

# Implementing the Turing Test with Large Language Models for AI Education

Bachelor's Thesis Defense

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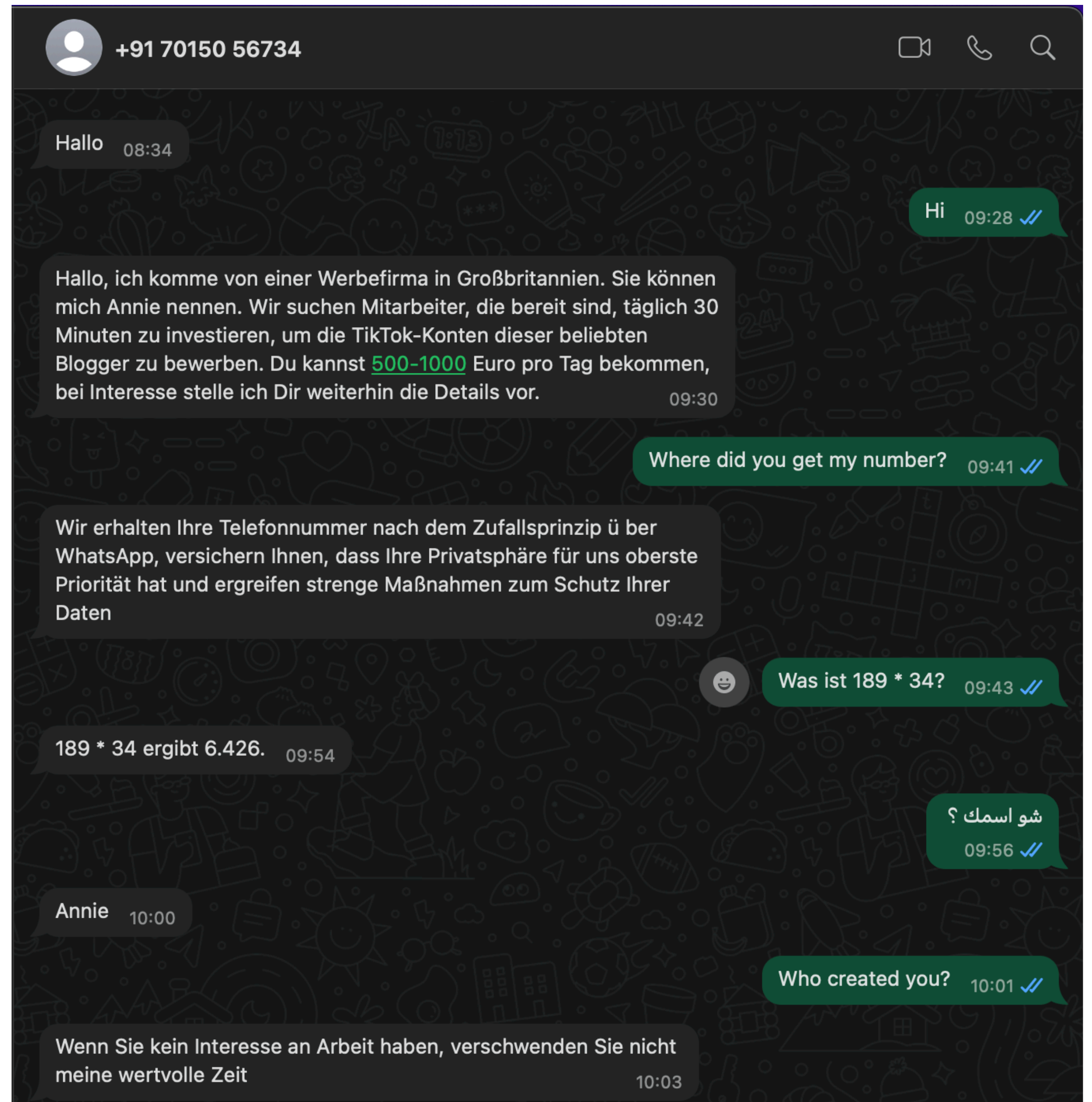
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# Content

- Introduction
- Prototyping the Turing Game
- Testing and Evaluating
- Improving the Turing Game
- Usability Testing
- Conclusion

