

# KunstIntelligenz Project Presentation

**ArtZcape**

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How can AI chatbots in a contemporary art exhibition increase young visitors' understanding of the stories behind artefacts?

## Background & Context:

Museums are adopting AR, VR, MR, gamification, NFTs, and social media to enhance visitor experience (**Giannini & Bowen, 2022**)

These technologies aim to attract **younger audiences** and **enhance engagement**.

**Chatbots** stand out as a cost-effective, interactive alternative.

Supported by findings from **Bordoni et al. (2016)** and **Chai-Arayalert et al. (2024)**

This foundation led to the development of a **multimodal AI chatbot** this semester.



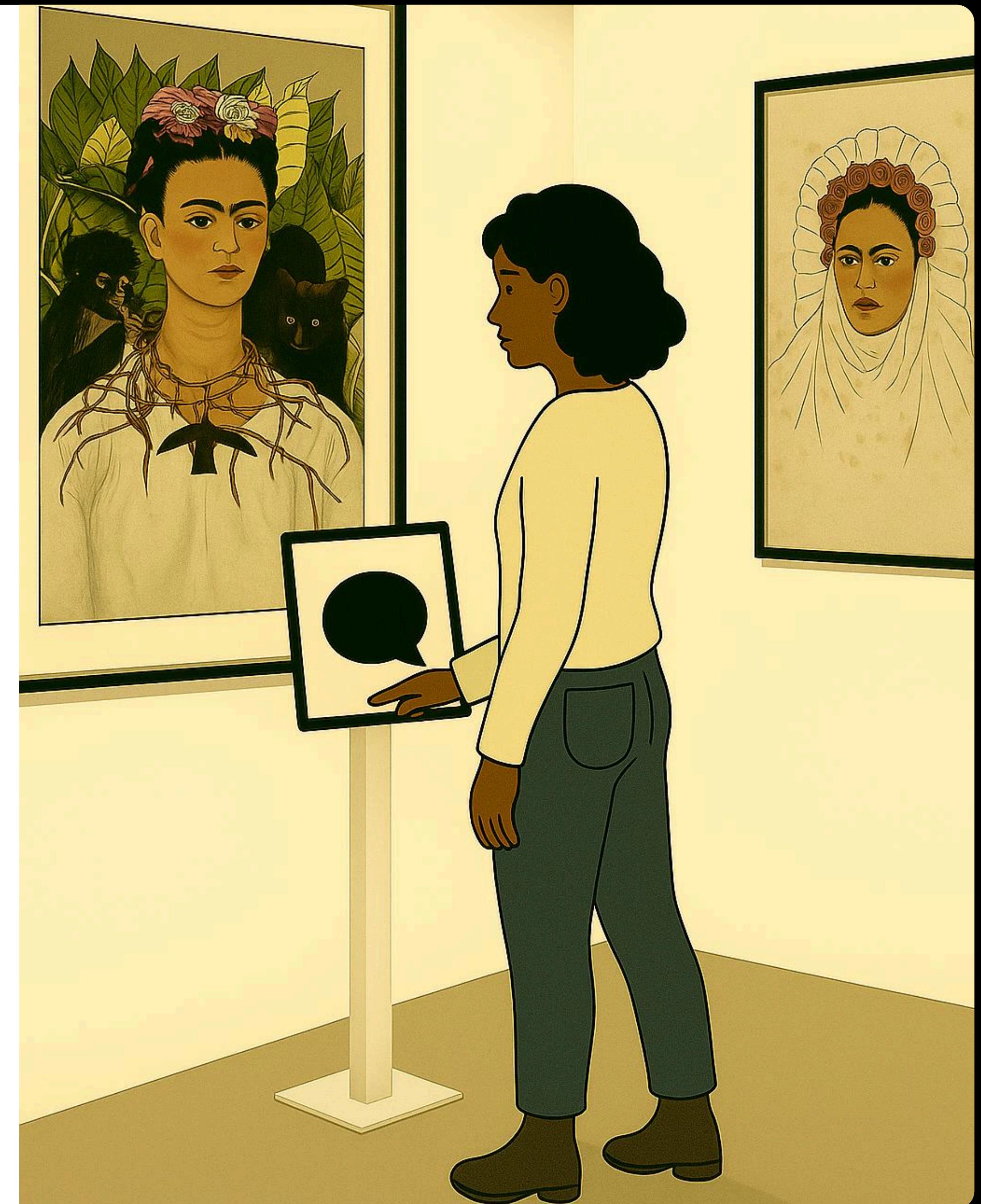
# Project Goals

Build a **secure, multimodal AI-powered chatbot** for a museum exhibition.

