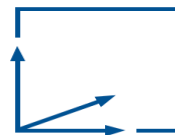


# Communication and Interaction Methods for Virtual Courses

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18.11.2021



Final: Master Informatics: Games Engineering

Supervisor: Prof. Gudrun Klinker, Ph.D.

Advisor: Daniel Dyrda, M.Sc.

# Motivation – Current Educational Situation



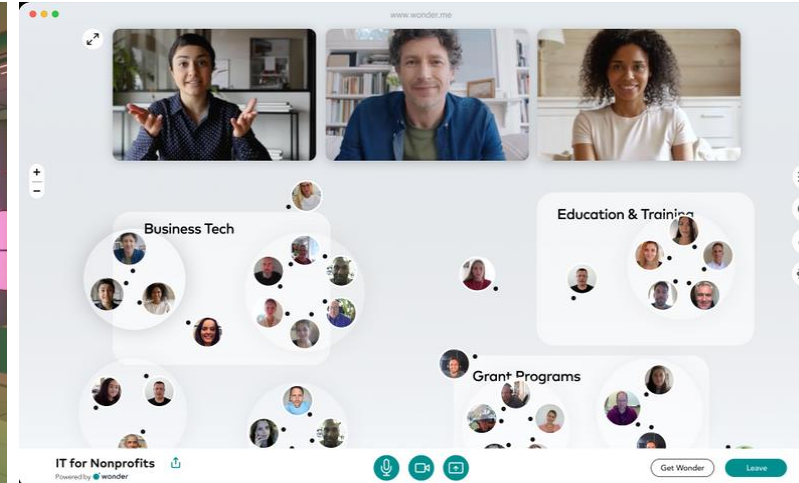
Issues: Lack of personality expression, communication and social interaction, Zoom fatigue (Fauville et al., 2021, forsa, 2020; Kuhn, 2021; Milheim, 2012)

# Recent Platforms

Mozilla Hubs



Wonder.me



Gather.town



Remo





## Related Work



River City (Dede et al. 2004)



Quest Atlantis (Barab et al. 2005)

MUVEs: “enable multiple simultaneous participants to access virtual contexts, to interact with digital artifacts, to represent themselves through "avatars", to communicate with other participants and with computer-based agents, and to enact collaborative learning activities of various types” (Dede et al., 2004, p. 1)

## Goals of this Thesis

1. Development of an online virtual world prototype
  - Offer 3D game space
  - Offer avatars as user representation
  - Be playable online
2. Integration of a proximity system
  - Basis for safe and interactive user interaction
  - Enable sense of community
  - Text, Voice, Emote chat
3. Demonstrate and explore opportunities for future applications



# Research Issues

1. Key features of virtual worlds and virtual learning environments
2. Design criteria for game spaces and its support for community interaction
3. Role of proximity in the prototype and safe implementation
4. Improvement of self-expression and representation through avatars

# Theoretical Background

- Sense of **Presence** - “*Being there*” (Schroeder, 2008, p. 2)  
How oneself subjectively experiences being in that exact environment, even though being physically situated in another. (Slater, 1999)
- Sense of **Social Presence** - “*Being there together*” (Schroeder, 2008, p. 2)  
“*The degree to which a person is perceived as “real” in mediated communication*”  
(Richardson & Swan, 2003, p. 70)
- **Immersion**  
Ability of technology to deliver an experience that will lead to sense of presence.  
(Slater, 2003)
- **Embodiment**  
Actions of users carried out through their avatars make players feel embodied within their character. (Benford, Bowers, et al., 1995)