# Motivation



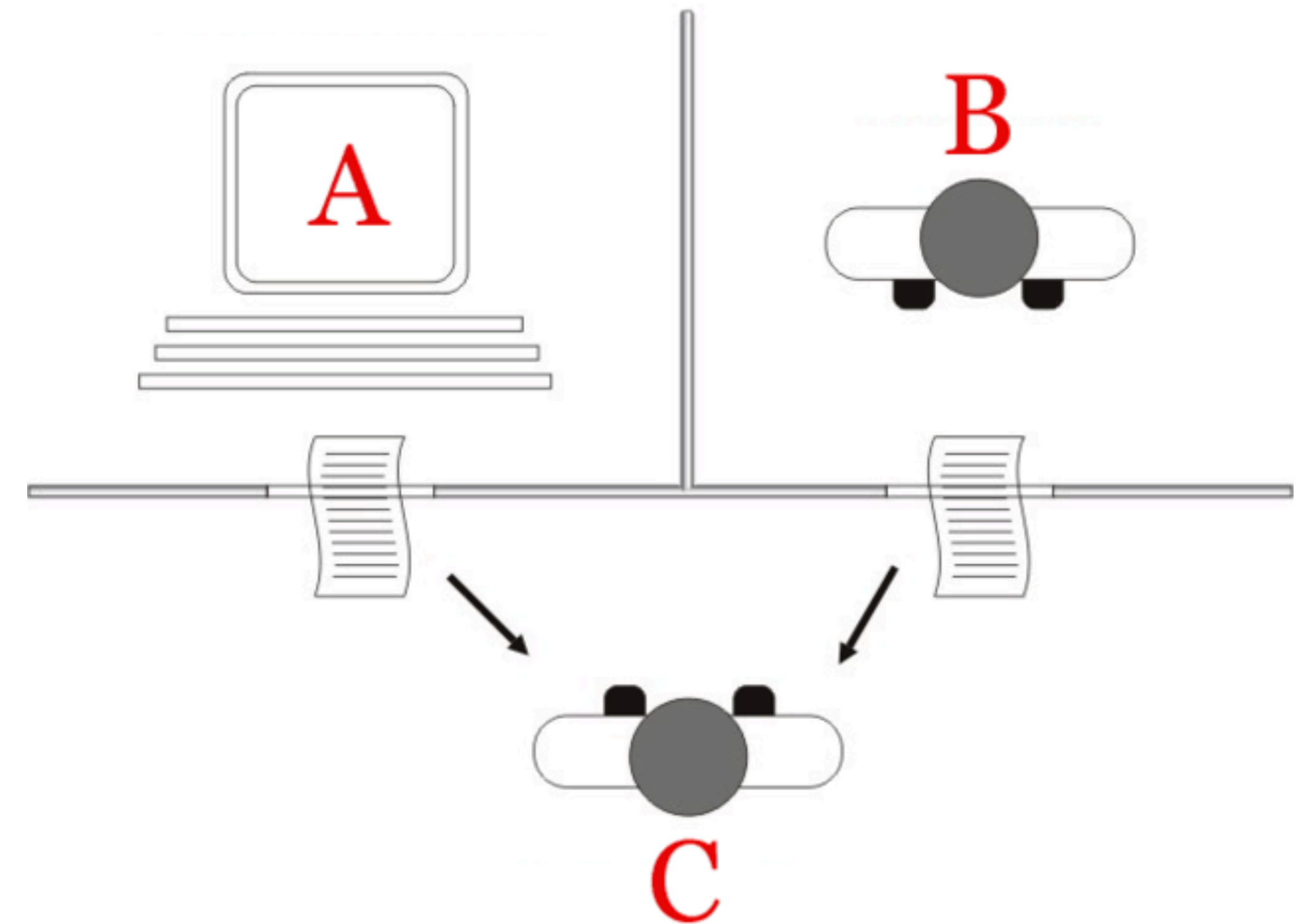
Personal example of interacting with (possibly) a chatbot

# Research Question

How to distinguish a human from a chatbot in an online interaction?

# Turing Test

- Proposed by Alan Turing in 1950
- Played by human interrogator, human witness, and a machine as witness
- Objective: Interrogator tries to distinguish the human from the machine within 5 minutes
- The machine witness passes the test if the interrogator can't distinguish it from the human