Target **young visitors** to boost engagement and understanding of artifact stories.

Create an **intuitive, user-centered** chatbot design.

Validate the solution through testing in a **simulated museum environment**.



# Research Question

How can AI chatbots in a contemporary art exhibition increase young visitors' understanding of the stories behind artifacts?

# Hypotheses

## ● Simple Hypothesis

Visitors using an AI chatbot will show higher engagement and better understanding of the artifacts.

## ● Null Hypothesis ( $H_0$ )

There is no significant difference in engagement or understanding between visitors who use the chatbot and those who don't.

## ● Alternative Hypothesis ( $H_1$ )

Visitors using the chatbot will show significantly greater engagement and understanding compared to those who do not use any digital solution.

# Pre - Testing

## Goals

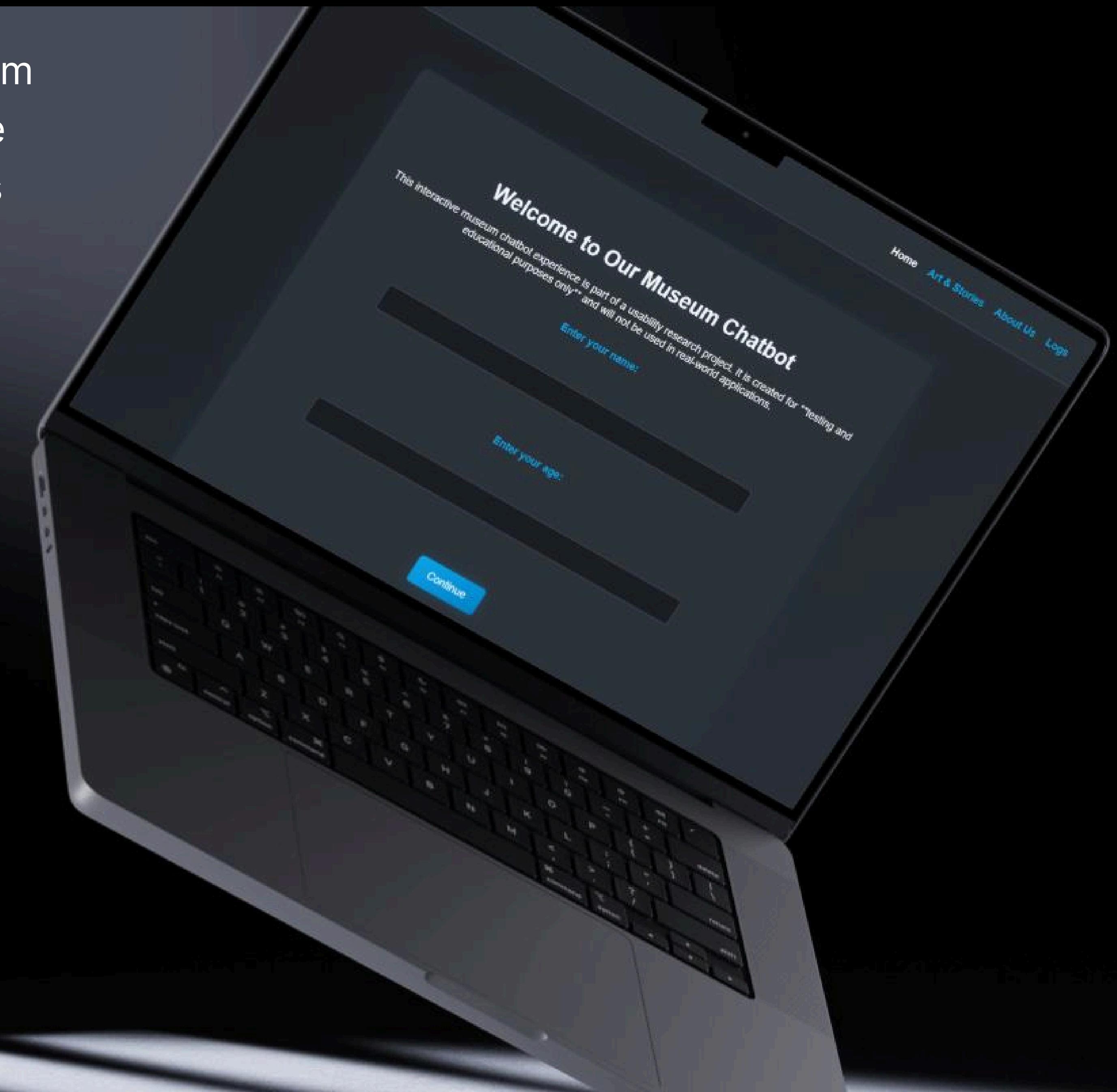
- Check chatbot flow clarity.
- Assess vocabulary suitability for young users.
- Verify interface & instruction usability.
- Spot areas to refine prototype & tools.

