

Game Audio Description in Death of Internet: Insights from Players and Developers

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Abstract. Audio description (AD) has started to be implemented into video games with the aim of improving accessibility for players with visual disabilities. However, the interactive nature of the medium poses several issues for the description of real-time gameplay, namely variability and synchronization. This paper details the implementation process of AD into the game Death of Internet, developed by a team of students at Cnam-Enjmin University (France), and presents the results of a series of playtests conducted with 13 players with visual disabilities. Interviews conducted with the development team show that AD, when considered from the design stage of the game, is straightforward to implement and concerns all industry professionals. Regarding user experience, AD appears to be favored by playtest participants, as it contributes to the understanding of the game setting. Moreover, the integration of AD with other features, namely the screen reader, is key to ensure the accessibility of the experience. Although further research is needed with a larger sample size, improved text-to-speech readability and character AD, this study points to the great potential of game AD for players and developers.

Keywords: Video Game · Accessibility · Audio Description · Visual Disability

1 Introduction

In the past few years, the game industry has been taking several steps forward in the field of game accessibility. Defined as the removal of “unnecessary barriers for players with disabilities, within the limitations of game rules” [1], game accessibility is concerned with making games more inclusive and playable for a wide range of players, regardless of their physical, sensory, or cognitive abilities. This includes implementing features to customize the gaming experience, such as control remapping, captions, colorblind modes, and adjustable difficulty settings.

As video games are primarily based on visual stimuli, players who are blind or have low vision may find interaction and progress particularly challenging [2] [3]. If visual stimuli, namely images and text, cannot be properly received, players will find it difficult to cognitively determine the response to said stimuli and to provide the suitable input to the game [4]. To overcome these barriers, players may use assistive technologies, such as screen readers, which read aloud in-game text through text-to-speech technology (TTS), and screen magnifiers, which allow players with remaining sight to zoom in. Built-in accessibility features that modify the mechanics of the game may also be useful for these users, such as sound cues, assisted gameplay, or quest bypassing.

However, none of these features provide detailed information about the action, the scenarios, and the characters. As a result, players may miss some of the context of the stimuli or have a limited experience in terms of comprehension and enjoyment [5]. Audio description (AD), an accessibility service widely offered in film and live performances to provide access to users with visual disabilities, may also be effective in video games, as it narrates visual elements out loud [6]. It is inserted in the silent pauses between the soundtrack of an audiovisual text, namely dialogue, sound effects, and music, and it poses no technical implementation challenges for non-interactive media. In fact, AD has already been added in Ubisoft game trailers [7]; cutscenes, such as in Naughty Dog’s *The Last of Us Part I* [8], and scripted events, such as in NetherRealm Studios’ *Mortal Kombat 1* [9]. Nevertheless, AD in interactive sections (hereafter referred to as *gameplay AD*) must account for variability and synchronization to player actions and in-game events [10].

This paper details the implementation process of AD in *Death of Internet*, one of the first efforts to implement *gameplay AD* [11]. *Death of Internet* was developed by a team of eleven students at the French university Cnam-Enjmin (École Nationale du Jeu et des Médias Interactifs Numériques) as the final project in the Master’s degree in Video Games and Interactive Media. After reviewing the state of the art of game AD, we present the insights of the game developers regarding AD implementation. Then, we detail the results of a series of playtests conducted with 13 players with visual disabilities, where users evaluate the AD and overall accessibility of the game. Lastly, we reflect on the potential of AD to improve game accessibility for players with visual disabilities and we outline the avenues for future research.