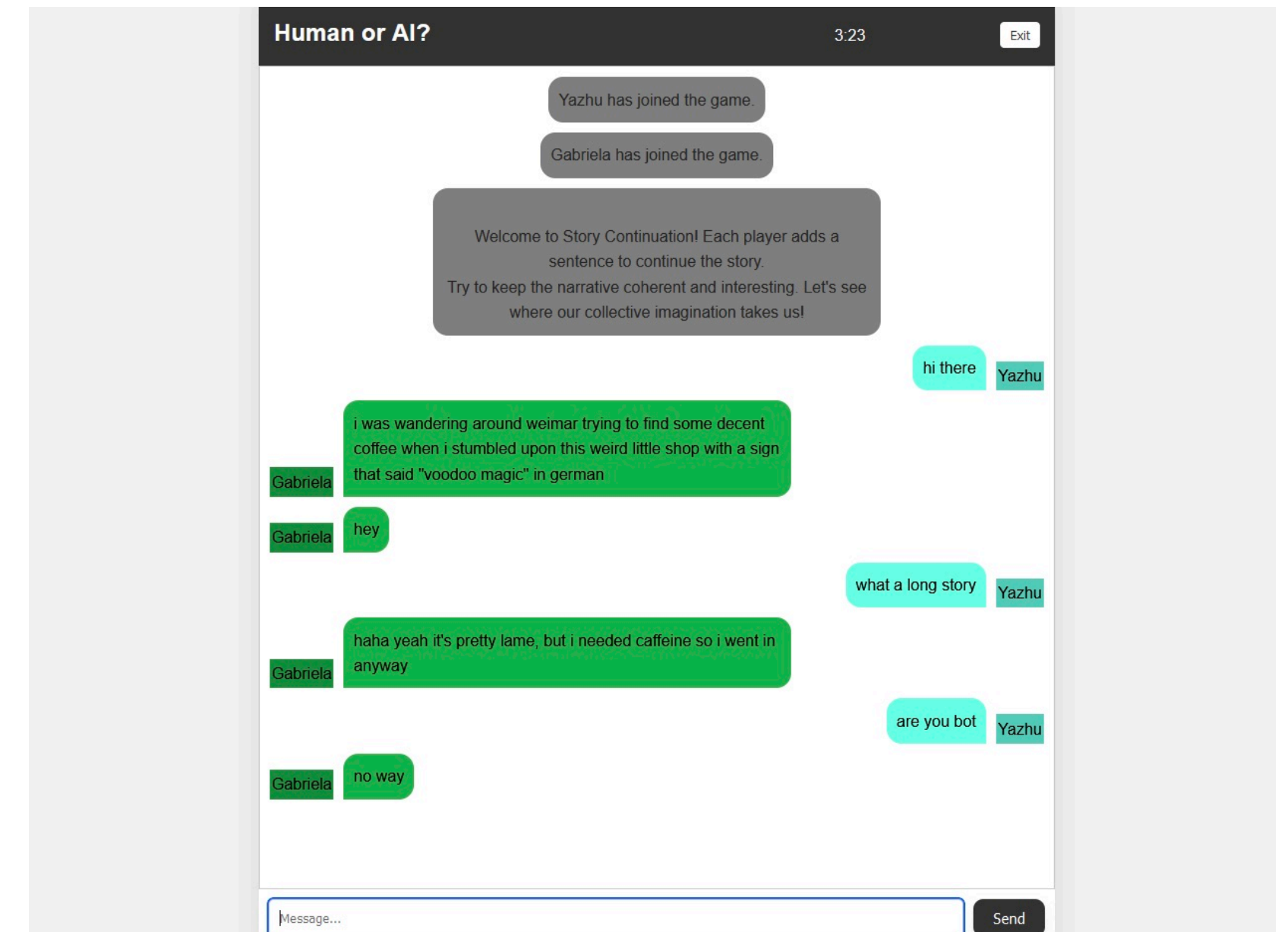
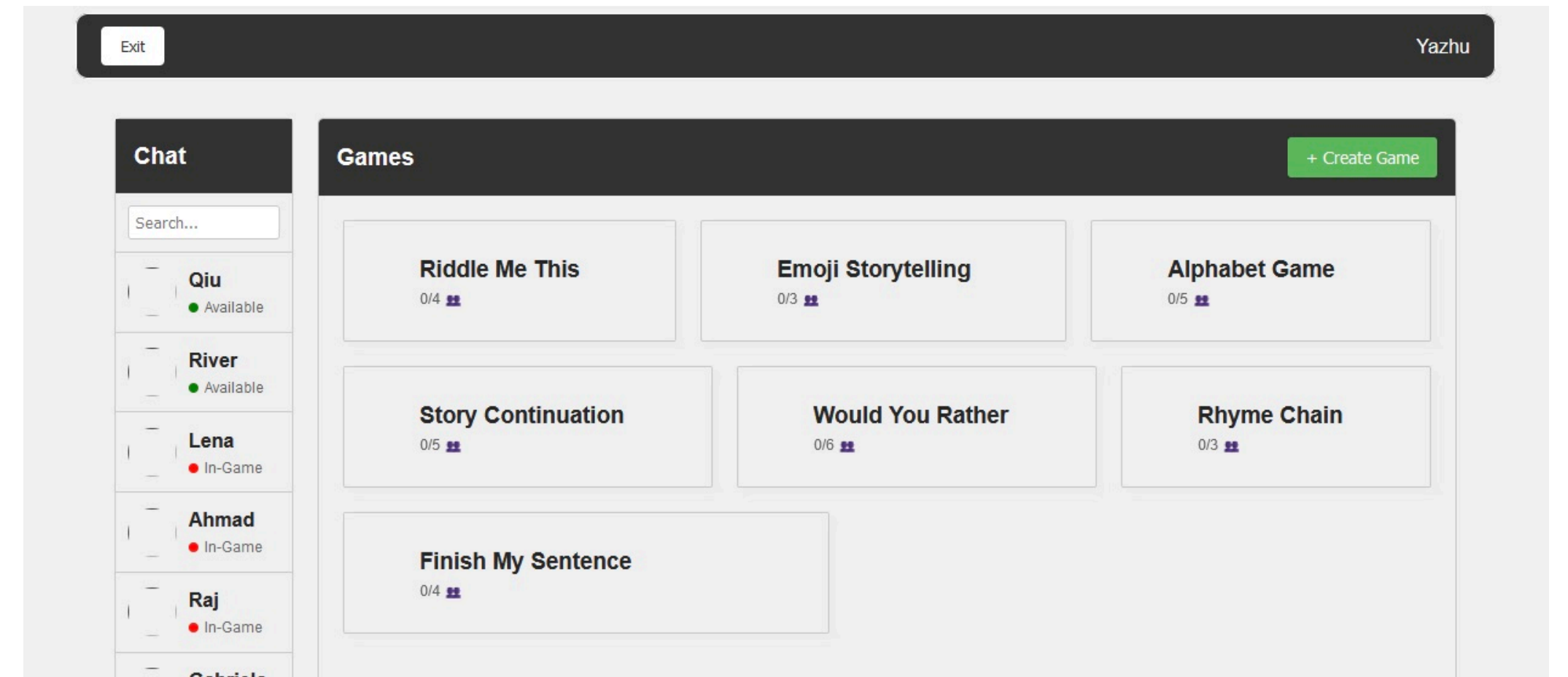