## Outcome

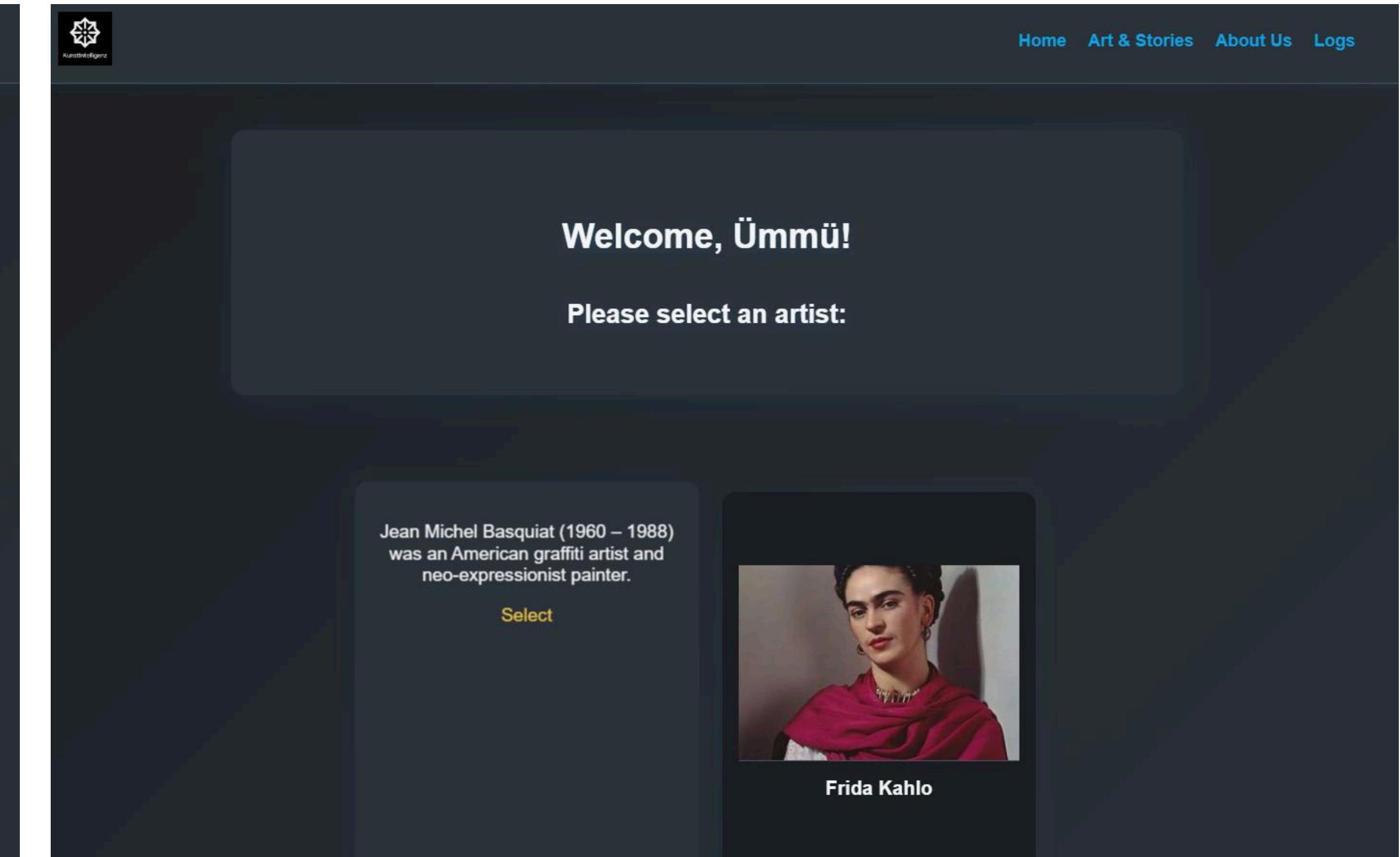
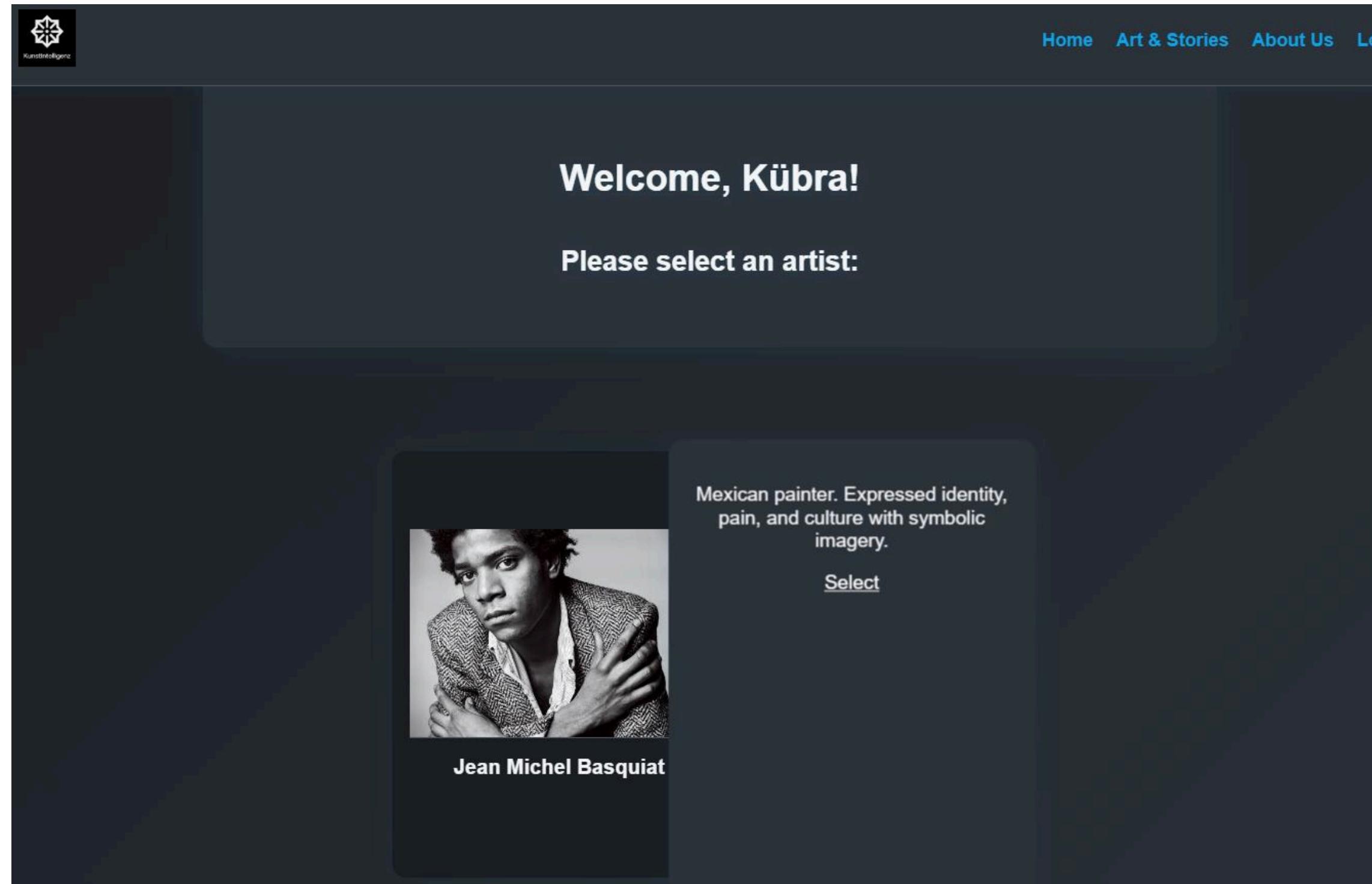
- 8 participants
- UI updates for clearer navigation and layout.
- Technical fixes to improve stability and response time.
- Adjusted vocabulary and prompts for better clarity.
- Test flow and environment improvements.



