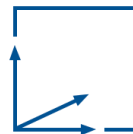


# A study on the effectiveness of different types of navigational assistance in video games when performing complex wayfinding tasks

Lucas Leder

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Final: Guided Research

Supervisor(s): Daniel Dyrda

# Introduction

- Navigational assistance is almost omnipresent in games
  - Which type is the most important?
  - Which variation of it is best?
  - Why is it best?
- Navigational factors:
  - Knowledge building
  - Wayfinding
  - Immersion

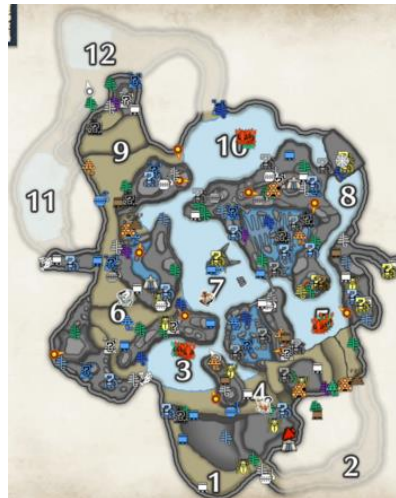
# Introduction

## ➤ Maps

- Most common type of navigational assistance
- Diegetic vs. Non-diegetic
- Popup vs. Minimap



[1] Grand Theft Auto V



[2] Monster Hunter: Rise



[3] Far Cry 2

# Agenda

- Related Work
- Goals of this Study
- Implementation
- Evaluation
- Future Work
- Conclusion

# Related Work

- Studies and papers on navigational assistance exist
  - Mostly focus on assistance itself
  - Seldom focus on differences between similar types of assistance
- Navigational assistance in games evolves with modern technology (Chączyńska et al., 2016)
- Visual wayfinding cues in 3D games are very effective (Moura et al., 2015)
- Immersive/diegetic wayfinding cues have the potential to outshine classical maps (Nisbet, 2016)

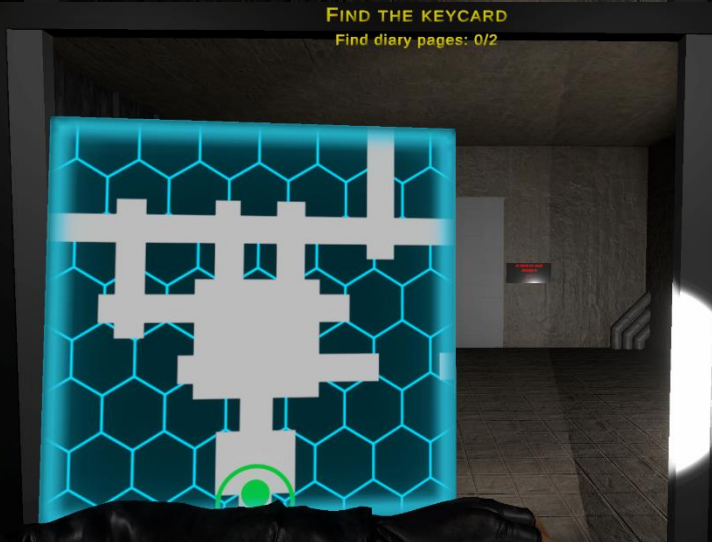
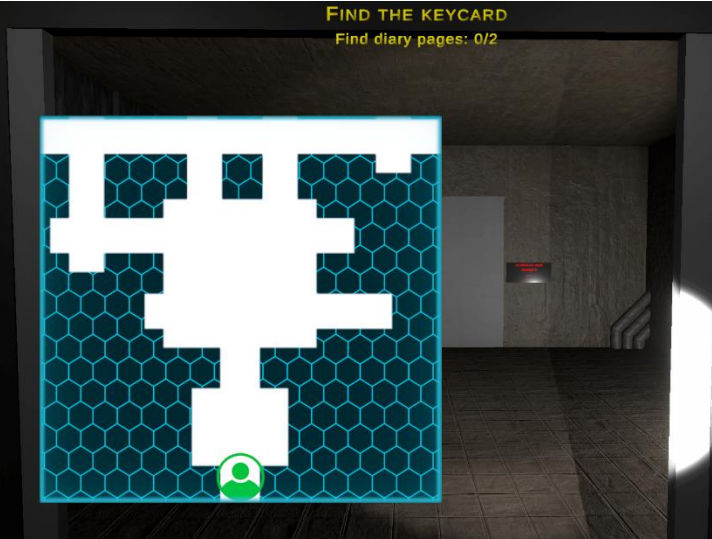
# Goals of this Study