# Virtual Campus App



Offline Scene - Home



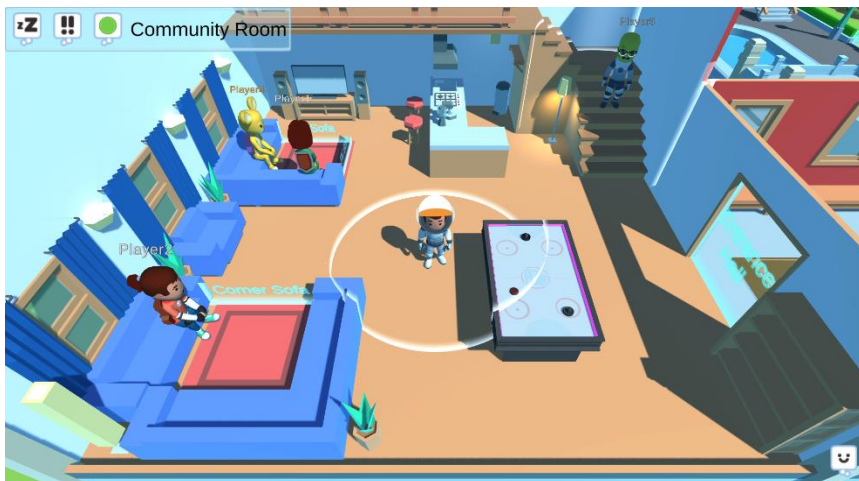
Online Scene - Campus

- Built with Unity3D + Mirror Networking
- Mumble open-source voice chat

- Host-client structure
- Open-source assets



# Game Space Design



**Push-Pull Principle**  
(Feil & Scattergood, 2005)

**Landmarks**  
(Schell, 2015)

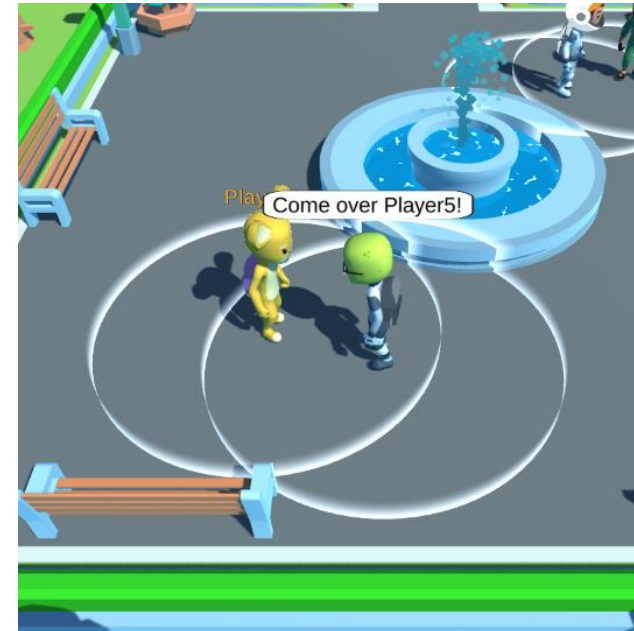
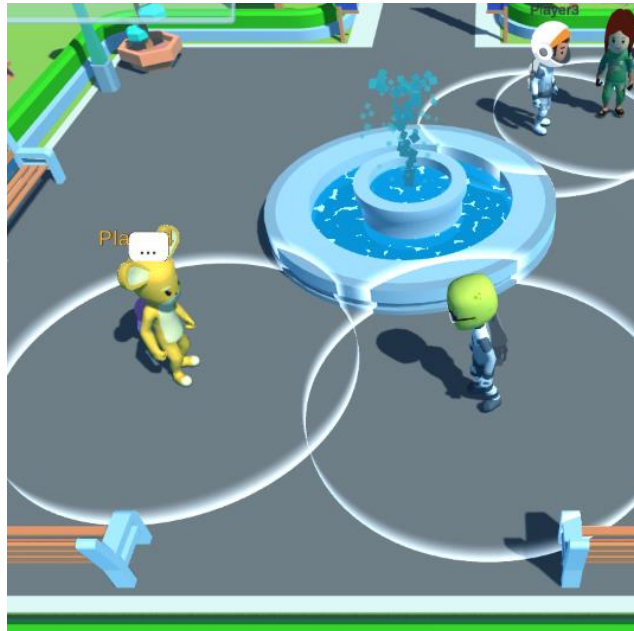
**Promenade Pattern**  
(Alexander, 1977)

**Dead-Ends**  
(Schell, 2015)

# Proximity

„The physical distance between people measured in units such as inches, meters, or miles.“  
(Kiesler and Cummings, 2002, p.58)

- + Awareness of privacy
- + Spatial distribution and group forming
- + Positive impact on relationships and natural interaction