2 Audio Description in Video Games

The use of AD is widespread in film, television, museums, opera, and theater [12]. However, it has only just started making its way into video games [13]. Players with visual disabilities have long expressed their interest in using AD in video games, as it would provide them with key information about the action, settings, and characters, thus enhancing their comprehension and enjoyment of the game [14]. The first games with AD have addressed non-interactive game content, namely trailers, cutscenes, and scripted events. As this type of media

does not require player input, AD may be scripted and recorded following the same conventions as in film, meaning that it is inserted in the silent pauses between soundtrack elements. These games include Ubisoft game trailers [7]; cutscenes in *The Last of Us Part I* [8], in the 2024 remaster of the 2020 game *The Last of Us Part II* [15], and in the 2024 update of the 2023 game *Marvel's Spiderman 2* [16]; and scripted events in the fatalities of *Mortal Kombat 1* [9], and in the racetracks of *Forza Motorsport* [17].

In recent years, innovative accessibility features for visually impaired people (VIP) continue to appear but even if “the researchers/developers have proposed solutions to increase the accessibility of the video games being produced; however, they are not enough.” [18]. Indeed, there is an example of studies that compare different Spatial Awareness Tools designed for VIP [19] but their conclusion is “that none of the approaches we investigated convey position and orientation effectively;”. In this paper they talk about an accessibility feature they worked on earlier which is the NavStick [20] who seems to work a little bit but it has the weakness to be too hazardous to get the information needed by the player. Especially about the localization of the different objects and about the size or the shape of the room, which is the kind of information that AD can easily provide. We also have examples of more innovative features like echolocation to acquire spatial knowledge [21][22]. With this VIP can identify the size and the shape of a room but also the material any of the room is made. However, they can't determine correctly the localization of an opening in the wall or a column that acts as an obstacle in a room. So, we can say that it would be hard for VIP to describe precisely a room and even more the disposition of some objects in it with such a system. We can also know that they couldn't get some information like the color of the objects. Which is again common information provided by AD.

Let us examine the first cutscene in *The Last of Us Part I* [8] as an example. When the AD is activated, the game opens with a voiceover that narrates: “Cut to a darkened living room. A blonde pre-teen girl stirs as she sleeps on a couch. An unseen man enters the house.” Then, the sound of a door opening and closing can be heard, followed by the voice of a man, saying: “Tommy, Tommy, listen to me, he is the contractor. He's the contractor, okay? I can't lose this job.” The AD follows with a brief description of the man's actions and physical appearance: “He is on the phone. He has dark hair and a beard.” Here, the AD provides key information about the scenario and characters, and contextualizes the soundtrack, namely dialogue and sound effects.

However, audio describing interactive content is not as straightforward, as it raises issues derived from non-linearity, randomization, customization, and synchronization. A prerecorded AD, like the one used in film, may not adapt to the variability of a video game, but a gameplay AD, combined with other accessibility features such as a screen reader, sound and haptic cues, and surround sound, may. Since 2022, a handful of games have been released with gameplay AD that address this variability, which are described hereafter.

Firstly, Bridge Multimedia’s Cyberchase: Duck Dash [23] is an educational game that combines AD with TTS to account for randomized events. At the start of the game, the player controls a bird flock that moves through three lanes while avoiding a series of obstacles. The AD narrates the action, and TTS reads out loud the variables regarding the position of the flock and obstacles. For example, the AD narrates: “The flock is in the top lane. A thick cloud appears in the top lane.” Here, top and thick cloud are variables, meaning that they change in each gameplay. With this information, the player knows to move the flock to the middle lane so that it avoids the obstacle.

Secondly, CowCat Games’ Brok the Investigator [24] is a point-and-click game where the AD is automatically triggered when the player enters a new scenario or interacts with a point of interest (POI). For example, when the player selects a picture frame, the AD narrates: “Close-up. Brok sees a picture frame composed exclusively of a triangle pattern.” Then, the main character of the game, Brok, says: “Weird. What’s this supposed to depict?”. The integration of the description with the gameplay through character dialogue adds to the immersive experience of AD users.

Thirdly, Soft Leaf Studios’ Stories of Blossom [25] is a slow-paced, narrative game that pauses the action while the AD is playing to avoid time constraints. The AD describes characters and scenarios and highlights the POIs. For example, one of the first scenarios of the game is described as follows: “Outside the town hall, stands a three-tier fountain. On top, there is a statue of the King in a heroic pose.” Then, the player may interact with the fountain, a name tag that is identified and read aloud by a screen reader.

