# Linux as a Gaming Platform: An Analysis on the User Experience.

Lucas Branco Alves de Melo [a]

[a] Affiliation: Bachelor of Computer Science, Federal University Of Agreste Of Pernambuco, Garanhuns, Brazil, 27lucasbranco27@gmail.com

**Abstract.** This research investigates the potential of Linux as a gaming platform by examining user experience. Through a comprehensive analysis of existing literature and usability testing, this study aims to identify the strengths, weaknesses, and opportunities for improvement in Linux gaming. The findings contribute to a deeper understanding of the factors influencing user satisfaction and the overall attractiveness of Linux as a gaming platform. By addressing the identified challenges and leveraging the benefits of open-source development, the Linux gaming ecosystem can be further enhanced.

**Keywords.** Linux Gaming, Linux, User experience, Gaming, Usability, Versatility, Open-source.

## 1. Introduction

The landscape of Linux gaming has evolved significantly, especially with advancements like Valve's Proton and the release of the Steam Deck. Historically, Linux was seen as a secondary platform for gaming due to its limited compatibility and support compared to Windows. However, with increased efforts from developers and communities, Linux is becoming more viable for gamers.

Linux distributions represent a unique system compared to their competitors, such as Windows and macOS. The Linux environment is focused on open-source and free software, which is generally attractive to users as it provides freedom, transparency, and no cost. Efforts to transform Linux into a viable gaming platform can potentially reshape the landscape for desktop operating systems, making open-source the norm rather than the exception.

This paper aims to explore the current state of Linux gaming, its potential, and the remaining challenges by understanding how a typical PC gamer, accustomed to Windows, might transition to Linux. We provide an overview of the relevant experience.

## 2. Literature Review

This chapter will examine existing research on Linux gaming, focusing on studies related to user experience, performance, usability, and versatility. It will identify gaps in the literature and position the current study within the broader research context.

The history of Linux gaming traces back to gaming on UNIX, which were mostly about hobby projects. However, Linux's journey as a platform for commercial games is often considered to have begun with Dave D. Taylor's port of *Doom* in 1994 [1]. Over the years, Linux Gaming experienced ups and downs, with a significant milestone in february of 2013 when Steam was officially launched for Linux [2], providing Linux users to better access to the most popular PC virtual game store at the time

[3]. Before Steam's Linux support, users already relied on Wine to play Steam and non-Steam games, but, in 2018, Valve released a fork from Wine called Proton, marking the start of Valve's support for the compatibility layer [5]. Today, 81% of the top 100 Steam games run on Linux, with around 60% needing minor tweaks according to *ProtonDB [7]*. This demonstrates how far Linux has come as a competitive gaming platform.

Also, representing Valve's support for Linux, in 2022, the Steam Deck was released [8], a portable PC gaming device running SteamOS, a distribution developed by Valve that is based on Arch Linux.

In 2017, prior to the release of Steam's Proton. [6] analyzed the state of Linux Gaming, exploring why it wasn't popular among gamers. The study explained that the lack of games compared to Windows was a primary reason. However, looking at the present, we can see how seven years of Linux Gaming have improved that scenario. As metioned earlier, 81% of the top 100 Steam games now run perfectly on Linux with minor tweaks, meaning users switching to Linux are likely to have access to most of their games.

One reason some games still don't run is due to anti-cheat systems blocking Linux machines. Again, according to *ProtonDB*, 8% of the top 100 games by player count on Steam are incompatible due to anti-cheat software [9]. In that list, no games are incompatible for reasons other than anti-cheat. Some anti-cheats utilize kernel-level access for cheat detection, which would not work on Linux since users have full kernel access. Others simply block Linux users. While there's no conclusive evidence that kernel-level anti-cheat improves cheat prevention, it's generally considered harder to bypass, though it hasn't eliminated cheating entirely [10].

Another issue noted by the author is hardware support. This problem is likely to persist unless Linux becomes the dominant desktop OS. Users often experience delayed or limited hardware support. Notably, as metioned by a community wiki [11], those who play racing simulators and virtual reality games will face limitations due to the "unique" hardware required, a challenge also present in other areas like flight simulators.

