

# Exploring Game Experience Variations Between Immersive and Non-Immersive RPGs

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## ABSTRACT

Comparing Non-Immersive Virtual Reality (N-IVR) and Immersive Virtual Reality (IVR) game experiences, while considering game genres, assists in understanding the specificities of IVR game design, providing future game designers with invaluable insights and guidelines. This work preliminarily evaluates game experience variations between an N-IVR and an IVR version of a Role-Playing Game (RPG). Our results indicate genre-specific variations in game experience between RPGs and other game genres studied in a similar manner. Moreover, our study identifies prior experience with N-IVR games in general, as well as with N-IVR RPGs, as an important factor affecting game experience in IVR RPGs.

## CCS Concepts

•Human-centered computing - Human-computer interaction (HCI) - HCI design and evaluation methods - User studies

## Keywords

Immersive Virtual Reality; Role-Playing Games; Game Experience.

## 1. INTRODUCTION

Several research efforts examine differences in game experience between Non-Immersive Virtual Reality (N-IVR) and Immersive Virtual Reality (IVR) games, extracting invaluable insights for future game designers [1-5]. Moreover, game design frameworks developed in the past are limited against specific game genres [6]. Those limitations are often taken into account in research efforts exploring differences between N-IVR and IVR game experiences, highlighting the importance of studying each game genre separately [7]. This work presents preliminary evaluation results of a game experience comparison between an N-IVR and an IVR version of a Role-Playing Game (RPG). Our goal is to reveal game experience differences between the two versions, examine genre-specific differences with other related studies, and study the impact of players' previous experience with N-IVR games and N-IVR RPGs on the game experience.

## 2. EXPERIMENTAL DESIGN

To evaluate the differences between an N-IVR and an IVR RPG experience we designed and developed a custom RPG using Unity. The game follows a linear scenario design where players find themselves as castaways on an unknown island. When exploring it players find their boat but also find an orc sleeping near it preventing their escape (see Figure 1a). Players seek help at a nearby house and find a merchant locked up inside. After unlocking the house door, using a key found at the back of the house (see Figure 1b), players are informed by the merchant that they have to collect ten (10) cobblestones to acquire a club (see Figure 1c) that can be wielded on the orc to immobilize it, thus allowing them to access their boat and escape the island. The N-IVR version of the game featured common desktop game controls such as using W, A, S, and D buttons to walk, the mouse to look around, and a crosshair

to pick up items. On the other hand, IVR version players had to move around using teleport, and perform, using motion controllers, several physical movements such as picking up key/cobblestones and swinging the club. Both games featured detailed graphical user interfaces communicating to players all the required information such as dialogs, current goals, remaining objects to collect, etc. A video demonstration can be found at: [youtu.be/IPML8CDkgSE](https://youtu.be/IPML8CDkgSE).

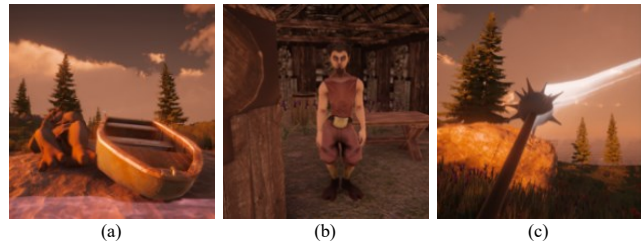


Figure 1. (a) Sleeping Orc; (b) Merchant; (c) Player swinging club.

Our study was designed to be between groups. Group A (16 players – 6 Females) played the N-IVR version of the game using a high-end gaming PC and a gaming headset, and Group B (16 players – 10 Females) experienced the IVR version using an Oculus Rift S Head-Mounted Display. Players were mostly students (80%) aged from 18 to 24 years old (72%). The average completion time of the N-IVR and the IVR version of the game was twelve (12) and seventeen (17) minutes respectively. After the game sessions players were asked to complete a Likert-scale based questionnaire (1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree) to evaluate their experience. The questionnaire included the core module of GEQ [8], along with four (4) questions about usability. Finally, players participated in a semi-structured post-questionnaire interview.

## 3. EVALUATION RESULTS

Regarding usability, our evaluation results showed that both versions of the game performed well without any serious errors. However, it took more time for Group B players to familiarize with game controls and interfaces. (see Figure 2).

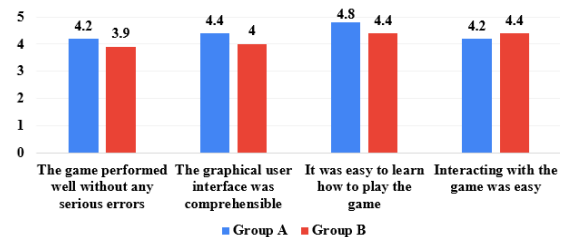


Figure 2. Usability Questions

The rest of the results presented in this work follow GEQ scoring guidelines [8], where the average score of players in certain GEQ questions is calculated to reveal the average score of each of its modules. GEQ results showed that IVR version players experienced increased levels of positive affect, and reduced levels of flow, compared to ones playing the N-IVR version of the game

(see Figure 3). Those results, combined with post-questionnaire interviews and usability questions, indicate that the IVR version of the game was more appealing to players, but difficulties in using the equipment, and getting familiar with the game interfaces led to decreased levels of flow.