Lastly, Death of Internet, the game presented in this paper, offers AD for the scenarios, characters, and POIs. In the following sections, we outline its accessibility features, the development process within an educational context, and the results of a series of playtests with players with visual disabilities.

3 Death of Internet

Death of Internet (DOI) is a single-player, first-person, point-and-click PC game. It was developed by a team of eleven students: three graphic designers determining the overall art direction, level art and modeling; two programmers coding the whole game; two game designers defining the rules, level design, narrative design and interactions of the game; two sound designers determining the overall artistic direction, creating and integrating all the sounds of the game; an UX designer developing UI, playtesting, accessibility and UX in general, and a project manager planning and coordinating workflow. The game was developed in Unreal Engine 5 and the interface design was created in Lunacy.

The goal of the player, who controls a character named Diane, is to explore different scenarios and POIs to unravel the mystery of her best friend’s disappearance, Nova. There are two types of input: interacting with an object through the left button of the mouse; and rotating it through the scroll wheel. Both inputs may be remapped on the keyboard.

Death of Internet poses three main interaction constraints for players with visual disabilities: navigation (i.e., handling the free camera to explore the scenario), selection (i.e., handling the mouse cursor to interact with the visuals), and comprehension of visual elements. To tackle them, the Blind Mode was developed, a type of gameplay that may be selected in the settings of DOI and that activates three features particularly useful for players with visual disabilities: POI navigation, TTS, and AD (Table 1).

Table 1. Visual accessibility features in Death of Internet, activated in the Blind Mode.

Visual accessibility feature	Description
Point of Interest Navigation	Navigation from one point of interest to the next through a fixed position camera.
Text-to-speech (TTS)	Narration of all texts in the game, including UI and in-game written content, and voiced by a male synthetic voice.
Audio Description (AD)	Description of the scenario, points of interest and events in first-person, from the point of view of Diane and voiced by its actress.

POIs are developed in the level design and placed at certain locations that are narratively relevant. They are defined by fixed cameras that act as screenshots, so that the player moves from one POI to the next. Inputs are restricted to moving and interacting with the POIs. AD and TTS are automatically launched when the player arrives at a scenario, interacts with an object, triggers a game event, or selects a UI element. At any moment, the player can provide a “Move” input, moving to the next or the previous POI.

The slow-paced, narrative focus of the game favors the use of AD to provide essential information about the visual elements to players who are blind or have low vision. AD in DOI is integrated, meaning that it is the main character, Diane, who narrates her (and the player’s) surroundings, as well as the objects and events she encounters. When the player enters in a new room, the AD describes the scenario and the POIs. Then, the player can move through the different POIs, select one to inspect it, or interact with it. In all cases, the AD describes the POI and the game event it triggers, when applicable. If the POI has text, it will be read aloud by a male TTS voice instead of Diane, so that both can be differentiated.

For example, Fig. 1 was described as the following: “The capsule is round, bathed by a warm, orange light. The walls are metallic, but the space is cozy. It is full of colorful pillows piling up on the floor. There are two holograms showing blog posts, one page of a notebook laying on a pillow, and one small sticky note glued to the wall on the right.” It is worth noting that before this excerpt, Diane narrates that there is a space capsule floating on water under the starry sky.

The POIs are the entry that shows the full room, two holograms, the notebook page, and the sticky note arranged in the room as shown in Fig. 2 When the player interacts with the notebook page, the AD narrates: “On an orange pillow, there is a notebook page of Nova’s handwriting. She used a black pen. Maybe they are from her diary. But why would she tear out the pages? Let’s read what it says.” Then, the TTS reads out the words written by Nova: “It’s difficult for me to look at someone in the eyes.”

