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A Study on the Immersive Realities Between PC and VR Versions of <Resident Evil 4>

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Abstract

In recent years, the rapid development of VR technology has secured its significant position in the gaming industry. This paper selects the PC and VR versions of Resident Evil 4 as the research objects, aiming to compare the similarities and differences between these two platforms. Through this comparative study, it is evident that the PC version of the game offers most players an excellent gaming control experience through precise and flexible operations. On the other hand, the VR version not only achieves immersive gameplay through virtual reality technology but also delivers more impressive visual effects to players. However, in comparison to the traditional PC version, the VR version incurs higher development costs, necessitating the production team to invest more resources to optimize the gaming experience and strike a better balance between immersion and playability. In conclusion, this study provides a valuable reference for game developers, assisting them in meeting the diverse needs of player groups and enhancing game playability and user satisfaction.

Keywords: *<Resident Evil 4>, PC Game, VR Game, Game Development, Game Contents, User Experience*

1. INTRODUCTION

The rapid development of VR technology has brought unique changes to the gaming industry, with many games launching VR versions to expand players' gaming experience. VR games provide players with a sense of immersion and natural interactivity that is significantly different from the PC version. Taking <Resident Evil 4> as an example, this paper explores the differences between these two game formats in terms of game content, player experience, and game development, with the aim of providing key insights for game developers

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to better adapt to the needs of different platforms, and to push the game industry in the direction of greater innovation and diversity.

2. THEORETICAL BACKGROUNG

2.1 <Resident Evil 4> for PC Version

<Resident Evil 4> is a survival horror game released in 2005 by Japanese game company *Capcom*, which was released in 2014 as a high-definition remake on steam. The storyline of the game revolves around the protagonist Leon S. Kennedy's mission to rescue the kidnapped president's daughter in a mysterious *European* village. The game was highly acclaimed for its great graphics, sound effects and compelling story. <Resident Evil 4> has received the highest ratings in the entire <Resident Evil 4> franchise on Metacritic, IGN, Gamespot, and other reputable information sites, and is widely regarded as a classic in the <Resident Evil 4> series.

2.2 <Resident Evil 4> for VR Version

In October 2021, Resident Evil 4 VR was officially released on the Oculus Ques2 platform. The <Resident Evil 4> VR version of the game flow is basically restored to <Resident Evil 4>, with little or no omissions or deletions in either the main plot or some of the details of the experience. Meta announced that <Resident Evil 4> VR is one of the best-selling games on Quest to date, based on the total revenue generated by <Resident Evil 4> in the first week of its release on the store. In the VR version of the <Resident Evil 4> game, players will take an immersive walk through the mysterious world reconstructed in VR from *Leon S Kennedy*'s first point of view.

3. RESEARCH CONTENTS

3.1 Game Contents

Visual Effect. In a VR environment, improved visuals are key to ensuring a great player experience. Despite the fact that the PC version of <Resident Evil> is a high-definition quality remake released nine years later, there are some obvious differences revealed in the comparison with the VR version. Table 1 compares the same scene or prop screen in different versions.

Since the VR device is very close to the player's eyes, the improvement of resolution becomes especially important. Combined with Table 1, we can find that even though the PC version is a high-definition quality replica released after nine years, some obvious differences are revealed in the comparison with the VR version. Especially in the quality of building models and mapping, the VR version has more meticulous details and superior mapping performance. And the props have a sharper contrast in the screen, which improves the player's attention. In the picture below, for example, the surface mapping of the crate shows a fine texture, making the wooden exterior of the crate clearly visible. The clever use of increased contrast makes these props stand out in the game scene and appear more three-dimensional and realistic under the light and shadow effects. On the other hand, light and shadow effects are crucial to creating realism. Realistic light and shadow effects enhance the three-dimensionality of the props and make them more vivid in the game, which helps to create a more in-depth and realistic game scene. Therefore, the VR version has significant advantages in terms of the resolution of the screen, the clarity of the models, as well as the light and shadow effects. Such visual image effects provide players with a high-quality gaming image experience.

Table 1. Comparison of PC and VR Graphics

PC	VR
	
	
	
	

Expanded Contents. In the PC version of the game, once the main story pass is completed, players will have the privilege of opening a number of exciting modes. This includes Mercenary Mode, Ada Mode, and Spy Mode, providing a rich variety of options for the gaming experience. Passing each mode will also bring additional benefits such as unlocking new weapons, unlocking hidden costumes, etc., providing players with more challenges and fun. In contrast, the VR version of the game is a slightly different experience. After the initial VR version, which only featured the main storyline, was a huge success in terms of sales, Meta introduced a mercenary mode the following year to meet player demand. However, no other game modes were introduced, which made the VR version relatively limited compared to the PC version's wide variety of game modes, and there were some limitations in the selection of modes, props, and costumes that could be unlocked in the VR version. All things considered, the PC version still has a significant advantage in providing a more comprehensive and diverse gaming experience.

Table 2. Expanded Content Form

	Mode	Costume	Firearm
PC	The Mercenaries	R.PD	INFINITE
			LAUNCHER
	Seperate Way	MAFIA	CHICAGO
			TYPEWRITER
	Assigment ADA		HANDCANNON
			MATILDA
			P.R.L.412
VR	The Mercenaries	R.PD	INFINITE
			LAUNCHER
		MAFIA	CHICAGO
			TYPEWRITER
			HANDCANNON

3.2 Player Experience

Interactivity & Manipulation. The flexible control of PC game and the new interactive way brought by VR game will present a very different game experience. <Resident Evil 4> PC version has the basic operation of general PC games, mouse control direction, aiming, firing, keyboard for movement, physical skills, etc. This operation makes it easier for players to familiarize themselves with the game operation, and flexibly respond to various situations in the game, so as to deeply participate in the battle. Comparatively speaking, in the VR version, players are able to directly experience more realistic interactions through virtual reality headsets and hand tracking devices. Handgun and RocketLauncher are two examples of this, with their different weapon holds, ammo loads and firing styles. Players are free to throw the gun into the air, subsequently tossing up the clip, grabbing the gun in mid-air, and firing it immediately. This immersive interactivity allows players to become more deeply integrated into the game world, injecting a more vivid and realistic element into the overall gaming experience.