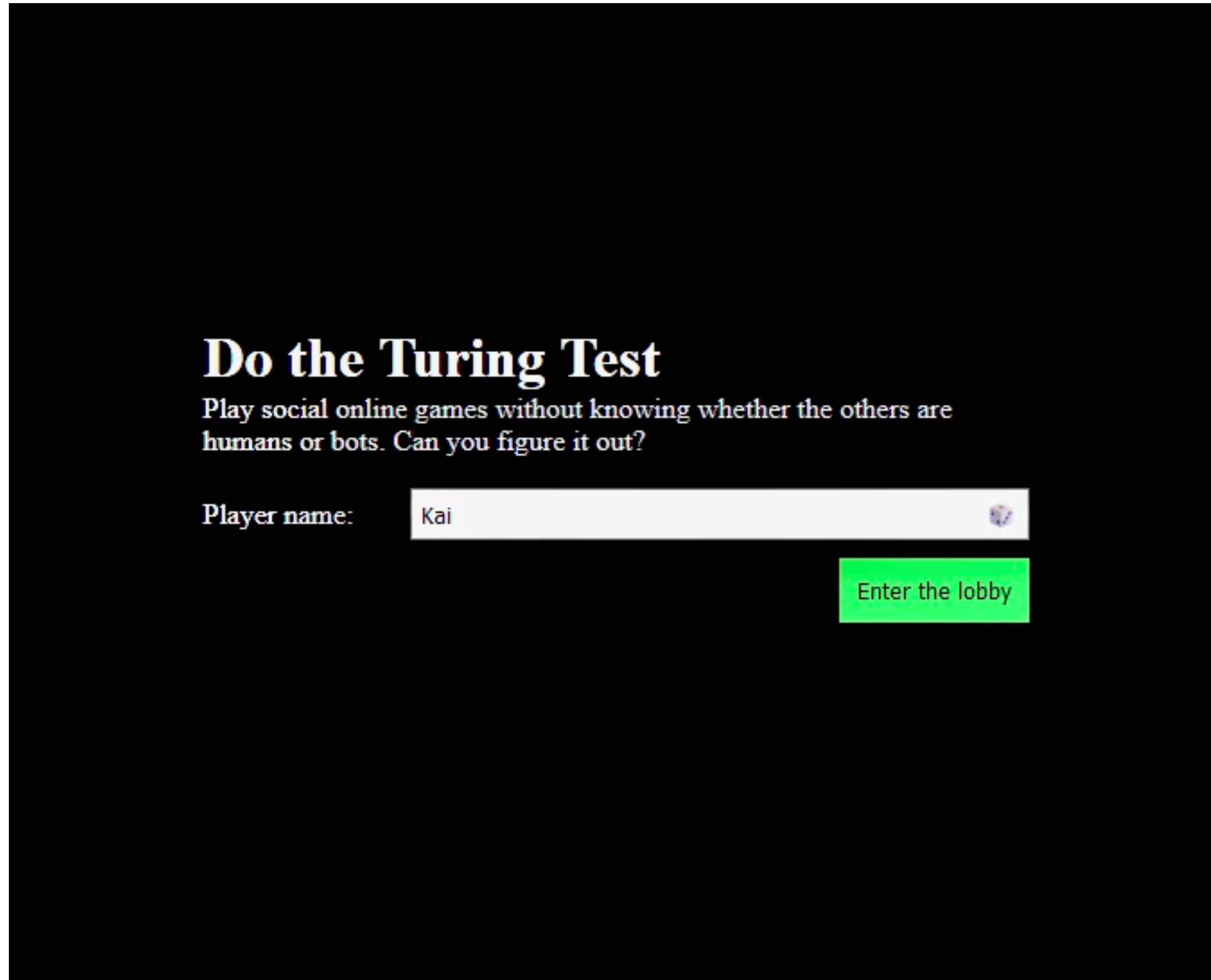