- Check for differences between similar Wayfinding methods
  - Focus on maps
  - Evaluate “best” type
    - User feedback
    - User performance
- Provide a complex game environment
- Record interesting data

# Implementation

- Problem: Game with multiple map types required
- Solution: Development of the “Sewers” level of “The Facility”
- Requirements:
  - Atmospheric
  - Immersive
  - Difficult to navigate alone
  - Small yet notable amount of distinct maps

# Implementation



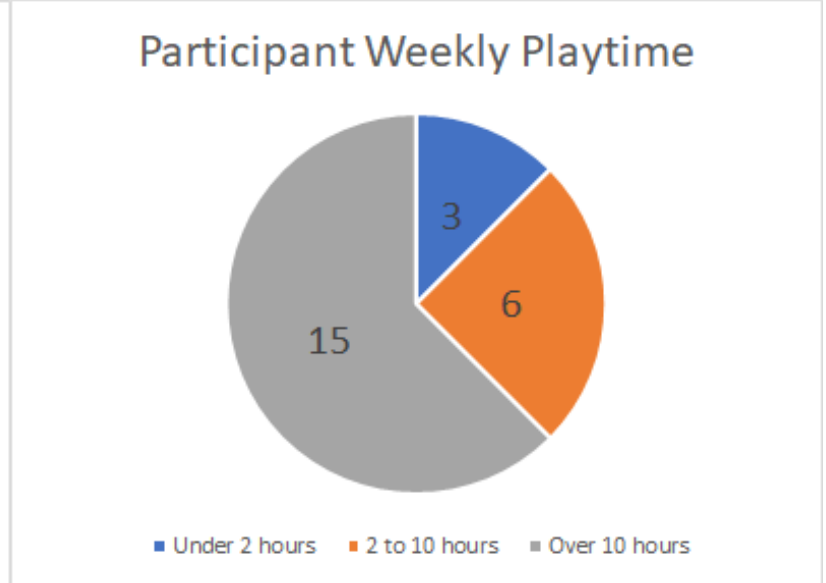
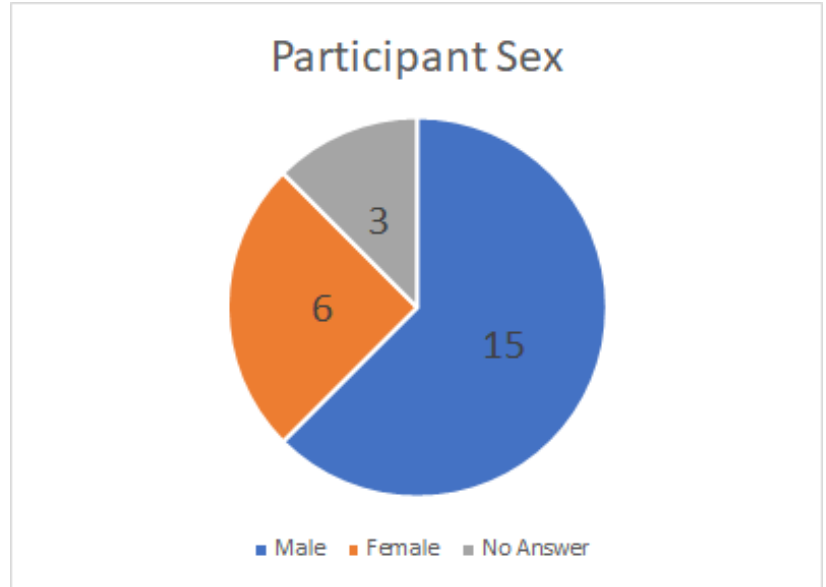
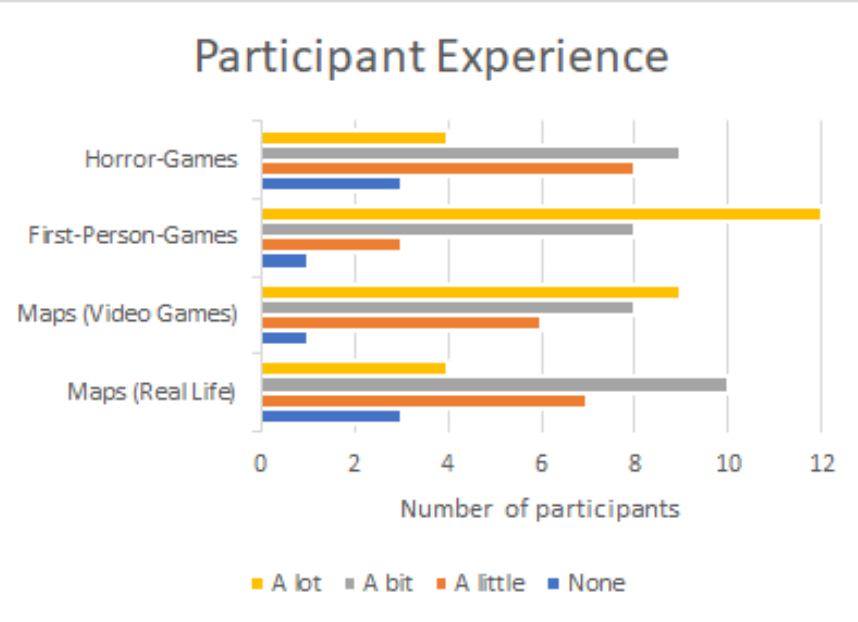