# Proximity Chat Variants



Discrete



Continuous

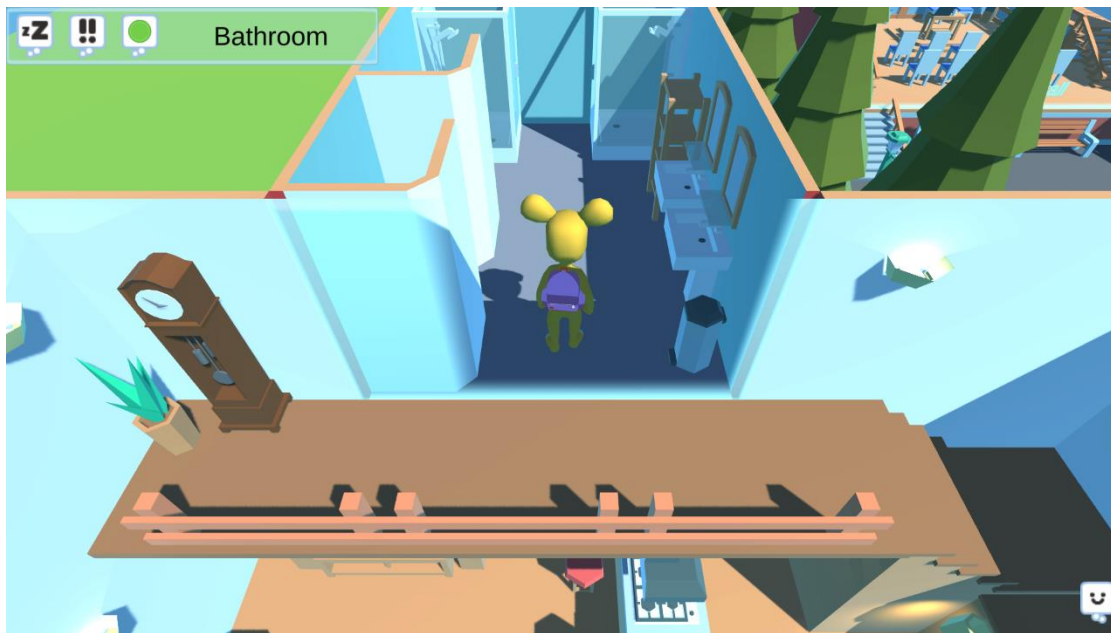
Room defines availability of

- Spatial chat
- Room chat
- Broadcast

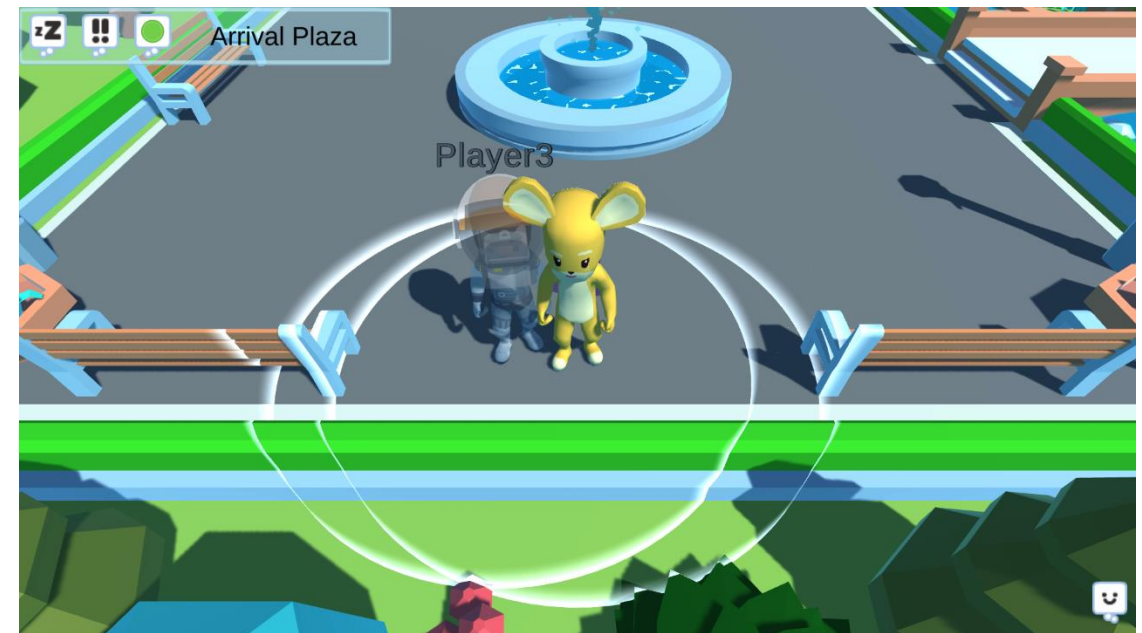


# Personal Space

*„At nearly zero distance, people in most situations are very uncomfortable.“*  
 (Kiesler and Cummings, 2002, p. 60)



