A Comparative Study of Gaming Interfaces and Impact on Players

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ABSTRACT

The main objective of this study was to investigate how different gaming interfaces compare and impact the players' general experience with games. Forty-seven (n=47) students were selected randomly to participate in the preliminary study. A brief questionnaire was administered after participants experienced three different game interfaces. The preliminary results showed that there were statically significant differences between the players' experience with the different game interfaces. Based on initial observation, the calculated means, and statistical analysis, we can postulate that when designing a game interface, it is not always best to utilize a simplistic interface design and that a complex interface may be more desirable in creating a positive impact for players. This is a work in progress, and with extended experimentation with a larger number of participants and a larger variety of games could potentially provide more accurate details in responding to our research questions.

Keywords: Gaming Interface, Interface Design.

1. INTRODUCTION

Over the course of the past decade, game developers and players have been developing a variety of user interface designs and implementations [1, 2, 3, 6]. These include but are not limited to use of voice control, motion control (also referred to as gesture-based control), and single-device controls. However, the impact of these devices has been uncertain and in some cases ineffective—even cumbersome to the point that a single, simple device within a user interface may be superior to a combination of more sophisticated devices. Specifically, this study was to investigate how end users interact with combinations of input devices within a user interface by using and comparing players' experiences with several game interfaces.

1.1 Concise Literature Reviews

An extensive search on gaming interface design reveals that there are only a few articles in the gaming field that are truly dedicated to interface guidelines and design [4, 5, 7, 8]. Johnson and Wiles [1], in an article titled "Effective Affective User Interface Design in Games" proposed that games designed to generate positive affect are most successful when facilitating a state of concentration, deep enjoyment, and total absorption in an activity – termed *Flow* [2]. They further stated that "the majority of research on non-leisure software design has been directed towards functionality and performance. Evaluation techniques have focused on measures of performance as a means of assessing usability" [1]. However, simple usability testing techniques appear to be extremely oriented toward serious software development (e.g., E-commerce, medical, defense, education, etc.) and not gaming assessment.

While there are not many comprehensive and useable studies focused specially on gaming interface design and its impact on players, authors nevertheless refer readers to a comprehensive systematic literature review of empirical games research reported by Connolly and colleagues [3]. The article identified 129 papers reporting empirical evidence about the impacts and outcomes of games to learning and engagement by providing an extensive summary of all the papers (including Aims/Objectives of study, Methods, and Results and Conclusions).

Research Question: Is there a significant difference between the players' gaming experiences using interfaces ranging from simplistic to complex?

Null Hypothesis: There is no significant difference between the players' gaming experiences using interfaces ranging from simplistic to complex.

2. METHOD

2.1 Participants

Participants (n=47) were randomly selected from a Human-Computer Interface class as well as other students from around campus ranging from novice to expert users.

2.2 Apparatus

Our control interface consisted of three compatible computer systems with three well-matched games installed (*League of Legends, Chivalry Warfare, and Guild Wars 2*). The computer specifications are described below. Each computer had one of the three games installed.

Computer 1:
- *Intel i7 3770k Processor*
- *2x Radeon 7970 GFX Cards*
- *16 GB G.Skill Ram*
- *512 GB RAID 0 SSD Array*

Computer 2:
- *Intel i7 2600k Processor*
- *1x Nvidia EVGA GeForce 570 GTX*
- *CORSAIR Vengeance 8GB Ram*
- *120 GB Vertex III SSD*

Computer 3:
- *Intel i5 2450m 2.4GHZ Processor*
- *1x Nvidia 650m GFX Card*
- *6gb Corsair RAM*
- *500 GB Raid 1 Samsung SSD*

Three popular games were used for this study: (I) *League of Legends* - a multiplayer online battle arena game created by Riot Games [10]; (II) *Chivalry Warfare* - a multiplayer game developed by Torn Banner Studios [9]; and (III) *Guild Wars 2* - an online multiplayer game developed and published by ArenaNet and NCSOFT [11]. To situate these games in the context of their popularity, *League of Legends* has 70 million accounts, 12 million daily active players, and 3 million concurrent players. *Chivalry Warfare* sold 3 million copies and has 400 thousand players. *Guild Wars* has 8 thousand players per day and features customized environments.

2.3 Procedure
Participants were first asked to fill out a pre-survey that asked questions about their previous experience with computer games and so on. Once these surveys were filled out, users then preceded to second phase of the project.

With the testing computer systems set up on one side of a college classroom, participants were selected at random to sit down at one of the computers. They were given 30 minutes total to play the game. Participants then filled out a survey questionnaire for the game they just played. After filling out the survey, participants then switched to another station and were allowed 30 minutes on that station. This was repeated three times for each student and allowed for each participant to experience all three different games. The surveys had nine questions and a scale of 1 to 5 for each question, with 1 being the lower end of the scoring and 5 being the high end or "perfection" point. The collected data was subjected to several statistical analyses.