One of the two programmers in the team was responsible for the technical implementation of AD and TTS in Unreal Engine 5. He used its Application Programming Interface presets. AD was added as an additional voice line, and TTS was directly integrated through Unreal. However, TTS settings are taken from the player’s PC configuration, meaning that the voice type and speed will depend on the device and not the game. As TTS speed could not be predicted, implementing AD right after it was challenging. To work around this issue, an AD or TTS line is always preceded by an empty TTS to ensure that there is silence before launching the next voice line.

In addition to the Blind Mode, other accessibility features in DOI include independent volume settings for dialogue, sound effects, AD and TTS; customizable screen resolutions and cursor color, and full and windowed mode; remappable controls, X and Y axis inversion, and sensitivity adjustment; subtitles for character dialogues and settings for font size, color, background opacity, and speaker name, and deactivation of screen flash effects.



Fig. 1. A point of interest: the entry of a capsule.

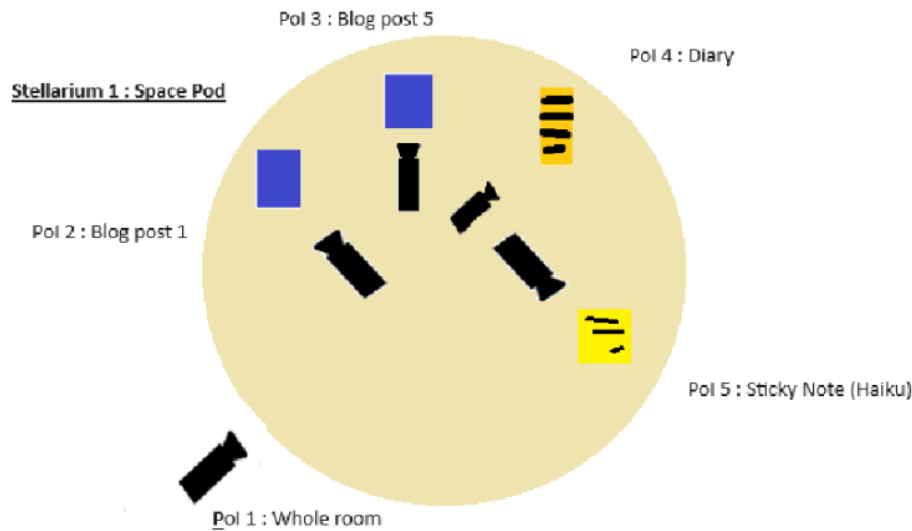


Fig. 2. A diagram of the capsule layout in top-down view realized by the game designers .

4 Insights from the development team

DOI was developed in an educational context, meaning that it served as a learning experience about game accessibility for the development team. To gather the perspectives of the students after the completion of the project, five individual semi-structured interviews were conducted, one for each role: a graphic designer (female, 23 years old), a programmer (male, 29), a game designer (male, 25), a sound designer (male, 24), and the project manager (male, 25). The UX designer is one of the authors of this paper. The following topics were addressed: AD and TTS features in DOI, learning outcomes of the experience, and perspectives on accessibility regarding the future of the industry. The interviews were transcribed and coded through thematic analysis. Results are discussed hereafter.

While only the UX designer was responsible for the AD in DOI, every team member's work was impacted by its implementation. In his interview, the game designer noted that the only change in his workflow was the extra step of writing and recording the AD, but that "the process was simple and effective." The project manager agreed, saying that prioritizing AD in the production process had aided its rapid implementation. The graphic artist raised an interesting point: after learning about the features of the Blind Mode, she realized that she could have been involved in AD scriptwriting, because she could provide insight about the characters and scenarios she had designed. This shows that accessibility is cross-disciplinary and concerns all members of the development team in sometimes unforeseen ways.

