Impact of Accessibility in Gaming Ecosystems

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Abstract

The gaming industry is undergoing a significant transformation towards greater inclusivity, driven by the recognition of the substantial population of gamers with disabilities and the ethical and economic imperatives of accessibility. This paper synthesizes current trends and advancements in gaming accessibility, drawing from recent reports and industry analyses. This paper also outlines the economic significance of a gaming ecosystem to adapt to the needs of gamers with disabilities as nearly 3 billion gamers are expected to have some disabilities by the year 2029 and that they make up for 20 percent of the gaming population [1]. In 2022, increased awareness and advocacy highlighted the need for improved accessibility features, with organizations like AbleGamers and SpecialEffect playing crucial roles in educating developers and providing resources [2]. Concurrently, the integration of artificial intelligence (AI) is poised to revolutionize accessibility through features such as voice controls, described visuals, adaptive difficulty, and personalized guidance [3]. Major studios are responding by incorporating customizable controls, visual and audio adjustments, and gameplay modifications, reflecting a shift towards inclusive design principles. Notable initiatives like the Xbox Adaptive Controller and AbleGamers' APX program exemplify these efforts. Despite progress, challenges persist, including inconsistent implementation, the cost of accessible hardware, and the need for universal standards. This paper underscores the importance of continued advocacy, collaboration, and education to ensure that gaming becomes a truly inclusive space, fostering community and enhancing the quality of life for all players. The future of gaming accessibility lies in the ongoing development of innovative technologies and the adoption of inclusive design practices from the ground up.

Keywords: Gaming e-commerce, Digital storefronts, Software, Accessibility, Artificial Intelligence

I. INTRODUCTION

Gaming is no longer a niche pastime; it has evolved into a global phenomenon, connecting people across cultures, abilities, and experiences. Yet, for too long, many players with disabilities have faced barriers preventing them from fully enjoying the medium. The call for accessibility is not just ethical—it makes economic sense, as it opens up the market to a broader audience. According to a study by scope [4], disabled gamers make up a greater portion of a games' in- game monetization; which has also been shown to be one of the most profitable business models in the gaming industry.

Improving a game's accessibility has wide ranging benefits that carries over to the non-disabled gamers as well. Disabilities often lie on a spectrum with disabled people feeling the symptoms profoundly while others face it a certain degree. Acting upon a certain accessibility experience, improves the average players experience as well.

Lastly improving accessibility improves the overall perception of a gaming studio and product as it brings forth a sense of pride among the players for supporting an upright and a naturally ethical movement that brings people together.

II. ANALYSIS

A. *Economic opportunity*

Studies have shown the gaming market is said to grow even bigger with more people engaging in some form of gaming or the other [1]. With gaming playing a bigger role in the lives of everyday people, the number of disabled gamers is also increasing [5]. A study by scope UK found that over the span of a year, 63 percent of disabled gamers have engaged in some form of in-app purchase compared to their non-disabled counter parts who were evenly distributed. This means that on an average, a disabled person is more likely to spend money after purchasing a game than a non-disabled person. Given the current state of games, this leaves an incredible vacuum of improvement whereby more gamers will increase their investment in a game if they feel a sense of inclusivity in the community.

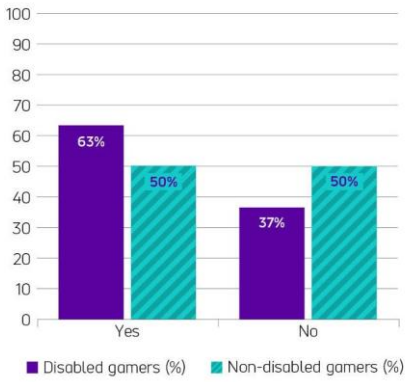

Fig. 1. Percentage of Disabled gamers

Let us consider the business model of free-to-play games. The base game is free and invites a large set of players to try out and play the game. The game either has a pass system that allows players to purchase in-game cosmetic or in-game micro-transactions for each item or some mix of the two. This effectively means that the larger a player base, the larger the section of the population that ends up paying for in- app purchases (provided the game is moderately successful). Improving the accessibility of a game, not only brings more people into the game by making the game more accessible, it also allows those gamers to play for longer as the toll of fatigue is reduced in the case of physical disabilities like cerebral-palsy or mental disabilities like color blindness and epilepsy. We've already seen how disabled people are more likely to spend money on in-app-purchases than non-disabled gamers (see Figure 1) and therefore results in more revenue generation.

The community also comprises of a higher disability representation compared to non-disabled people. About 61 percent of all disabled gamers watch and engage with the e-sports community in some form or the other and so adding it all up presents an incredibly ripe economic opportunity for gaming ecosystems to build an inclusive community (see Figure 2) where disabled people are respected, portrayed accurately and the platform makes it easier for them to be engaged with the games they play.