The questionnaire included questions that were administered the participants for each specific game and are as follows:
I.   *You have experience with the video game League of Legends, Chivalry Warfare, and Guild Wars2.*
II.   *You believe it took you a short amount of time to understand and operate the games interface.*
III. *You believe the number of buttons required to play the game was overwhelming?*
IV.   *You believe the amount of time given to you was enough to learn the specified commands.*

V.   *You believe from your experience the game is worth continuing to play.*
VI.   *You believe the instructions were detailed enough to accomplish your task*
VII. *You believe the keyboard and mouse was satisfactory for this game.*
VIII. *You believe the overall experience with the game was satisfying.*
IX.   *You believe the layout of the controls was suitable.*

The entire experimental phase was monitored and a range of different reactions, expressions, and emotions of players were recorded.

3. RESULTS
Before analyzing the collected data, it is important to begin with the first question in the survey:
"*I. You have experience with the video game League of Legends, Chivalry Warfare, and Guild Wars 2."*

The majority of the participants had little to no experience with any of the three games used in this experiment. This allows for collecting more related responses in terms of learning and manipulating the interface widgets by participants.

While authors originally had anticipated *League of Legends* being the most enjoyable and comprehensive interface, players' observations and surveys showed that it was actually the most difficult to utilize. Shown in Figure 1, it can be seen that players responded an overall lower score to *League of Legends* (2.48 out of 5 possible points). Following the League of Legends mean of 2.48, the *Chivalry Warfare* and *Guild Wars 2* means were 3.37 and 3.55.
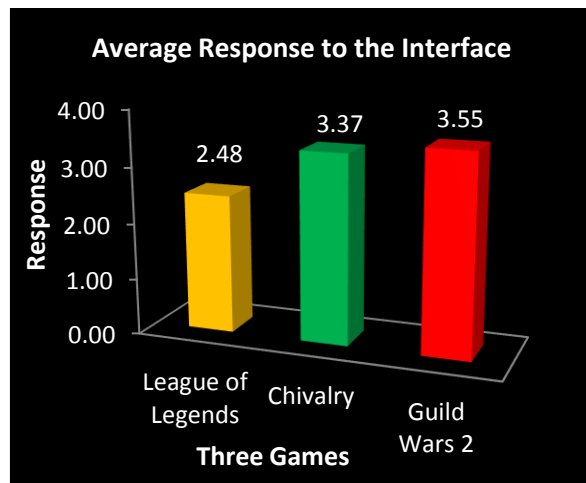

Figure 1. Graph showing the average response to the interface of each game.

Overall, Figure 2 depicts the average response of each question across all three games (*League of Legends*–left bar graph, *Chivalry Warfare*–middle bar graph, and *Guild Wars*2-right bar graph) while Table 1 shows their individual analysis. Exploratory ANOVA statistical analysis was applied to the collected data for all questions. The computation showed an *f*-ratio value of 18.88258 with *p*-value of .001523, supporting

that the results of the analysis of the three games is significant at $p < .05$; *Guild Wars 2* having the superior interface (Table 2). To further figure out the ranking of games' interfaces, *t*-test analyses were conducted for each pair. The *t*-value between *League of Legends* and *Guild Wars*2 was 3.8168 with a *p*-value of 0.000944, showing a statically significant difference at $p < .05$ (Table 3). However, the *t*-value between *Chivalry Warfare* and *Guild Wars*2 was 0.7224 with a *p*-value of 0.240969, showing no statically significant difference at $p < .05$ (Table 3). This exploratory compound analysis showed that the *Guild Wars 2* interface was perceived to be superior to the *League of Legends* interface, but not statistically superior to the *Chivalry Warfare* interface. *Guild Wars 2* showed higher means compared to the other games (see Figure 1).

Questions	*f*-ratio	*p*-value	Difference Analysis
I	1.065	0.041	Insignificant (N/A)
II	2.802	0.072	Insignificant
III	5.079	0.011	Significant
IV	4.738	0.014	Significant
V	3.318	0.046	Significant
VI	14.164	0.000	Strongly significant
VII	1.294	0.285	Insignificant
VIII	4.921	0.012	Significant
IX	0.429	0.654	Insignificant

Table 1. Single factor ANOVA analysis between three games' interfaces for each survey question.

ANOVA: Single Factor Analysis			
SUMMARY			
Groups	*Sum*	*Average*	*Variance*
League of Legends	109.73	2.334681	0.49616
Chivalry Warfare	146.06	3.10766	0.734762
Guild Wars2	155.1	3.3	0.71843
ANOVA			
Source of Variation	*SS*	*MS*	*F*
Between Groups	24.539	12.2696	18.88258
Within Groups	89.67	0.649784	
Total	114.21		

Table 2. Exploratory ANOVA statistical analysis of three games' interfaces.