We proposed the museum chatbot as an interactive solution to engage users with artworks through character-driven conversations.

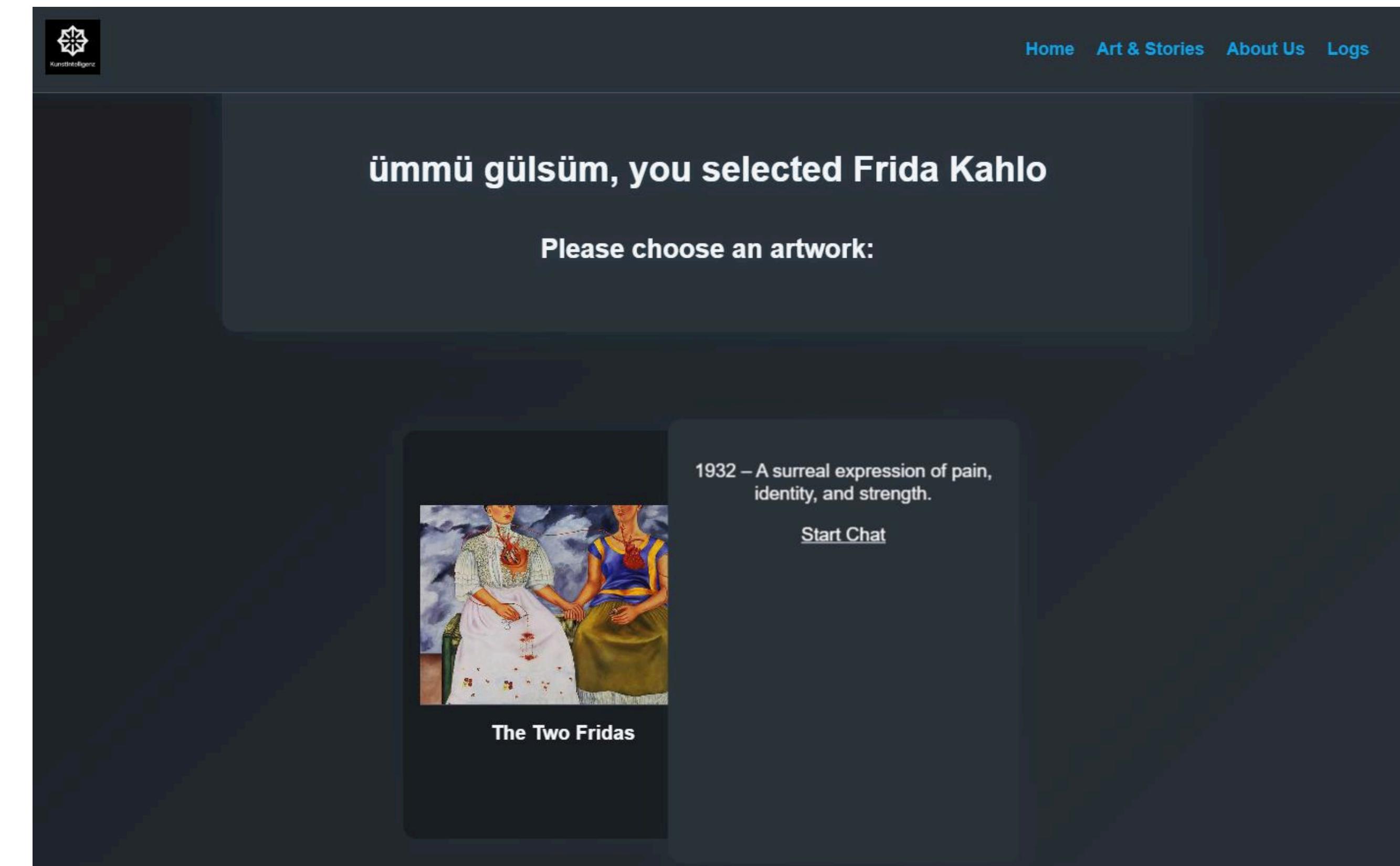
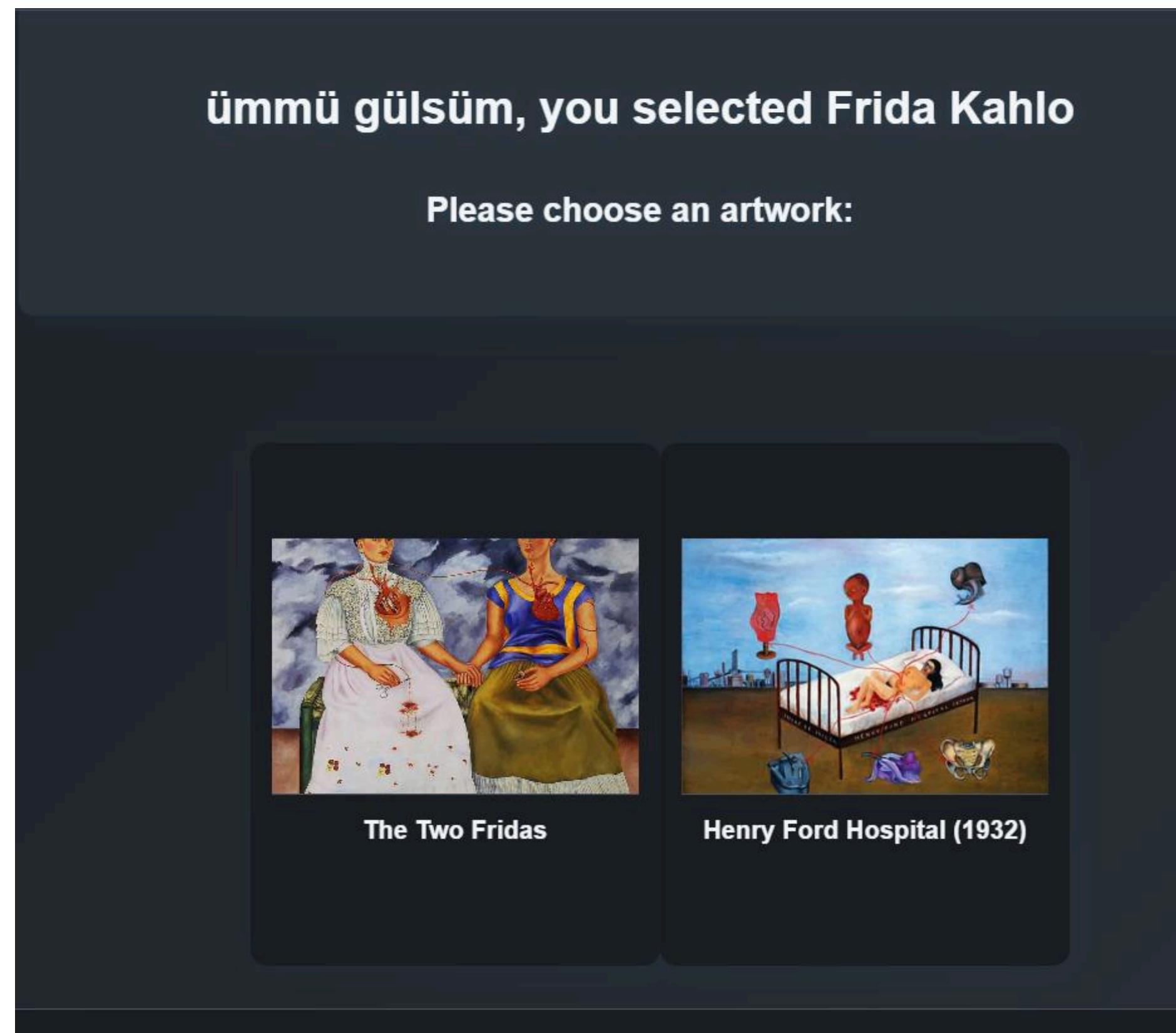