When asked about the learning outcomes of the experience, team members agreed that accessibility was surprisingly easy to implement. For one of the sound designers, “the genius of gameplay AD is more about having the idea to do it than to actually put it into practice.” Similarly, the project manager mentioned that the greatest challenge of AD in DOI was “creating something new.” However, it requires one person working on it full-time, in this case, the UX designer. The programmer highlighted that planning from an early stage in the development process was essential to succeed in the implementation: “Accessibility is not just something you can add as an afterthought. Instead, the game must be designed with accessibility in mind.” In line with this idea, the project manager noticed its creative potential for the development team, as accessible features provide new gaming experiences for both players with and without sight: “AD is an accessibility feature that opens new ways of thinking about video game design and play.”

Regarding the impact of this experience on their future in the game industry, all team members that were interviewed stressed that they will consider accessibility when working on other games. The sound designer “will promote accessibility in the teams I am a part of in the future, as it can foster creativity and inspiration.” After his work in DOI, the developer feels “more informed to work on game accessibility, because I put it into practice.” Likewise, the UX designer said, “I can implement accessibility by myself, but a big challenge would be to convince big studios to integrate it more and more.”

5 Insights from the players

The Blind Mode is an original feature in DOI developed specifically for the game. A set of playtests were conducted with players with visual disabilities to assess the suitability of the accessibility solutions and explore future improvements, which are discussed in this section.

5.1 Methods

The participation requirements for the playtests were to be a person with a visual disability, as it is the main user target of the Blind Mode; to speak English, as DOI is only available in this language; and to have access to a PC to run the game. Participants were recruited through a forum about video games for people with visual disabilities, AudioGame.net on a voluntary basis. Persons who showed interest in the study were contacted by email and asked to respond to a short survey about their background and use of AD. Out of the 33 persons who were contacted, 13 were finally participated in the playtests, coming from 12 different countries (Malaysia, Lithuania, Ireland, Saudi Arabia, USA, Estonia, Poland, Mongolia, Turkey, Colombia, India and Sweden). They all play video games at least once a week, they all use screen readers like NVDA, and they are familiar with AD as they use it at least once a week.

After the initial survey, a video call was individually scheduled with each participant to conduct the playtest. Different videoconferencing software was used, depending on the preferences of participants, including Zoom, Google Meet, and Discord. The build of the game was sent beforehand so that participants could test if they were able to run it on their computers. The agenda for the call was an explanation of the aims of the study, the development context of DOI and the plot of the game; followed by a description of the controls of the Blind Mode:” The game is controlled with the keyboard. You can use the right arrow to go forward, the left arrow to go backward and the spacebar to interact with the objects”. Then, participants were asked to run the game, which was a simplified version lasting between 3 and 5 minutes. Lastly, a semi-structured interview was conducted, aiming to validate the controls, comprehension of the story, satisfaction with the Blind Mode, and suitability of the AD. The whole session took up to 40 minutes and it was video recorded.

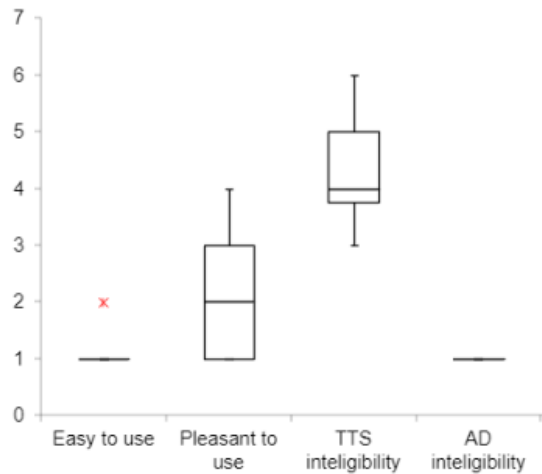


Fig. 3. A box plot showing the distribution of responses to the 4 questions asked, using a Likert scale from 1 to 7.

5.2 Results and analysis

Four main topics were addressed in the interviews:

A: Are the controls validated ?