Private room that hides all other players, while oneself is hidden for others



Protecting personal space, other characters turn translucent on contact

# Avatars



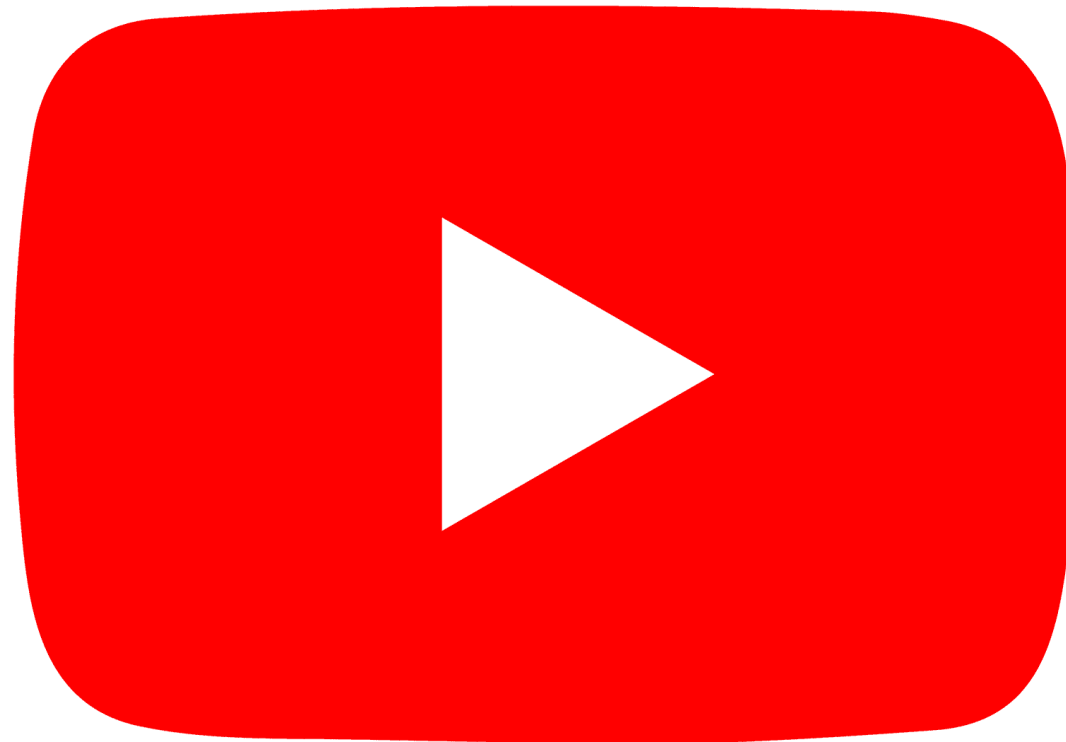
Avatars are mediators of communication and provide necessary cues for co-communicators. (Benford, Bowers, et al., 1995)

One has to feel connected and identify with the “*aesthetics, appearance, customization and representation.*” (Kolesnichenko et al., 2019, p. 249)

➡ Single most defining feature for constructing identity, experienced embodiment and presence.



# Trailer



## Discussion

- Suffices all virtual world definition features but one:  
“*synchronous, persistent network of people, represented as avatars, facilitated by networked computers*” (Bell, 2008, p. 2)
- Proximity circle can be cluttering and create awareness mismatch:  
Improve by making circle more subtle + transformable
- Lack of peripheral awareness cues for spatial emoji messages + voice chatting  
Increased social presence through meaningful animations
- Includes text, voice and emoji chat, but no video chat  
Might actually be beneficial for preventing constant self-reflection

## Conclusion

- **Provided a standalone social online virtual world**
  - Explores concepts for better social communication in online education
  - Allows interactions through text and voice chat or non-verbal communication
  - Included avatars as user representation that allow identity formation
  - Demonstrated a proximity system that defines more natural ways of interactions
  - Game space is designed to increase player encounters on the map
  - Offers ways of protecting one's privacy online (avatar, private room, personal space)
  - Easy to adapt program for other applications like conferences, work, socializing etc.

## Outlook

- Test the Virtual Campus App side to side with a Uni course and evaluate it's feasibility
- Integrate LMS into the app and embody interactions in the environment
- Integrate themed maps suitable for situated learning: avatars as embodied icebreakers
- Does self-studying in an online environment such as the library improve study outcomes or concentration?
- Offer more privacy options such as muting others/increasing personal space
- Add more game/gamified features for immersion!





# Questions?





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# Issues of Proximity