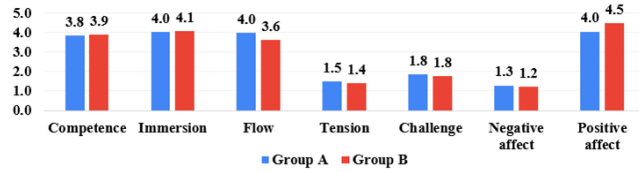


Figure 3. GEQs modules scores averages.

Continuing, when compared to similar previous studies, our results reveal genre-specific differences for RPGs. IVR version of the FPS game *Half-Life* delivered increased levels of flow and immersion to players compared to its N-IVR version [1]. In our case flow levels were reduced in the IVR version of the RPG, while immersion levels were the same across N-IVR and IVR versions. Regarding the driving game *Driveclub* [3], and sandbox game *Minecraft* [2], IVR versions players reported increased levels of competence, immersion, and flow against N-IVR ones, while tension levels were similar for both versions players. In our case, competence and immersion were the same among both N-IVR and IVR versions of the RPG, while IVR version flow levels were reduced. Finally, IVR versions players of the arcade game *FruitNinja* [4] and FPS *SmashHit* [5] reported increased levels of competence and immersion against N-IVR versions players. Players evaluating our RPG reported similar levels of competence and immersion in both the N-IVR and IVR versions of the game.

Nevertheless, the most interesting result of this study is the impact of prior experience of players with N-IVR games and N-IVR RPGs on the game experience delivered by the RPG evaluated here. Nine (9) players in both groups had significant experience with N-IVR games and N-IVR RPGs, while (7) players in both groups had very little experience with N-IVR games and none with N-IVR RPGs. Experienced and inexperienced players of Group A showed almost no differences in GEQ results (see Figure 4).

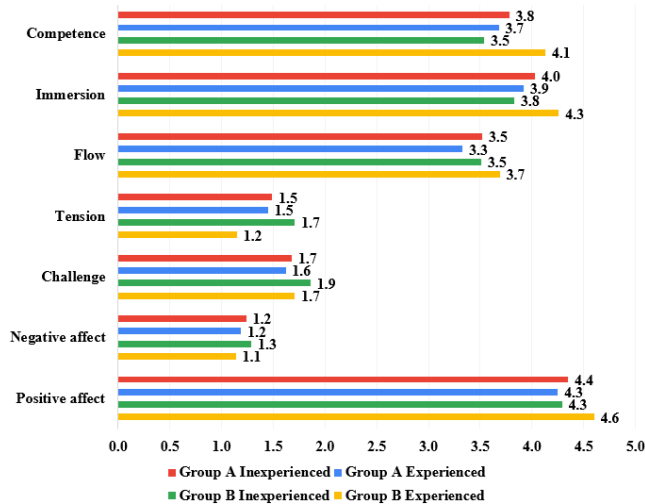


Figure 4. GEQs modules scores averages based on previous experience.

However, as Figure 4 shows, experienced players of Group B reported increased levels of competence, immersion, flow, and positive affect, along with decreased levels of tension, challenge, and negative affect, compared to inexperienced players of Group B. Moreover, inexperienced players of Group B reported the lowest

competence, immersion, and positive affect levels, along with the higher levels of tension and challenge among all groups of participants. Post-questionnaire interviews also showed that five (5) out of seven (7) inexperienced Group B participants found it difficult to follow in-game dialog texts, an incident which was not mentioned by any of the experienced Group B participants.

## 4. CONCLUSION & FUTURE WORK

Our study showed genre-specific differences between RPGs and other game genres when comparing N-IVR and IVR versions. Also, we identified prior experience with N-IVR games and N-IVR RPGs as a factor affecting game experience in IVR RPGs, indicating that previous experience with N-IVR games may have a slight effect in traditional N-IVR mediums, but a great one in newly introduced mediums such as IVR. This result is rather interesting as related studies often include only experienced players [1, 2] or do not discuss their results against previous player experience using distinct user groups [3, 4, 5]. Upcoming studies should incorporate increased numbers of participants to investigate the effect prior N-IVR game experiences have on IVR ones. This will extend our knowledge of user groups to be considered in future studies evaluation processes. Moreover, future work should take into account the usability and GEQ results of this study to investigate specific factors affecting game experience between N-IVR and IVR RPGs (e.g., scenario, interaction, and interface design, etc.).

## 5. ACKNOWLEDGMENTS

This research was funded by the Research e-Infrastructure “Interregional Digital Transformation for Culture and Tourism in Aegean Archipelagos” {Code Number MIS 5047046} which is implemented within the framework of the “Regional Excellence” Action of the Operational Program “Competitiveness, Entrepreneurship and Innovation”. The action was co-funded by the European Regional Development Fund (ERDF) and the Greek State [Partnership Agreement 2014–2020].

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