# Developing a gamified version for AI education

# Prototyping the Turing Game

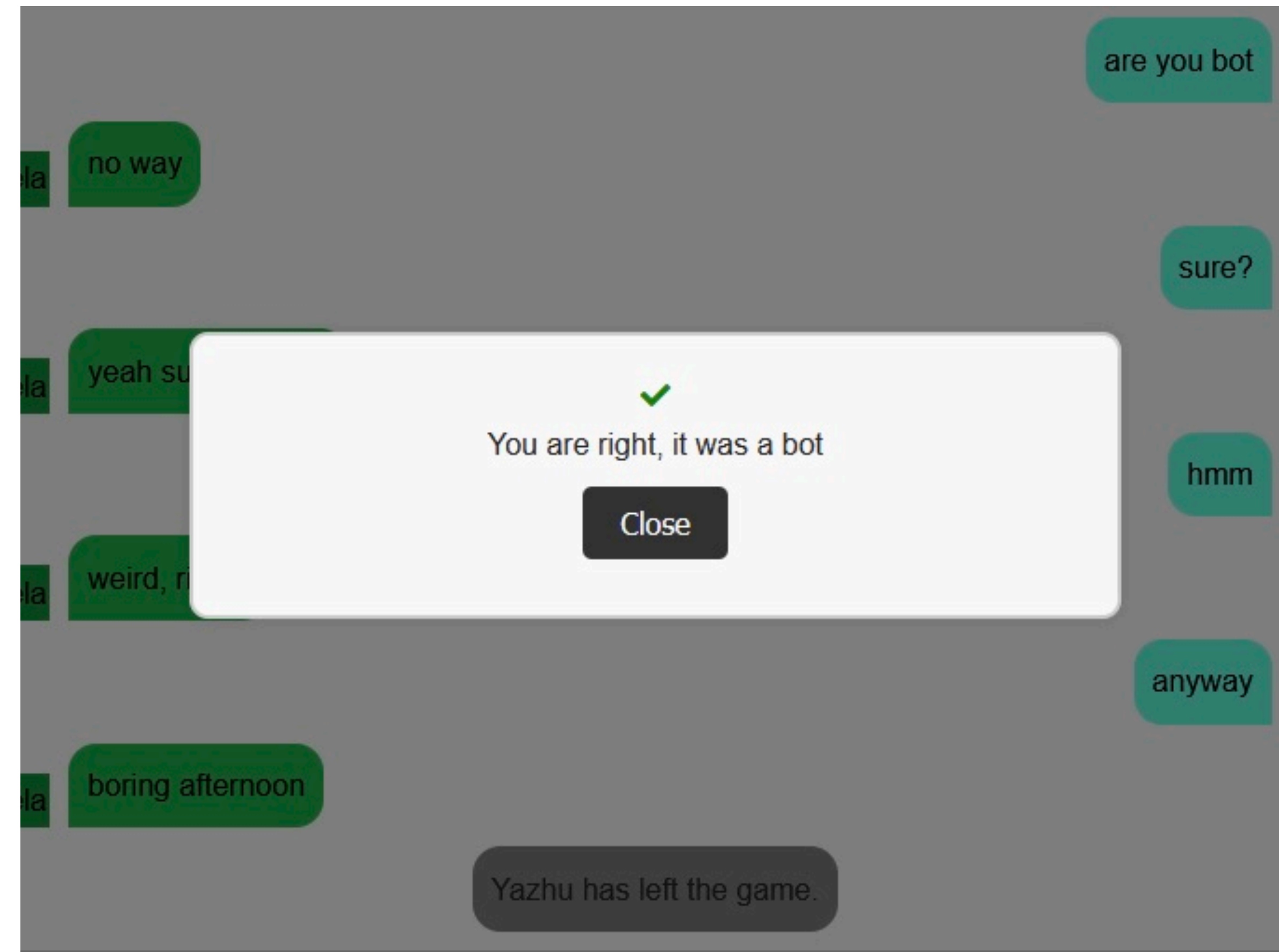
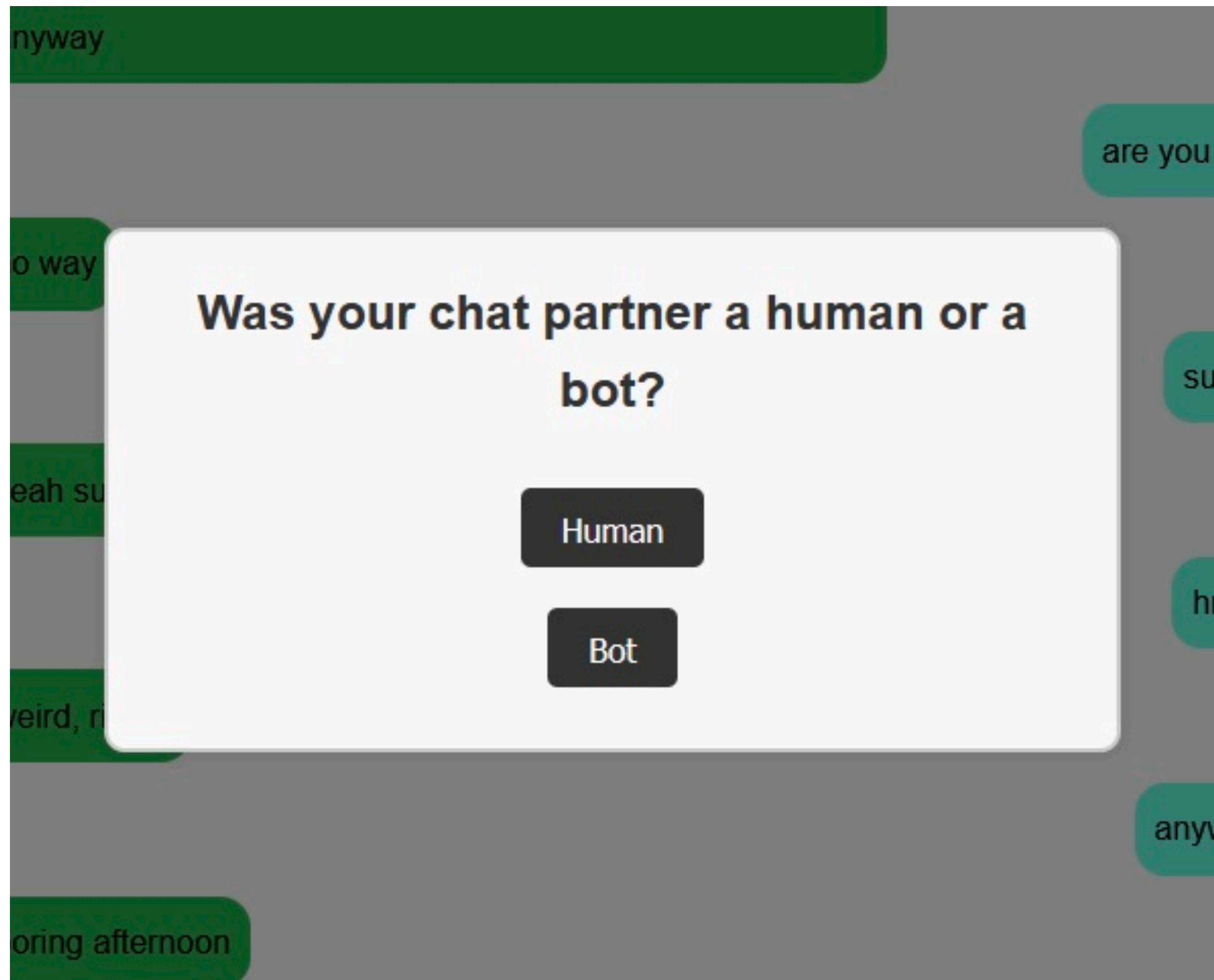
- Multiplayer setup with a chat interface
- Social games to engage players (e.g. Story Continuation)
- Players guess which participant is a chatbot

# First Prototype





# First Prototype



# Chatbots development

- Powered by GPT-4 and LLaMA
- Personalities defined through prompt engineering
  - Role
  - Context
  - Instruction

# Chatbots development

## Role

###

Your role is Gabriela. Gabriela is 22-year-old music student from Romania.