Games Comparisons	Interfaces	*t*-test	Significant Difference
League of Legends vs. *Guild Wars*2		3.8168	Affirmative
Chivalry Warfare vs. *Guild Wars*2		0.7224	Negative
League of Legends vs. *Chivalry*		2.4527	Affirmative

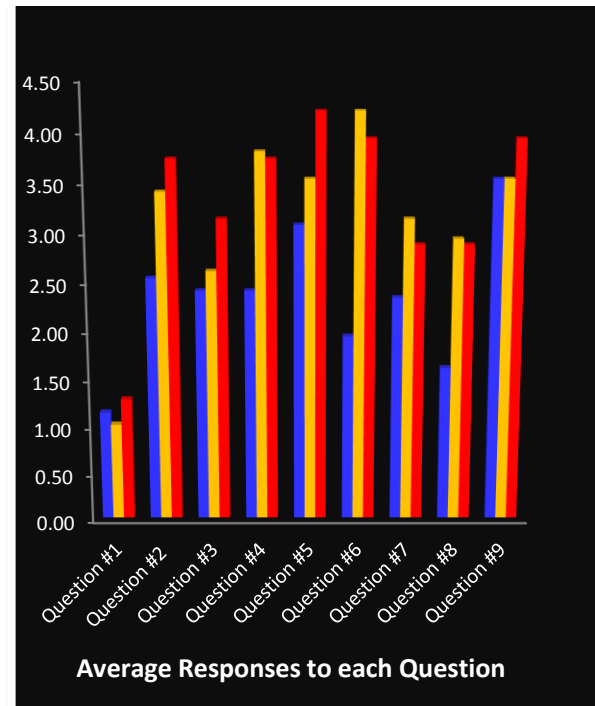**Table 3.** Compound *t*-test analysis for each pair of games' interfaces.

Figure 2. Graph showing the average response of each question across all three games (*League of Legends–left bar graph, Chivalry Warfare–middle bar graph, and Guild Wars 2-right bar graph*).

Noticeably, there were a few questions that really highlighted the important aspects to this study:
"*II. You believe it took you a short amount of time to understand and operate the games interface.*"
"*V. You believe from your experience the game is worth continuing to play.*"

League of legends scored the overall lowest average (mean=2.53) compared to *Chivalry Warfare* (mean=3.40) and *Guild Wars2* (mean=3.73) for question II, meaning players felt there was a need for more time to learn the interface more appropriately. However, there could be several reasons why this interface was disliked. These issues will be investigated in future study. Another interesting analysis of question V is to note is that *Guild Wars 2* showed the highest desire of participants to continue the game while *Chivalry Warfare* (mean=3.33) scored in between *League of Legends* (mean=3.07) and *Guild Wars 2* (mean= 4.20).

Authors monitored the entire experimental phase and recorded a range of different reactions, expressions, and emotions of players. The complete detailed analysis of these recorded observations will be documented and available on a full future paper. However, a general synopsis is provided in the next section.

Players were observed playing games in an attempt to gather and record observable data. Players often showed scowls or frustrating looks. Some players even announced their dislike for what was going on within the game. However not every user showed this frustration, some users showed some

reactions of joy and satisfaction. One user in particular left us a very unpleasant message at the end of the questionnaire about how bad of a time had during experiment of this game.

As the experiment continued, some trends were seen that involved the interface of the game. One of the trends noticed was that there was not one user who leveled up "abilities" within the game. This could denote a lack of visual cues within the interface itself. However this information could be subjective as users did not seem to have the same difficulty with other games.

4. CONCLUSIONS AND DISCUSSIONS

Using a limited number of participants (n=47) and three gaming interfaces, authors have appropriately tested the hypothesis of *"There is no significant difference between the players' gaming experiences using interfaces ranging from simplistic to complex"* and attempted to answer the indirect question of whether a simplistic interface is more enjoyable to players than a more complex and in-depth interface. Based on the preliminary data analysis, it is safe to assume that our initial hypothesis that a "simplistic game interface is better" could potentially be incorrect. The analysis showed that users often preferred the more complex interfaces of games such as *Guild Wars 2* as opposed to *League of Legends* and *Chivalry Warfare*. Based on the collected data and its analysis it is apparent that our sample group was generally not familiar with the games we provided, thus giving us a better test group to see how players truly react and deal with new interfaces.

While currently limited, the current results given by the experiment and research show a very important aspect of interface design. From the observation and analysis of collected data, it could relatively be concluded that when designing a game interface it is not always best to consider a simplistic design. Our research shows that from our small sample group there were more individuals who would prefer to use more drastic and complex interfaces as long as they are intuitive to use. It is entirely likely that with additional future research, we could provide more in-depth details into what makes more enjoyable and effective game interfaces.

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