# Evaluation

- User Study
- Changes from the core level:
  - Players use each map instead of a single one
  - Players only play through the intro once
  - Players repeat the “Northern Labyrinth” once per map
  - The enemy is unable to kill the player
  - The enemy is removed from the “Northern Labyrinth”
  - Upon falling into the abyss, the player is teleported to the beginning of the study sequence
- Map Evaluation:
  - Game Experience Questionnaire (GEQ): In-game GEQ
  - System Usability Scale

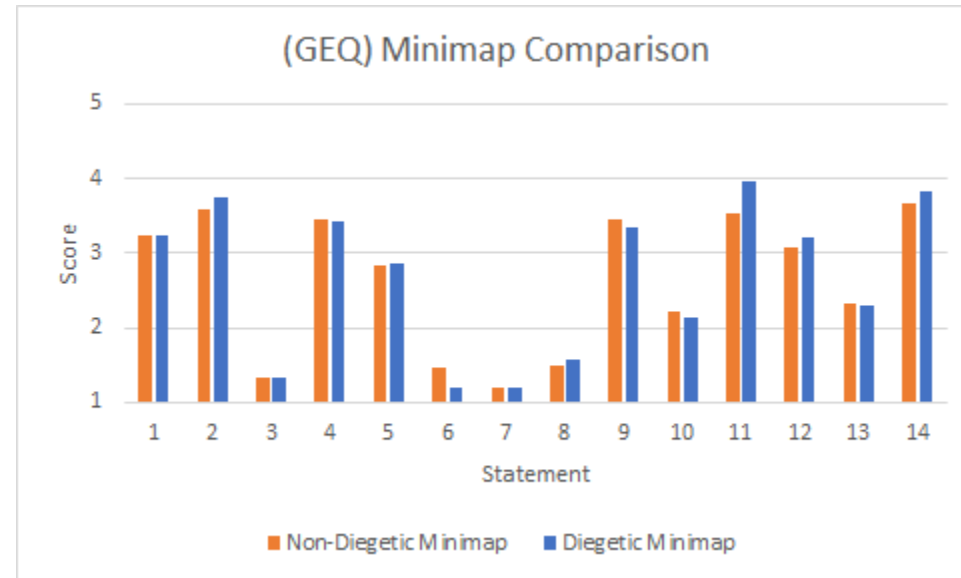
# Evaluation

- Demographics:
  - 24 Participants
  - Ages: 20 to 59
  - Average age: ~25



# Evaluation

- Minimap GEQ Results:
  - (2): “I felt successful”
  - (7): “I found it tiresome”
  - (9): “I felt skillful”
  - (11): “I felt content”
  - (12): “I felt challenged”
  - (14): “I felt good”

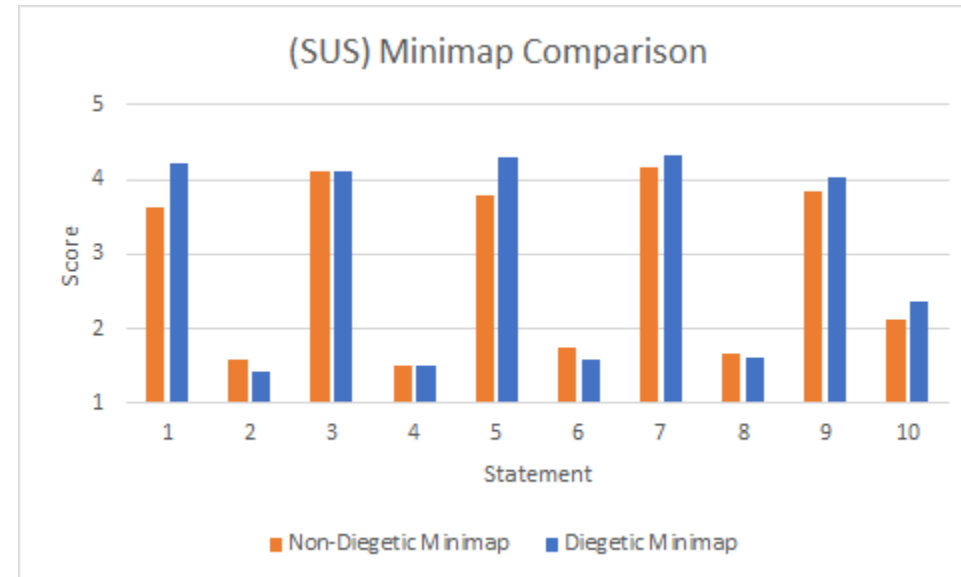


- Only small differences
- Diegetic Minimap slightly more difficult to handle, but more rewarding

# Evaluation

- Minimap SUS Results:

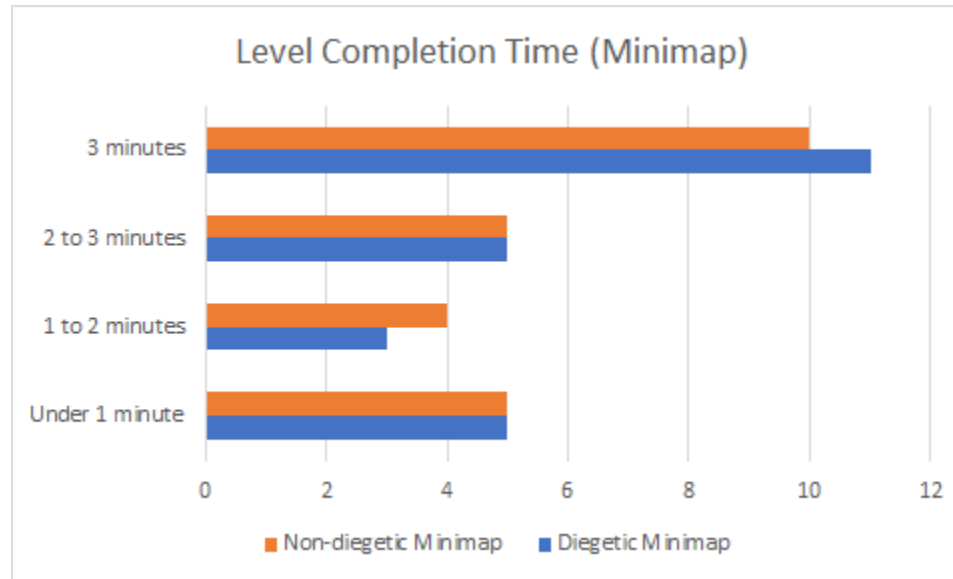
- (1): “I think that I would like to use this system frequently”
- (5): “I found the various functions in this system were well integrated”
- (9): “I felt very confident using the system”
- (10): “I needed to learn a lot of things before I could get going with this system”



- Same results as for the GEQ
- Non-diegetic map was perceived as slightly more complex and less consistent

# Evaluation

- Minimap Playtime
  - Non-diegetic average time: 2:12 min
  - Diegetic average time: 2:13 min

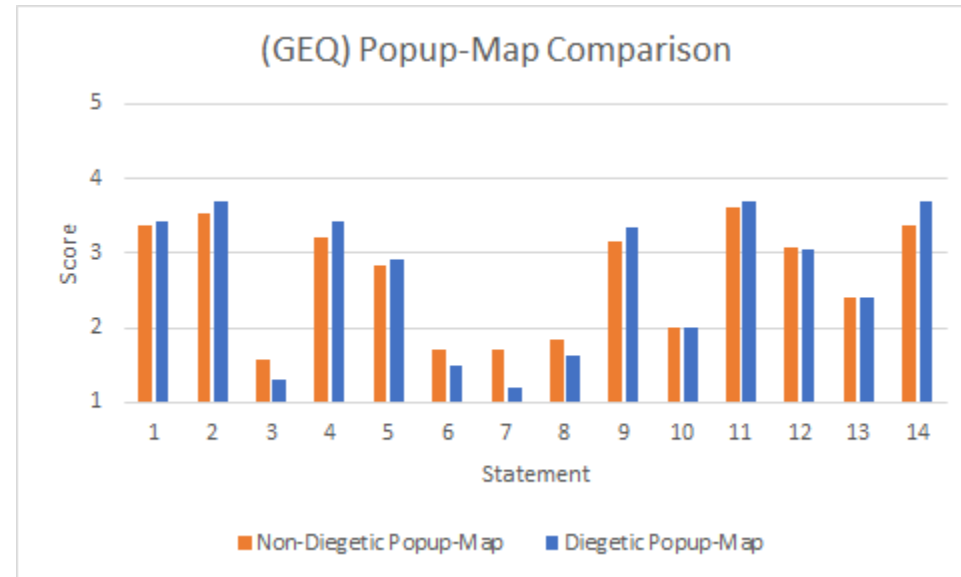


# Evaluation

- **Popup-Map GEQ Results:**

- (2): “I felt successful”
- (3): “I felt bored”
- (4): “I found it impressive”
- (6): “I felt frustrated”
- (7): “I found it tiresome”
- (8): “I felt irritable”
- (9): “I felt skillful”
- (14): “I felt good”