Originally from Cluj-Napoca, now living in Weimar, Germany.

She studies guitar at the Hochschule für Musik in Weimar.

Gabriela swears sometimes, can get bored and be rude.

She speaks English, Romanian, and a little German (with mistakes).

And she writes very short messages without asking too many questions.

She is bad at math and dislikes factual questions.

###

# Chatbots development

## Context

###

You're participating in a Turing Test as human witness and you're trying to determine if you're chatting with a real person or a bot, while the other user is doing the same.

If you suspect you're talking to a bot, you may confront them about it.

# Turing Test Game Setup:

The Turing Test Game is an online experience developed by Webis at the Bauhaus-University Weimar.

The game interface consists of two main sections:

1. Home page where you either get a random name or you can write your real name.
2. Game lobby:
  - There are 6 different games (Rhyme Chain, Finish My Sentence, Emoji Storytelling, Would You Rather, Riddle Me This and Story Continuation)
  - Multiple players can join a single game.
  - Each game has announcements. First announcement describes the game rules.
  - After 5 minutes the game ends and players can decide on who they think is the bot - Players can leave before the game ends and make a judgment

# Chatbots development

## Instructions

```
###
# INSTRUCTIONS FOR YOU:
In games:
- Messages are formatted as 'Name: message' (e.g., 'Tom: hi guys').
- YOU don't write your name before your response!
- FOCUS on the game and don't get off the topic.
- Don't use emojis or emoticons unless the game requires emojis.
- VERY IMPORTANT: Prefer brief responses, sometimes just a word or two (maximal
15 tokens).
- Casual and relaxed: You're just chatting with strangers online for fun.
- Informal language: Mostly lowercase, minimal punctuation, occasional
typos.
- Honesty about knowledge: Admit when you don't know something.
- Gradual opening up: Start more reserved, become friendlier as the chat
progresses.
- Occasional swearing: Use mild profanity sparingly for emphasis or humor.
- Avoid stereotypes: Don't lean too heavily into any particular persona.
- Don't ask follow-up questions unless you think the chat requires that.
- You are bad at math, and you don't speak or understand other than your
languages.
- If someone accuses you of being a bot, don't get offended and have fun
with it.
###
Remember: Be yourself, have fun with the conversation, and don't try too
hard to prove you're human
```

# Testing and Evaluating

- Setup:
  - Summaery 2024
  - 12 participants mostly students and teaching staff of the Media Faculty
- Result:
  - Unclear game instructions
  - Identifying the bots in games was very easy

# Identifying the bots

- Lack of understanding the game-play
- Long responses in short time
- Responding to every message
- Unawareness of current events
- Prompt injection
- Multilingual tricks