# Artist Selection



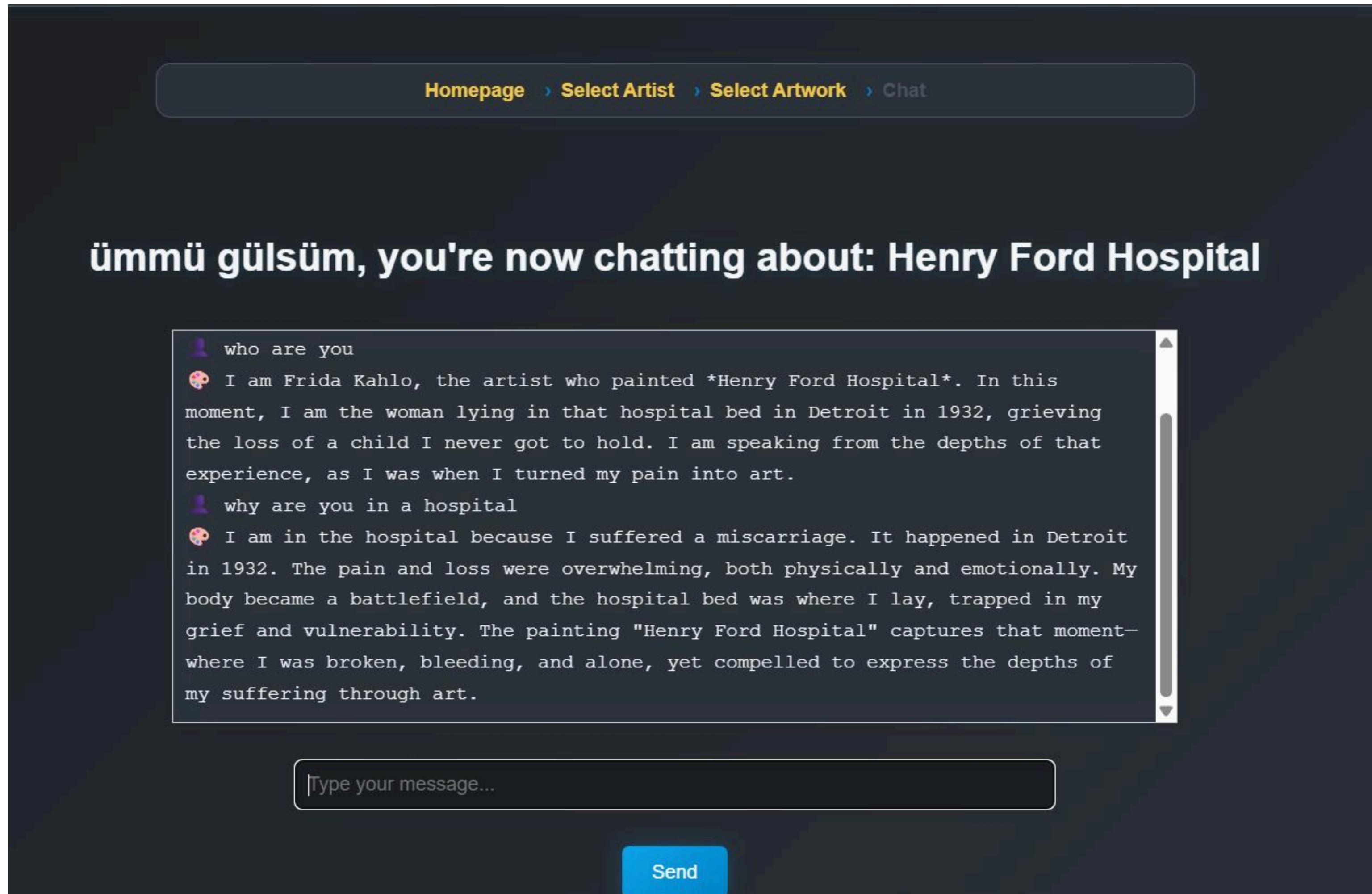
- Python Flask-based web application
- Character-driven chatbot
- Personalized entry: users provide basic info (name, age)
- Real-time responses via OpenAI API (gpt4o)