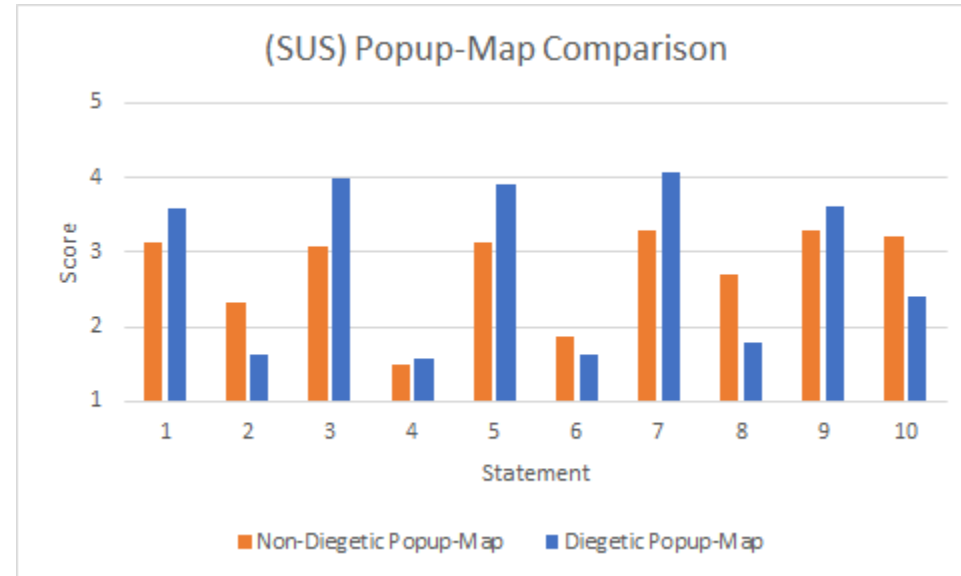
- Only small differences to each other, but noticeable differences to Minimap
  - Lower perceived skill
  - Higher perceived challenge



# Evaluation

- **Popup-Map SUS Results:**

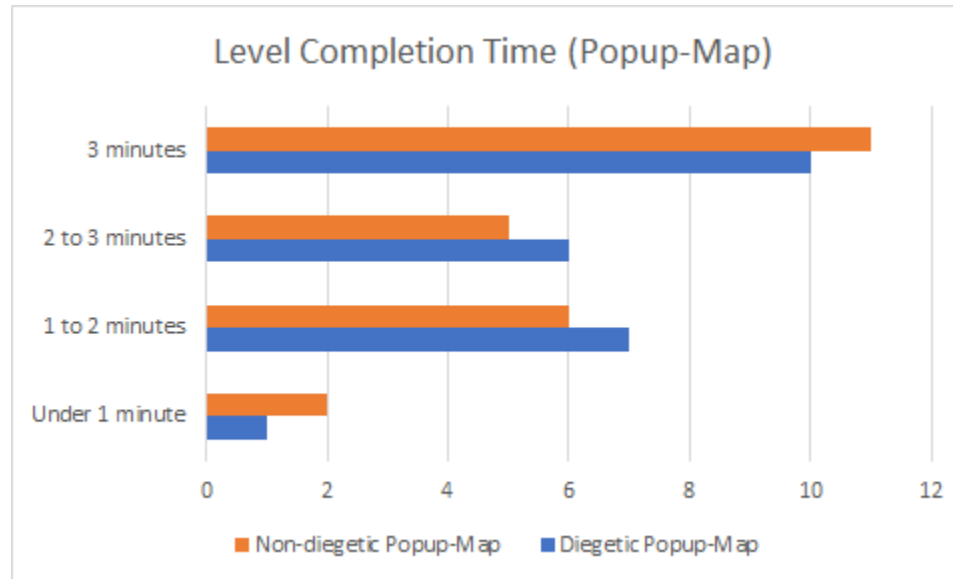
- (1): “I think that I would like to use this system frequently”
- (3): “I found the system was easy to use”
- (9): “I felt very confident using the system”
- (10): “I needed to learn a lot of things before I could get going with this system”



- Much larger differences than at GEQ
- Non-diegetic map was perceived as much more complex and difficult to use