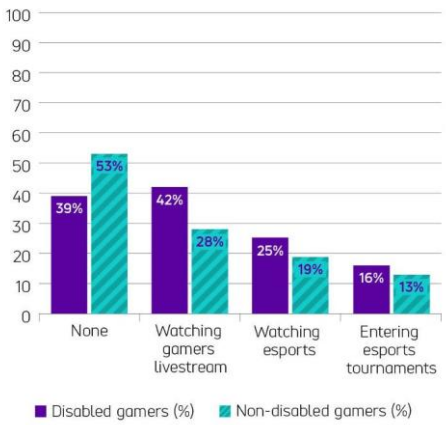

Fig. 2. Percentage of Gamers interested in e-sports

B. Player Experience

Disabilities often express themselves on a spectrum. Phys- ical disabilities like loss of vision, color-blindness, loss of hearing, epilepsy are some examples. As hardware and soft- ware technologies evolve and become more complex, so do the games that are created with them. Modern games often involve many visual and audio stimuli and far too often end up in a situation where there many disclaimers and warning before playing a game that warn people of these barriers to entry. Research also indicates that it is harder to continue playing for longer hours owing to the intense mental toll that modern games take on the player.

When your economic model is a function of time and player experience during that time, it comes as no surprise that games that feel natural with a lower barrier of entry do well for longer and are more profitable than games that don't. The study of making software and especially gaming ecosystems more accessible has the compounded effect of forcing gaming publisher companies to make really accessible games that have a low barrier of entry and are designed to be intuitive. For instance, a game that is considerate to color-blind people have found a niche with competitive e-sports player bases as many of them want to optimize their configuration to set themselves up for the best chances of success.

A similar example can be made for audio cues being introduced to make the game easier to play for visually-challenged players. This too had the compounded effect of reducing the visual clutter in games like Overwatch that already had high visual stimuli every second. This layer of polish added to games can be the difference to retain a large loyal player base for many years owing to the trust that the community places on their needs being addressed and the overall player experience being enjoyable.

C. Public Reception

The last but certainly not the least merit of improving the accessibility of a gaming ecosystem is the public perception of such an endeavor. In a business model that relies on the trust of the community to part with their money for entertainment, the decision to purchase is often emotional and is made a lot easier when the players feel that they are contributing to a cause that is integral and empathetic.

By listening to the needs of disabled gamers, one can see that community changes and acceptance ranks higher than actual software inefficiencies in the system. This means that the algorithms that govern behavior within a game that either rewards or reprimands a certain player is in greater need of tuning than heads-up-displays and other needs.

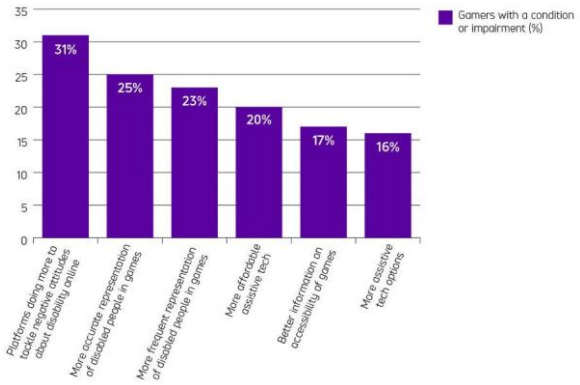

Fig. 3. Top changes to see in the gaming industry

D. AI in Gaming

The role of AI in our lives is undeniably changing the paradigms with which we interact with technology. With real-time conversational agents that can understand complex sentences, voice control of character can make it a breeze for people with physical disabilities to interact with games. Purchase transactions and upselling of products can also be made easier through voice which reduces the barrier for monetization.

Better real-time adaptive agents within the game can make it easier to tune the game to the needs of player and thereby offering tailor-made experiences that are enjoyable in different ways to different people. This can mean features like providing a certain time of mini-game experience for a person with physical disabilities that does not rely on mechanically precise movements or a mini-game that does not require a lot of contextual memory for a person with learning disabilities.

Agents can also improve the overall player experience like we mentioned earlier by providing an immersive experience in an ecosystem. World-building with AI agents can feel more realistic and can engage players for longer. AI powered enemies can be more challenging to suit the player's difficulty levels and feel more rewarding to accomplish.

III. CONCLUSION

The journey toward full accessibility in gaming is an ambitious and ongoing endeavor, with significant work still ahead. Challenges such as inconsistent implementation, the high cost of accessible hardware, and the lack of universal standards require sustained effort, advocacy, and innovation. However, the progress made thus far is undeniably promising. [4]

From groundbreaking technologies like AI-driven accessibility features to initiatives such as the Xbox Adaptive Controller and programs spearheaded by advocacy groups like AbleGamers, the industry has demonstrated its commitment to inclusivity. These achievements not only benefit players with disabilities but also enrich the gaming ecosystem as a whole by bringing more people into the world of gaming and thereby increasing the size of the market economically as well. By building on recent advancements and addressing existing gaps, the gaming world has the potential to become a space where every player feels welcomed and empowered.

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