We asked participants how easy it was to use the controls of the Blind Mode based on a Likert from 1 to 7 (1 is very easy and 7 is very hard). The average score of their answers is 1.15 out of 7 (Fig. 3), so the people found the controls really easy to use. Overall, the controls were praised for their simplicity, although

some suggestions were made when asked about their interest in remapping them. Seven participants would like to use the ‘Enter’ Key for interaction, instead of the ‘Spacebar’. Four participants would like to move with the ‘A’/’D’ Keys instead of ‘Left Arrow’/’Right Arrow’, and three persons would prefer to use ‘Up Arrow’/’Down Arrow’.

When asked about controls that were not available in the Blind Mode, participants suggested to repeat the AD by pressing the ‘R’ Key; to slow it down and speed it up using ‘Page Up’/’Page Down’; and to stop and play it with the ‘Ctrl’ Key. Moreover, they would like to adjust the volume of the music and sound effects through a menu, not a keyboard input.

With that score and the comments about the eventual remapping of the controls, we can say that they are really easy to use and we only need to make some little adjustments to improve them like changing the input for the interaction on the Enter key.

B: Is the understanding of the story validated ?

Regarding the comprehension of the story, players were asked to describe the scene as they imagine it (The scene is the inside of the space pod (Fig. 1), so a cozy room with pillow and some posts on the wall.). Most participants (77%, or 10 out of 13) were extremely accurate in their responses. For example, a participant stated that: “It’s a capsule, or a bedroom I guess [...] sort of a rounded room with pillows on the floor, maybe a computer on a desk, piece of page from a diary/journal and a post-it note on the right side, near the computer, on a wall”. When asked about how many documents were in the room, 69% of participants (9 out of 13) correctly answered that there were four, namely two blog posts, one diary entry, and one sticky note or haiku. Participants described Nova as an “introverted, socially awkward person” (4 out of 13), although most of them stated that there was “not enough information to really describe her”. When we asked people to describe the environment, they got it right, but when it came to talking about the character, they couldn’t really answer us. It seems that the people understood well where they were but didn’t really grasp the information we gave them about the character.

C: Is the Blind Mode validated ?

Participants rated the suitability of the Blind Mode on a Likert from 1 to 7 (1 is very pleasant and 7 is very unpleasant). The average score of their answers is 2.1 out of 7 (Fig. 3), meaning that the people found the Blind Mode pleasant to use. Regarding the strengths of the accessibility solutions, eight participants highlighted the controls, and seven participants praised the AD. However, eight participants consider that the TTS should be improved, particularly regarding intelligibility. Five participants would like to choose between different TTS voices, whose speed could also be customized. Two participants mentioned that they would like to adjust the volume of the music and use sound effects for accessibility purposes, something that was not available in the Blind Mode. In any case, all participants showed interest in using the Blind Mode throughout

the entire game, particularly the AD. With that score and the comments about the strengths and weaknesses of the Blind Mode, we can say that for now, it is already functional and pleasant to use. Also, the AD and the controls seems to be really good but the actual TTS need some changes and we can also improve the Blind Mode by adding some little feature like the possibility to change the different volume of the game.

D: Are AD and TTS validated ?

Participants were asked about the intelligibility of the AD and TTS on a Likert from 1 to 7 (1 is very intelligible and 7 is not intelligible at all). The average score of their answers is 1 for AD (Fig. 3), meaning that it is totally validated; and 4.3 (Fig. 3) for TTS, so the people found the TTS rather unintelligible. All the participants said that they prefer AD voice. After explaining that AD is used for descriptions made by the main character and TTS for reading out loud the texts of the documents, participants found it relevant (77%, or 10 out of 13), although they had not realized that there was a reason for using different voices. With all this data we can say the AD was really understandable, but the TTS is quite bad and not intelligible enough. Meanwhile peoples found the TTS relevant and useful in the Blind Mode to understand better what is about the environment and the character actions and what is about the player action (10/13 said “Yes” to this question). We can conclude that it is important to keep a TTS voice, but we need to change it to a more intelligible one.

