



How Controller Designs Affect Video Game Accessibility and User Experience

Amelia Mitchell, Department of Mathematical and Computational Sciences, The College of Wooster

Advisor: Dr. Asa'd As'ad



START

INTRODUCTION

- The video game industry has vastly expanded, especially in entertainment.
- Aims to explore how **controller design** influences both **user experience and accessibility**.
- Help further future research in the field of **human-computer interactions**
- Help guide controller and video game designs to provide a better user experience and to become more accessible to all.

BACKGROUND

- **Human Computer Interactions**
 - Explores how humans interact with different pieces of technologies and software [1].
 - Functionality, Usability, User Experience.
- **User Experience**
 - Human side of the interaction [2].
 - The overall experience that an individual has from interacting with something.
- **Accessibility**
 - Able to be easily obtained, used, or understood.
 - Technology compatibility, affordability, availability, and adaptability [3].

REFERENCES

[1]. Scott MacKenzie. Human-Computer Interaction: An empirical research perspective. Morgan K Kaufmann, 2024.

[2]. Niamh McNamara and Jurek Kirakowski. "Functionality, usability, and user experience: three areas of concern". In: Interactions 13.6 (Nov. 2006), pp. 26–28. issn: 1072-5520. doi: 10.1145/1167948.1167972. url: <https://doi.org/10.1145/1167948.1167972>.

[3]. Ole Goethe Adam Palmquist Izabella Jedel. Universal Design in Video Games: Active Participation Through Accessible Play. Springer International Publishing, 2024.

[4]. Lobna Hassan. "Accessibility of games and game-based applications: A systematic literature review and mapping of Future Directions". In: New Media & Society 26.4 (Nov. 2023), pp. 2336–2384. doi: 10.1177/14614448231204020. url: <https://doi.org/10.1177/14614448231204020>

[5] Nine Pines Animation. 2D Character Sprite Animation - Penguin. Standard Unity Asset Store EULA.

EXPERIMENT

- Tested the usability, functionality, user experience, and accessibility of four controllers by having participant use the controller in a small game while filling out a survey.
- Small video game comprised of 5 scenes:

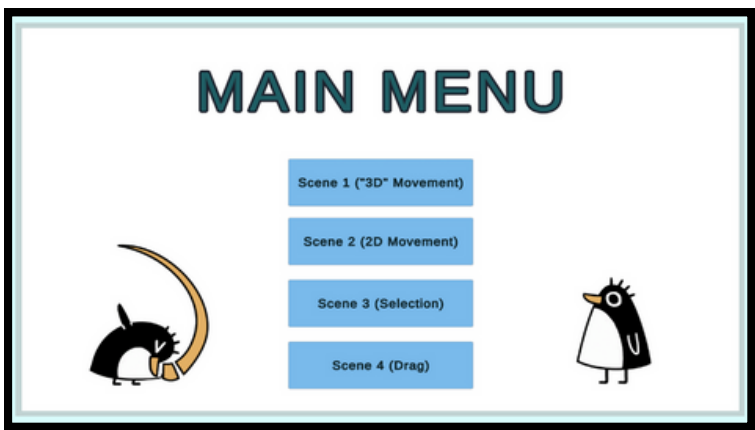


Figure 1: Main Menu Scene
(Connected all of the scenes).



Figure 2: Scene 1
(movement on x and y axes).

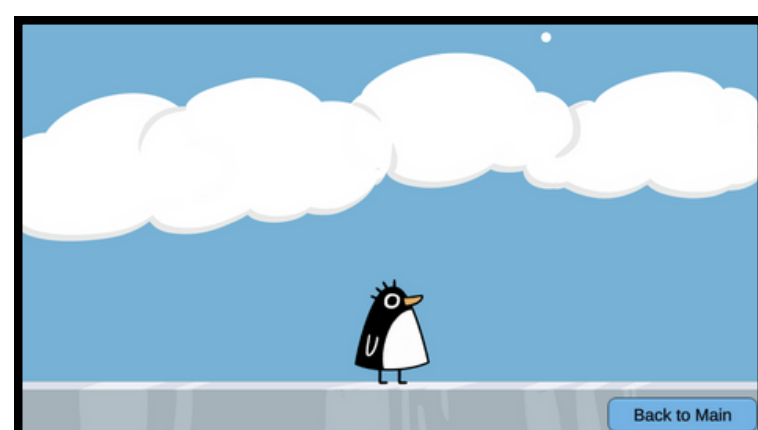


Figure 3: Scene 2 (movement
on only the x axis).