# Evaluation

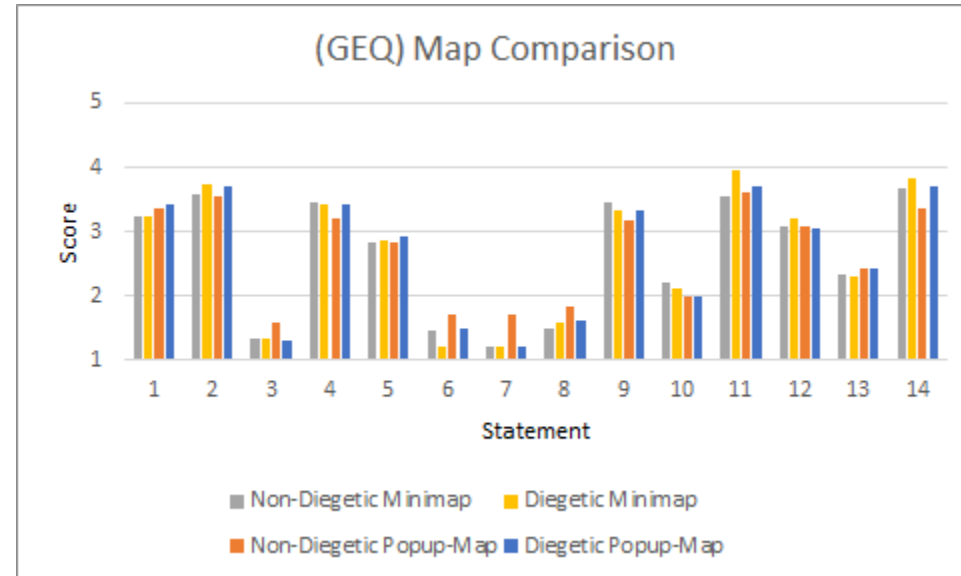
- Popup-Map Playtime
  - Non-diegetic average time: 2:18 min
  - Diegetic average time: 2:17 min





# Evaluation

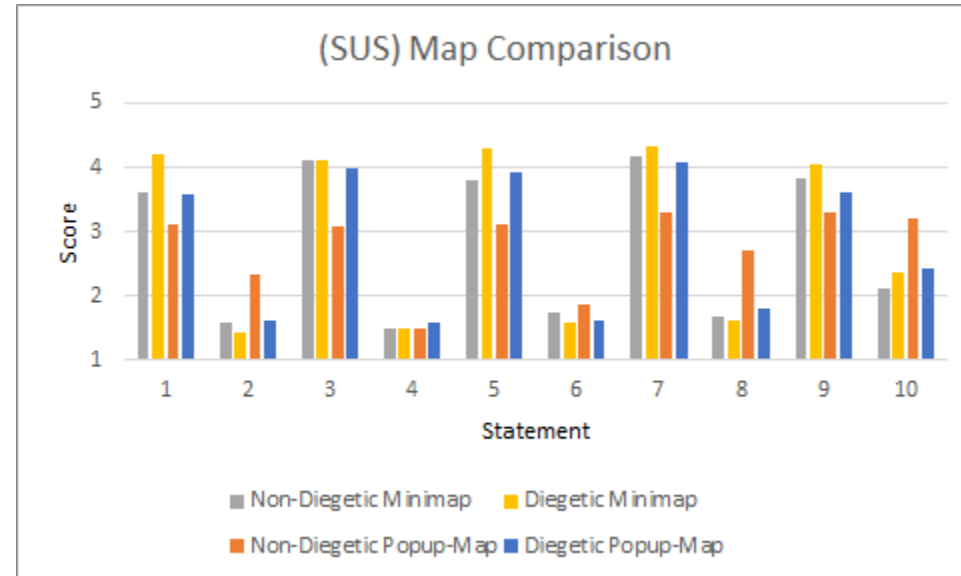
- Direct comparison (GEQ):
  - Generally quite similar
  - Largest differences at “negative” statements
  - (6): “I felt frustrated”
  - (7): “I found it tiresome”
  - (11): “I felt content”