Comfort & Vertigo. Due to individual differences, players experience comfort and vertigo very differently in the two game modes. For most players, PC gaming is more effective in maintaining player comfort compared to VR gaming with the help of a stable monitor and traditional controls. However, for some novice gamers, adapting to the new input methods offered by virtual reality headsets may take more time. In addition, when considering comfort and vertigo, focusing on the operations that players may face in the game is also a very important part of the process, including the player's unfamiliarity with virtual environments and three-dimensional space, where players may be unfamiliar with how to interact with virtual objects and environments. Using VR's headset and joystick is also considered a challenge for players who are used to traditional screens. This further highlights some of the advantages of PC gaming over VR gaming in terms of comfort and adaptability.

3.3 Game Development

Interaction Design. The PC version usually adopts keyboard and mouse as the traditional input method, which is relatively limited in freedom and lacks special interaction design. In contrast, the VR version is controlled by joysticks, gestures or somatosensory control, which requires more in-depth study of various interaction

methods from a game development perspective. In the VR interaction design of <Resident Evil 4>, game developers need to make a detailed division of all objects in the game (buttons, joysticks, etc.) according to the operation category (push, press, pull), and then carry out a complex pre-analysis of the records, taking into account factors such as the frequency of their use and location. Although <Resident Evil 4> VR is a port based on the original game, the difficulty of its development cannot be underestimated. The development team not only needs to deeply understand and master all the original code and data formats, including audio, animation, plot screen, camera, texture, etc., but also needs to re-implement the particle effects system in the original game, which is a great challenge for game developers.

Table 3. VR Version Adjusts Contents

	Adjustment Contents	Concrete Analysis
Screen Content	Adding real-time interactive objects	Objects in the game are able to interact in real time, responding to the player's movements. This real-time interactivity makes the player feel more real in the virtual environment and improves immersion.
Sound Properties	Stereo sound design	With stereo sound technology, players are able to perceive sounds from different directions more accurately. This makes in-game environments and events more realistic and creates an immersive feeling for the player.
Antagonistic Behavior	Adjustment of enemy target selection	Modified the enemy AI so that it is more inclined to attack the player-controlled protagonist (Leon) to accommodate the player's more aggressive, proactive tactical approach. This ensures that the enemies in the game are more in line with the player's actual behavior in the VR environment.
	Change the position of enemy thrown weapons	Adjusted the position of enemy throwing weapons to throw them at the player from more angles to increase the challenge and tension in the game. This adjustment is intended to increase the excitement and interactivity of the game
	Adjustment of enemy generation rate	In the more difficult parts of the game, the enemy generation rate has been changed to keep the game balanced. This adjustment is designed to ensure that player encounters in VR are tighter and more challenging, enhancing the game's entertainment value.

User Experience. Unlike the PC version of the game, enhancing immersion is a key task in the VR version of the <Resident Evil 4> game. In order to achieve a higher level of immersion, the game developers have adopted a variety of strategies such as adding real-time interactive objects, changing the sound design, and optimizing

enemy interactions. For example, in the VR version of <Resident Evil 4>, enemy sounds may come from all directions, increasing the player's perception of threats in the game, and when the player touches a virtual object with the handle or gestures, the object will make corresponding movements or feedback. In addition to this, Armature Studio, the developer of the VR version of <Resident Evil 4>, has modified the enemy AI, adjusting how they choose to treat Leon and Ashley as targets for attack so that they are more inclined to attack Leon, and allowing them to throw their weapons at the player from a wider variety of positions, and changing the enemy generation rate in a few of the tougher portions of the game in a bid to keep the game balanced, making a lot of effort. In conjunction with the above, Table 3 summarizes five content adjustments that game developers have made to improve the user experience. These adjustments aim to allow players to better experience the game in VR environments and optimize their behavioral habits in the field to provide a more realistic and exciting gaming experience.

4. CONCLUDE

In this study, we provide an in-depth comparison between the PC and VR versions of <Resident Evil 4> in order to get a full understanding of the similarities and differences in their gaming experiences. Overall, the PC version presents a traditional and reliable operation, offering a richer selection of game modes and making the overall gaming experience more comfortable. In contrast, the VR version stands out for its exquisite mapping, excellent modeled scenes, and superior interactive experience. However, it should be noted that while the VR version offers a more immersive visual experience, the PC version is more comfortable due to the possibility of dizziness and other discomforts.

In summary, the different versions each offer unique strengths, with the PC version emphasizing comfort and a traditional gaming experience, while the VR version focuses on visual immersion and interactive experiences. This diversity provides players with a more flexible and personalized gaming environment that meets the needs of different types of players. Through this study, we find that both versions have merits in different aspects, and their common point is that they both provide players with rich choices. And this study provides a useful reference for game developers, which can help them better meet the needs of different player groups and improve the playability and user satisfaction of the game. In the future, we expect to see PC and VR games continue to develop in terms of technology improvement and user experience innovation, creating a richer and more immersive gaming experience for players.

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