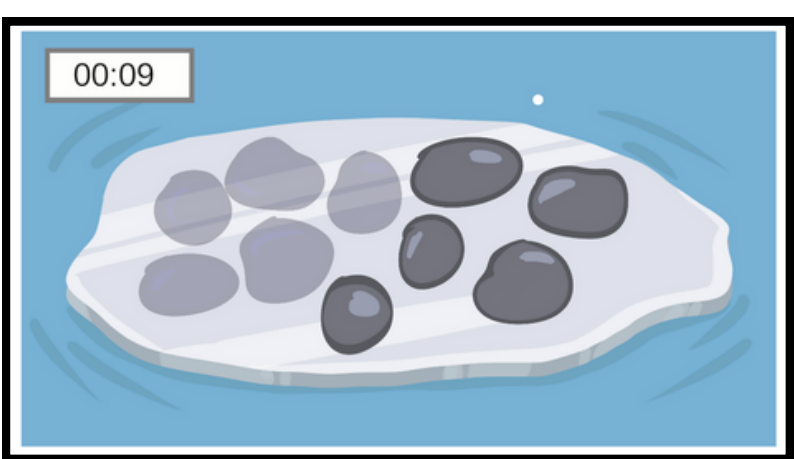


Figure 4: Scene 3 (Select).

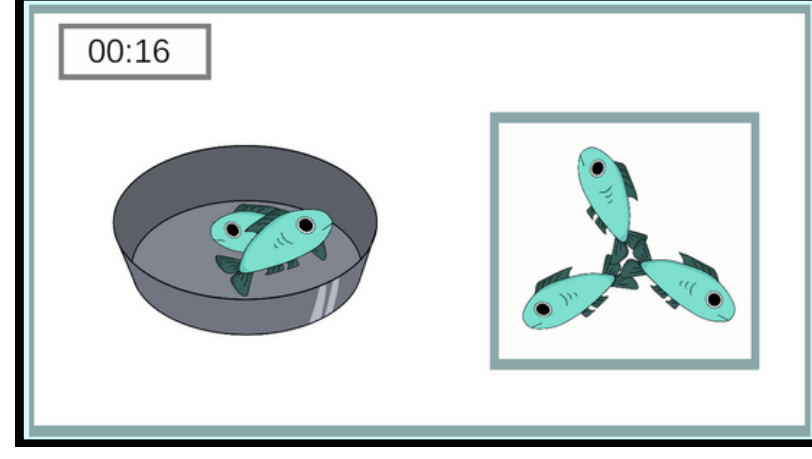


Figure 5: Scene 4 (Click,
Hold, and Drag).

- Survey comprised of 7 sections:
 - Demographics, Game Experience, Definitions, Controller 1-4, and Final Thoughts.
- Controllers tested:
- 23 Participants



RESULTS

- Controllers have an influence on both accessibility and user experience.
 - A lot of overlapping comments in the survey answers.
- Sensitivity and calibration are essential to improving user experience and accessibility.
- Familiarity played a major role in user experience.
- Most participants preferred the keyboard or Xbox controllers.

	Average Usability	Average Functionality	Average UX
Head Tracker	4.2727	4.1364	4.3182
Keyboard	9.0435	8.8182	8.9565
Voice	6.4583	6.7391	6.4583
Xbox	8.7826	8.5652	8.5652

Table 3: Displays the averages of participants ratings of usability functionality and average user experience (UX) for each controller.

Head Tracker	0
Keyboard	14
Voice	3
Xbox	8

Table 1: Displays what participants thought was the most accessible controller.

Head Tracker	2
Keyboard	10
Voice	1
Xbox	11

Table 2: Displays what controller participants thought provided the best user experience.

RESEARCH QUESTIONS

- How do video game controllers affect the user experience and accessibility of gameplay?
- Does accessibility affect user experience? In what ways does accessibility impede user experience?
- How do usability, functionality, user experience, and accessibility affect the users' overall experience with gameplay?
- Does familiarity or experience play a role in user experience? Does familiarity or experience influence a user's view on whether a particular controller is accessible?

FUTURE WORK

- Re-conducting this experiment with a more nuanced/detailed game.
- A more in-depth exploration of non-conventional controllers (this could include an eye tracker controller).
- Creating a new study looking into the bounds of adjustable settings.
- Looking into how familiarity affects a user's opinion of a controller.

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END