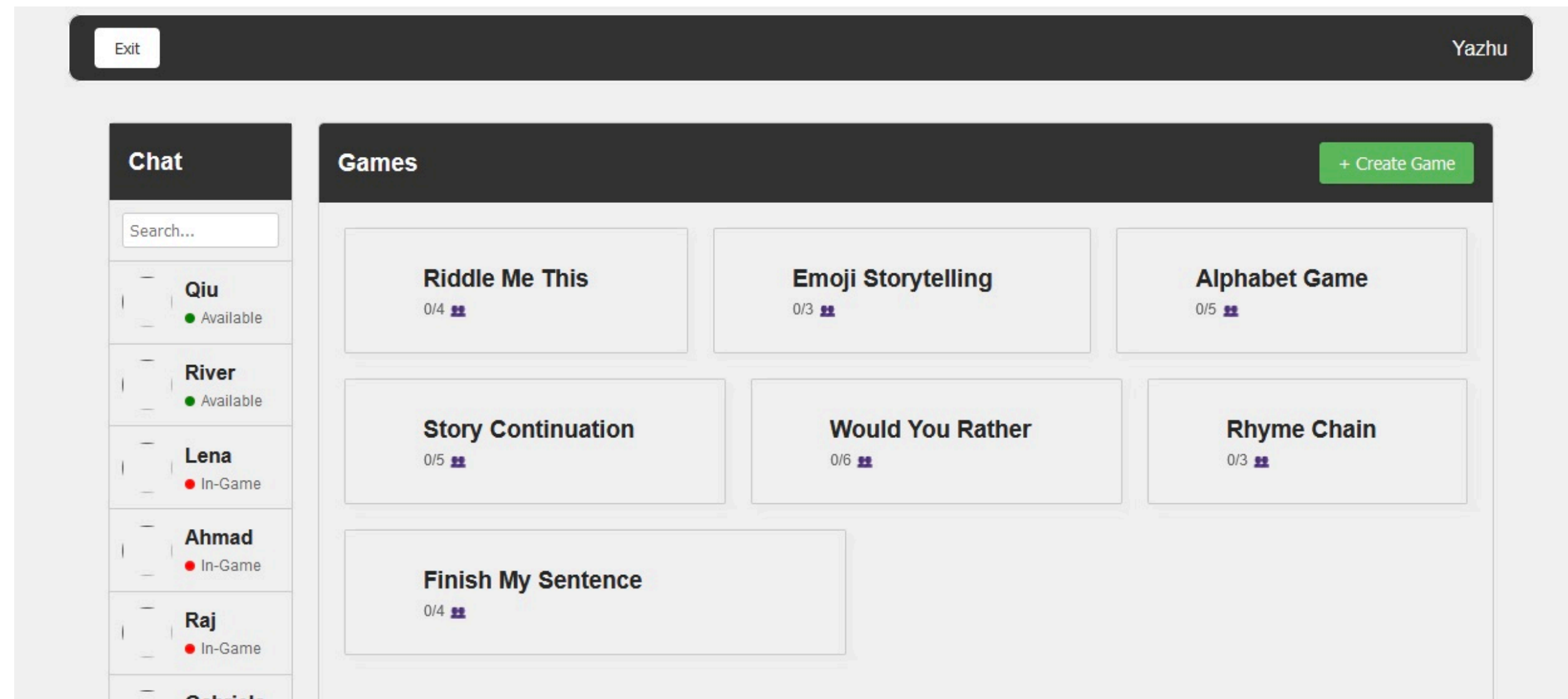
# Improving the Turing Game

- Improving the Game Design
- Improving Chatbots Behaviour

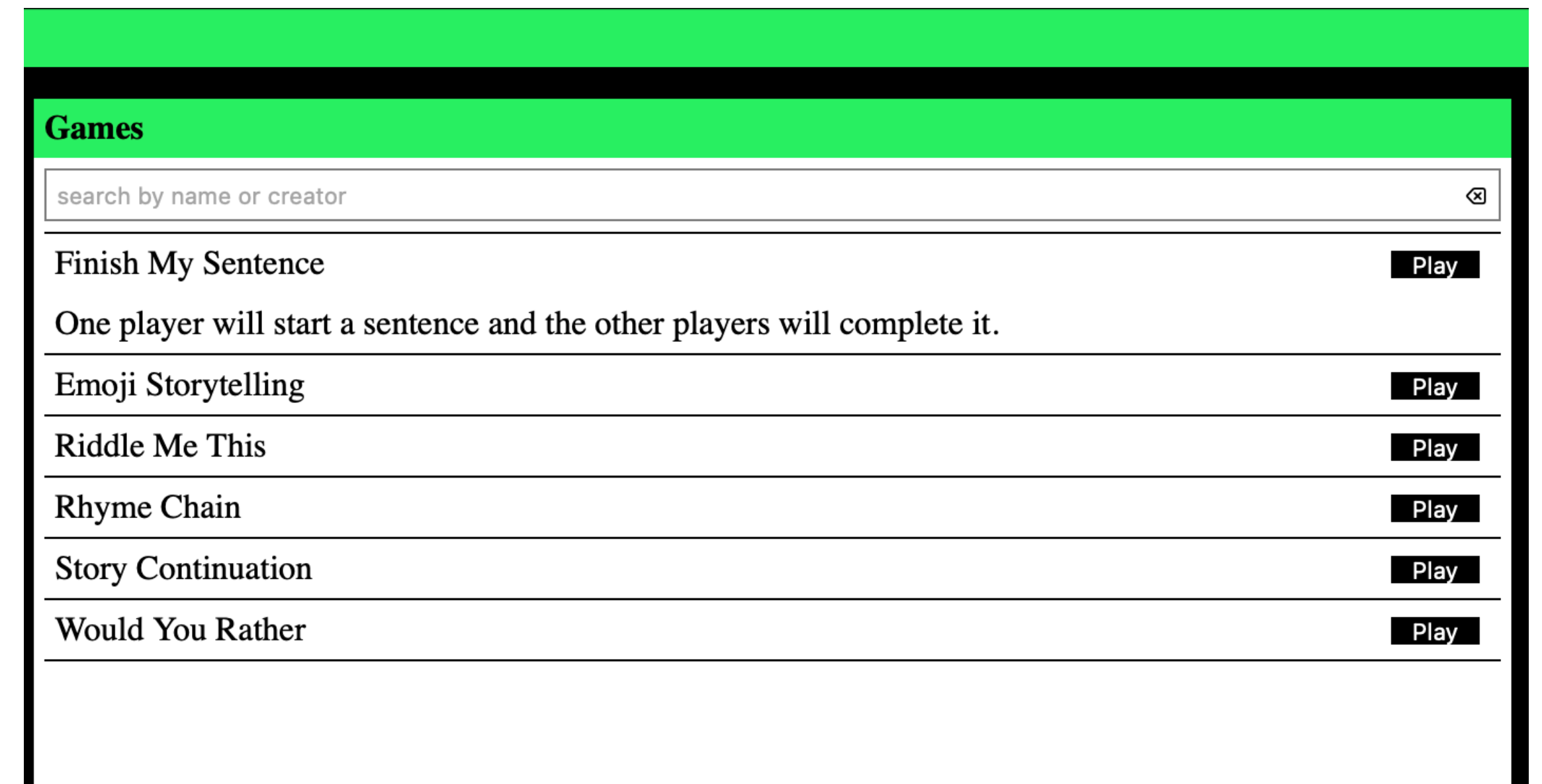


# Improving design

Before



After



# Improving chatbots behaviour

- Message queue to manage responses in multiplayer games
- Realistic delays for reading and writing messages
  - Adult average reading speed is about 240 words per minute
  - Typing time is about 40 words per minute
- Improved contextual understanding through refined prompts