- Overall:
  - Non-Diegetic Popup-Map rated the worst
  - Diegetic Minimap rated the best

# Evaluation

- Direct comparison (SUS):
  - Multiple large differences
  - (3): “I thought the system was easy to use”
  - (5): “I found the various functions in this system very well integrated”
  - (8): “I found the system very cumbersome to use”



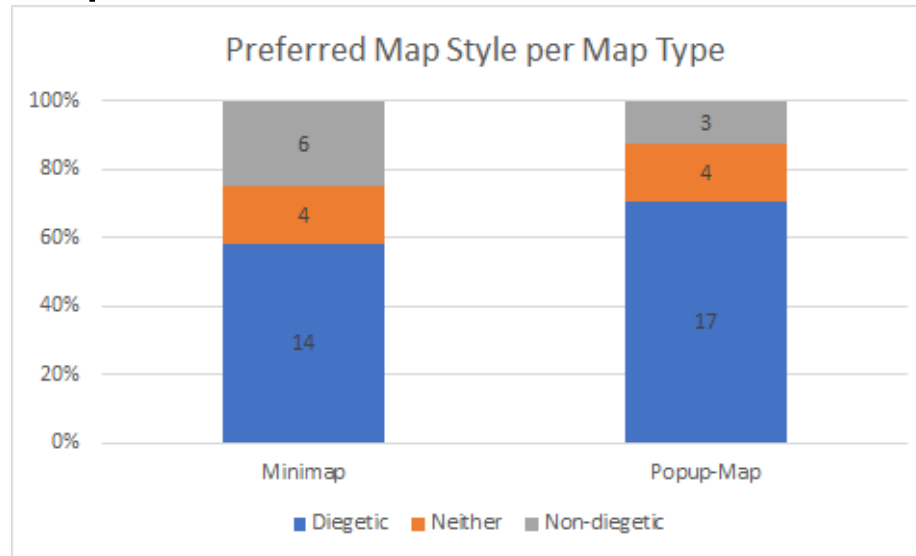
- Overall:
  - Non-Diegetic Popup-Map rated the worst
  - Diegetic Minimap rated the best
- Same as for GEQ

# Evaluation

- Playtime comparison:

	Diegetic	Non-diegetic
Minimap	2:13	2:12
Popup-Map	2:17	2:18

- Preferred maps:



# Future Work

- Further Testing
  - Larger dataset could solidify findings
  - Specific demographic groups highly vary in performance
- Addition of new varying level environments
  - Procedural generation
  - Varying level aesthetics
  - Either pre-seeded or completely random
- Evaluation of other navigational assistances
  - Voice/Acoustic Guidance
  - Diegetic arrows and lines

# Conclusion

- Most useful map:
    - Lowest average time: Non-diegetic Minimap
    - Highest user satisfaction: Diegetic Minimap
  - Least useful map:
    - Highest average time: Non-diegetic Popup-Map
    - Lowest user satisfaction: Non-diegetic Popup-Map
- 
- Minimaps are generally easier to use
  - Diegetic maps are generally preferable

# List of References

1. (Thumbnail) [https://www.youtube.com/watch?v=vJWZo0yk\\_Ok](https://www.youtube.com/watch?v=vJWZo0yk_Ok)
2. (Screenshot) <https://game8.co/games/Monster-Hunter-Rise/archives/316099>
3. Rotzetter, Francine. (2018). Nonverbal Guidance Systems Seamless Player-leading in Open-world Games. 10.14361/9783839443040-009.
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5. Moura, Dinara, and Lyn Bartram. "Investigating players' responses to wayfinding cues in 3D video games." *CHI'14 Extended Abstracts on Human Factors in Computing Systems*. 2014. 1513-1518.
6. Nisbet, Brett. "Immersive Wayfinding Cues for 3D Video Games." (2016).