In the specific context of online gaming, [4] concluded that Linux is fully capable of supporting online games, as it has done in the past. However, there are limitations, As [6] also noted, the open-source nature of Linux means that it doesn't receive the same investments as proprietary platforms. This results in the motivation to improve and maintain Linux distributions relying heavily on community efforts. Additionally, the limited market share of Linux makes it less prioritized for commercial game distribution.

Studies in this field clearly indicate that Linux is continuously improving as a gaming platform. However, they often don't focus on the actual Linux gaming experience, which is crucial to the platform's growth since gaming involves much more than just running games. The typical "PC gamer" is a Windows user with limited knowledge of operating systems. How will such a user adapt to the Linux environment, and what will their experience be like? This paper seeks to answer these questions.

# 3. Methodology

This study employs a mixed-methods approach, integrating both qualitative and quantitative research techniques to obtain a holistic understanding of Linux as a gaming platform. This approach allows for the examination of user experiences, usability aspects, and versatility from various perspectives.

## 3.1 Data Collection Methods

- **Usability Testing:** Focusing on a gamer user, usability tests were carried out to evaluate the user interface design, navigation, and overall user experience of Linux distribuitions. This involved task-based testing.
- **Literature Review:** A thorough review of existing literature were conducted to identify gaps and position the current study within the broader research context. This review will also inform the development of survey and interview questions.

## 3.2 Justification of Methodology

The mixed-methods approach is justified by the

need to capture both the quantitative performance metrics and the qualitative user experiences that define Linux gaming. This comprehensive approach ensures that the research findings are robust, well-rounded, and reflective of the diverse aspects of Linux as a gaming platform.

# 4. Linux Gaming Experience

Linux, as an open-source platform, offers significant flexibility, but this comes with challenges in terms of usability, particularly for gaming. Unlike Windows, where the user experience is standardized, Linux users face multiple distributions (distros), each with unique interfaces and package managers. For a new user, the installation process and setting up gaming environments—through tools like **Proton**, **Wine**, and **Lutris**—can be daunting.

Most Windows users are familiar with a straightforward gaming experience, where installation and configuration are relatively simple and well known. In contrast, Linux gaming requires navigating through “new waters” to run games developed for other operating systems. The introduction of tools like **Proton**, integrated within **Steam**, has greatly simplified the experience of running Windows games on Linux, turning it almost straightfoward as Windows, but there are few games that only runs after some tinkering and games that don’t run at all. For non-steam games, the process remains complex compared to the plug-and-play nature of Windows gaming [13].

In the following scenario, we imagine what it might be like for a typical Windows user to switch to Linux. This user, accustomed to Windows' familiar interface and streamlined setup, is motivated to try Linux gaming. Initially, they face a steep learning curve: choosing from multiple distributions, understanding package managers, and using tools like Proton or Wine to play games. Though overwhelming at first, with time and perseverance, the flexibility and open-source nature of Linux can provide a rewarding and highly customizable experience for such user.

## 4.1 Searching a Linux distribution

We will first examine what switching from Windows to Linux would entail for the previously defined user. It's important to note that this scenario involves the exceptional, yet common, situation where the user must install an operating system. If Linux were to become the most widely used desktop OS, this scenario would likely be unnecessary, as most users' PCs would already come with a pre-installed Linux distribution. Thus, gaming on Linux would become more streamlined, much like gaming on Windows today, without requiring manual installation.

The following words were sellectected for what would be a search from the user on Google, the most widely used search engine worldwide [12] , (“Linux”, “Linux install”, “Linux Gaming”). provides a clear path, often directing users to *linux.org*, where they can find a "Download Linux" tab featuring 24 popular distributions, with Ubuntu listed first as seen in Fig. 1. Searching for “Linux Gaming” presents a more varied set of results, such as the *linux_gaming subreddit*, *gamingonlinux.com*, and the Linux Gaming board on *linux.org*. These searches typically lead to Ubuntu and Mint as recommended distributions.