6 Discussion

Video games allow for a great amount of creativity regarding accessibility, within the constraints related to gameplay and the developers’ intent[?]. The Blind Mode is a way to render a game fully accessible for VIP, who seem to be satisfied with the feature. However, it is important to note that AD could be easily implemented into Death of Internet because it is a one player, slow-paced game with no time constraints. In multiplayer, fast-paced games, AD faces implementation challenges regarding time constraints and detail level.

We know the Blind Mode is well integrated from the developer’s point of view because they were integrated in the production since the beginning and so they were able to validate each step of the feature. In that way, we encourage the people who want to integrate accessibility features in their game to discuss it with the developers as soon as possible to do it in the right way.

It is also important to include people with disabilities in the production process in order to improve accessibility features according to their feedback. The playtests of Death of Internet were conducted to that aim. In fact, the next step in this research is to add the Blind Mode in the whole game, which is around 30 minutes of gameplay. We plan then to improve the Blind Mode according to the feedback presented in this paper, such as improving the TTS voice and mapping the interaction input on the Enter key. All the participants of the playtests regularly play video games and use AD in other media, but it

would be interesting to conduct further research with novice gamers and persons who are less familiar with AD. Although the AD voice was praised, it is possible that there was a certain bias regarding the comparison of the AD and TTS voice. Therefore, in future playtests, TTS voice should be improved to avoid this limitation.

Even though the playtesters understood the scene of the game, there is room for improvement regarding the understanding of the character. A possible reason could be that the AD described the scene, while the character was addressed by the TTS. In this sense, it may be an issue related to the TTS intelligibility. The duration of the demo was very short (around 2 to 5 minutes), so we do not really know how enjoyable the blind mode is for a game session lasting several dozen minutes. This is one of the main reasons why the next playtest will be carried out with the blind mode integrated into the whole of *Death of Internet* and so the gameplay session should last around 30-40 minutes. In that way, we can imagine a playtest with 2 conditions, one playing with the Blind Mode and the other without, to check that the understanding of the environment and the story is the same, but also that the game is fun in the same way.

7 Conclusions and future work

Death of Internet is one of the first-ever attempts at implementing AD into gameplay. In the same period that the project was developed, from December 2022 to February 2023, only three other games were released with similar features. The interdisciplinary approach that joined the efforts of each specialty of the development team with an AD researcher proved to be successful in creating a new gaming experience, called the Blind Mode. Moreover, the interviews with team members provided valuable insight into the implementation process. Documenting the challenges and solutions of this experience was one of the main goals of this paper, aiming to serve as a resource for developers and researchers tackling game AD.

Future work includes further researching AD parameters and linking them with user preferences. Different versions of AD could be created and compared, such as first and third-person AD, and voiced by a human or a synthetic voice. The impact of this feature on gameplay for players with and without visual disabilities could also be studied through reception research. More training and education are also needed beyond UX designers and programmers, as hinted in the interviews with the development team. Joint seminars between development teams, accessibility providers (such as audio describers) and users could set the ground for a common language to create quality accessibility from the design stage of the game.

The playtest showed promising results for the Blind Mode, validating its functionality and appeal for VIP. Future playtests will be organized on the entire game, comparing the gaming experience with and without the blind mode to definitively validate the relevance and contribution of Blind Mode to the video game industry.

In the future we can also imagine a plug-in available for video game engines like Unity or Unreal Engine 5. This plug-in could be inspired by the works of Klemens Strasser[26] who created an accessibility toolkit for game engine Unity. This should be a plug-in that put automatically some AD in the game thanks to AI developed to write automatic AD. As well, thanks to all the data we already have, combined with what we'll get from the playtests, we'll be able to draw up guidelines for correctly integrating real-time AD into a video game.

Finally, this pilot study has highlighted that AD provides game-changing possibilities for players, industry, and training of future professionals in a cross-disciplinary manner. The rapid development of the game, in just three months, shows that accessibility is not difficult or costly to implement if done from the start of the design process. As stressed by the game designer in his interview, "if students can implement AD in a game, everyone can. With accessibility, we have everything to gain."

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