_a : the control and treatment conditions would produce different results.

H_b : guidance and information provided would influence usability.

H_c : various elements of usability would be influenced by guidance and information.

Game usability methods employed by game studios in Northern Europe include the following; gameplay testing, observation of gameplay, usability testing, focus groups, interviews, think-aloud approaches, filmed play sessions, questionnaires, and data logging. Usability Questionnaires, which were found to be utilised by 38% of studios [13], are chosen as the vehicle to facilitate this study. Specifically, we adopt and adapt the IBM PSSUQ [14]. The questions used in our study, as adapted, are as follows:

1. Overall, I am satisfied with how easy it is to play this game
2. It was simple to play this game
3. I could effectively complete the objectives and challenges
4. I was able to complete objectives and challenges quickly
5. I was able to efficiently complete objectives and challenges
6. I felt comfortable using this system
7. It was easy to learn to play this game
8. Whenever I make a mistake in the game, I recover easily and quickly
9. The organisation of information on the game screens is clear
10. The interface of this game is pleasant
11. I like using the interface of this game

As posited by Lewis [14], we investigate across 4 distinct sub-categories of usability that can be examined at the various levels. These are the overall variable 'OVERALL' (Overall Usability), plus the more specific variables, 'SYSUSE' (System Use), 'INFOQUAL' (Information Quality) and 'INTERQUAL' (Interface Quality).

3.2. Materials

3.2.1. Equipment

Two games were selected to review the effect of guidance upon usability; 'Super Mario Run' and 'Linia'. The games were selected based on their similar yet contrasting interaction complexity, since they can both be controlled with one finger. However, the combinations and precision of interactions, along with other gameplay manipulations such as pace, challenge the player's inputs past the seemingly simple one-touch interaction.

It should also be noted that these two specific games were chosen as they both are clearly of a different genre. The first is a side-scrolling, platform game whilst the latter is a puzzle game. These are (both) off-the-shelf games, so the FTUEs they both showcase were used as presented in the original, commercial offerings (i.e. no changes have been made to their FTUEs for the purposes of the experiment). The detailed operation of these individual FTUEs for each title are presented in the following section. To further elaborate on the earlier point about the

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