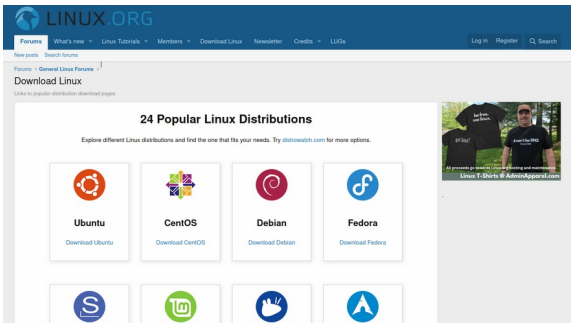


**Fig. 1 -** Linux.org "Download Linux" page.

Given that Mint is Ubuntu-based, Ubuntu was chosen for this scenario. The process of installing an operating system is fortunately well-documented on the internet, with numerous tutorials in both text and video formats. The Ubuntu installation is very straightforward and can be considered a "next, next, finish" process, requiring little user intervention. Unless the user encounters a hardware problem—though this is unlikely—the installation process is typically smooth and user-friendly.

## 4.2 Linux Gaming

Now that Ubuntu is installed on the user’s

computer, they will likely want to play video games. Since Steam is the most popular PC gaming platform, the user will search for instructions to install it. However, some highly popular games, such as League of Legends, Valorant, and Fortnite, do not run on Linux at all due to anti-cheat restrictions. This limitation makes Steam the more viable option, as it provides access to a broader selection of compatible games on Linux.

Upon first launching Ubuntu, the user will see a prompt indicating that the App Center offers a variety of applications to get started, including even the Steam logo on the picture, as seen in Fig. 2. If the user opts to search for Steam in the App Center, the installation process will arguably be easier than on Windows. Alternatively, If the user accidentally adopts a more Windows-like approach, they might search for Steam online using the pre-installed Firefox browser and download a .deb installer from the official Steam website. While this method is less ideal than using the package available in the App Center, it will still work effectively to install Steam on their system.

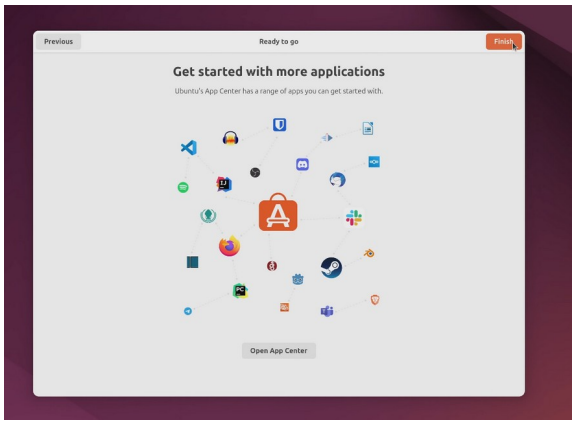


**Fig. 2 -** Ubuntu Greeting Window

With Steam installed and running, the user will experience gameplay similar to what is reported by Linux players on *ProtonDB.*

## 5. Discussion

the Linux gaming landscape is improving, though not without challenges. The market share of Linux on Steam has doubled, now sitting around 2%, compared to 1% in March 2022 [15]. This growth is largely driven by the Valve Steam Deck. More broadly, Linux's market share has been increasing globally [14], showing that both general users and gamers are increasingly viewing Linux as a viable platform for their needs, despite remaining limitations like anti-cheat software compatibility and hardware support.

As noted by [13], the market share of Linux in gaming directly reflects the platform's evolution in this domain.

## 6. Conclusion

Linux gaming still has a long way to go. While this paper demonstrates that there is now a substantial catalog of playable games on Linux, it is crucial to note that many popular titles with large player bases are not available. This limitation significantly impacts gamers' operating system choices; if they cannot play their favorite games, they are unlikely to adopt Linux as their primary platform.

Another significant factor affecting Linux gaming is hardware compatibility issues. Although such problems are relatively rare and tend to occur only in specific cases, they can significantly impact the user experience. Additionally, it is common for Linux gamers to spend time tinkering with settings to ensure games run smoothly. This necessity can transform what should be a leisure activity into a frustrating experience, turning gaming sessions into tasks if users struggle to get games up and running quickly.

For Linux to emerge as the dominant gaming platform, it must minimize its existing issues. Continuous improvements in hardware support are essential, alongside enhancements to gaming software, particularly compatibility layers like Proton and Wine. Ensuring that gamers can enjoy a smooth and hassle-free experience will be crucial for attracting a broader user base and fostering a more robust gaming community on Linux.

In the current status quo, Linux is gaining traction as a gaming platform. This progress indicates a promising, though still imperfect, path forward for Linux gaming.

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