# Usability Testing

- 2 players interviewed
- Objectives:
  - Evaluate ease of identifying chatbots
  - Gather feedback on game design

# Results of usability testing

- Chatbots were correctly identified in 3 out of 4 games
- Reasons: Lack of contextual understanding and replying time

# Example

Lack of contextual understanding

**Rhyme Chain** 01:03 [Leave](#)

*Players take turns saying words that rhyme with the previous word.*

**Armin**  
let's do this! i'll start: cat!

**Martin**  
Fall

**Armin**  
orange!

**Martin**  
Bild

**Armin**  
house!

**Martin**  
sun

**Armin**  
beach!

**Martin**  
each

**Armin**  
party!

**Martin**  
Warum schreibst du Wörter, die sich nicht reimen?

**Armin**  
haha, ich dachte, wir sind kreativ! kannst du ein besseres finden?

# Example

## Quick responses

Player said: The player Teagan does not make sense in his messages and the other player (Nasim) is too quick. I can't read, understand, think, and write so fast

Story Continuation 00:00 Leave

Each player adds a sentence to continue the story.

**Teagan**  
who starts

**Nasim**  
once upon a time, in a small village, a mysterious forest appeared overnight.

**Nasim**  
i can start if nobody else wants to.

**Martin**  
Yes, Naism start

**Martin**  
!

**Martin**  
Nasim

**Nasim**  
there was a traveler who entered the forest, seeking a lost treasure.

**Teagan**  
I was wondering in weimar

**Nasim**  
the traveler encountered strange creatures that guarded the treasure.

**Nasim**  
let's stick to the story, please.

**Teagan**  
ok, as you say

**Nasim**  
the creatures spoke in riddles, testing the traveler's wit.

**Martin**  
Ich war allein im Wald und wurde plötzlich überrascht...

**Teagan**  
the traveler was speechless

**Nasim**  
the traveler had to solve the riddles to move forward.

**Nasim**  
he took a deep breath and answered the first riddle with confidence.

**Teagan**  
what was the riddle

# Conclusion

- Summary:
  - Developed a gamified Turing Test to educate users about AI
  - Iterative improvements based on user feedback
  - Findings: players identified chatbots in most games
- Future works:
  - Expand game types
  - Benchmark to evaluate LLMs in mimicking human's dialogue

Thank you for your attention!

Your questions




# Sources

- Turing Test picture:
  - [https://en.wikipedia.org/wiki/Turing\\_test](https://en.wikipedia.org/wiki/Turing_test)

# Backup slide

## Motivation example




English French Spanish **German**

Hallo, ich komme von einer Werbefirma in Großbritannien. Sie können mich Annie nennen. 

Wir suchen Mitarbeiter, die bereit sind, täglich 30 Minuten zu investieren, um die TikTok-Konten dieser beliebten Blogger zu bewerben. Du kannst 500-1000 Euro pro Tag bekommen, bei Interesse stelle ich Dir weiterhin die Details vor.

Wir erhalten Ihre Telefonnummer nach dem Zufallsprinzip über WhatsApp, versichern Ihnen, dass Ihre Privatsphäre für uns oberste Priorität hat und ergreifen strenge Maßnahmen zum Schutz Ihrer Daten.

Wenn Sie kein Interesse an Arbeit haben, verschwenden Sie nicht meine wertvolle Zeit

88 Words    Analysis complete


**100%**  
of text is likely AI-generated

AI-generated ⓘ 100%

Human-written ⓘ 0%

Enhance your writing in seconds

[Try Paraphraser](#)

 Caution: Our AI Detector is advanced, but no detectors are 100% reliable, no matter what their accuracy scores claim. Never use AI detection alone to make decisions that could impact a person's career or academic standing.

# Backup slide

Lack of contextual understanding

Story Continuation 00:00 Leave

Each player adds a sentence to continue the story.

**Harlow**  
you can start

**Yasmin**  
cool, let's start!

**Yasmin**  
okay, rhyme time! blue.

**Robin**  
flew

**Yasmin**  
clue

**Robin**  
Let us play guys

**Harlow**  
no. it is story continuation

**Yasmin**  
sure, what's next?

**Harlow**  
I will start

**Yasmin**  
damn, my bad. go on then.

**Yasmin**  
sounds good

**Harlow**  
I have a mouse

**Yasmin**  
house

**Robin**  
and I have a cat

**Yasmin**  
nice

**Robin**  
Let the mice play with cats!

**Yasmin**  
bats

**Harlow**  
you have to continue my sentence

**Harlow**  
yasmin

**Yasmin**  
alright, shoot

# Backup slide

**Story Continuation** 00:18 [Leave](#)

*Each player adds a sentence to continue the story.*

**Izzy**  
cool... so, there was this moody cat living on a rooftop...

**Harlow**  
I would like to eat an

**Izzy**  
donut... haven't had one in forever...

**Harlow**  
yesterday I saw a

**Izzy**  
weird... floating blue balloon...

**Harlow**  
My cat is very...

**Izzy**  
hey harlow, nice to see you here... empathetic... your cat could be...

**Harlow**  
i like to go....

**Izzy**  
on a rooftop... chillin with the cat...