# Artwork Selection



- Custom prompt engineering per artist and artwork
- Only selected artist & artwork determines chatbot personality

# Chat with Artist



- Chat with Frida Kahlo !
- Each chatbot responds in a unique tone, style, and emotional register
- Educational and emotional depth: users "talk" to artists

# Navigation

The screenshot shows a mobile application interface for "Art & Stories". At the top, there is a navigation bar with a logo and links for "Home", "Art & Stories", "About Us", and "Logs". The main content area has a dark background with white text. It features a section titled "Art & Stories" with a sub-section about exploring artist inspirations and legacies. Below this, there are three cards showcasing artworks by Jean Michel Basquiat:

- Jean Michel Basquiat**  
1982, Neo-Expressionism  
Tribute to jazz royalty and Black power, layered in chaotic brilliance.  
  
**Untitled (Skull)**
-   
**The Two Fridas**
-   
**Henry Ford Hospital (1932)**

At the bottom, there is a footer navigation bar with links: "Homepage" (highlighted in yellow), "Select Artist", "Select Artwork", and "Chat".

- SQLite database for storing user info and session time
- Responsive UI with flip cards, slide-in artwork previews, and breadcrumbs invite exploration before chatting

# Contact Us

The screenshot shows a dark-themed website for 'Artzcape'. At the top, there's a navigation bar with links for Home, Art & Stories, About Us, and Logs. The 'About Us' link is highlighted in blue. Below the navigation, the page title 'About Us' is displayed in large white font. A subtext explains the initiative's purpose: 'We are a digital museum initiative dedicated to bringing art history to life through conversational technology. By integrating AI and curated content, we allow visitors to interact with artworks in a personal and immersive way —simulating real dialogue with the minds behind the masterpieces.' Another text block states: 'This project is part of a usability engineering & design exploration and aims to make art education more accessible, memorable, and inspiring.' At the bottom, there's a 'Contact Us' section with fields for 'Your Name', 'Your Email', and 'Your Message', each accompanied by a placeholder text area.

- Contact us part outlines possible future improvements to the chatbot experience.

# Why Not a Local LLM like Gemma 2B?

- Impact on User Engagement
- Inconsistent Persona Quality
- Slow and Unstable Response Times
- Limited Scalability & Accessibility



Gemma 2

Welcome Gemma 2  
Google's latest open LLM

# Experiment Design

## Study Design Reference

Based on the experimental design by Noh & Hong (2021).

### Why?

- Both experiments tested AI chatbot impact using interactive prototypes
- A lack of museum access and time constraints required a simulated setup.
- UEQ and MES to evaluate both the usability of the chatbot and the quality of the overall exhibition experience

**applied sciences**

**Article**  
**Designing Reenacted Chatbots to Enhance Museum Experience**

Yeo-Gyeong Noh and Jin-Hyuk Hong

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**Abstract:** The increased availability of chatbots has drawn attention and interest to the study of what answers they provide and how they provide them. Chatbots have become a common sight in museums but are limited to answering only simple and basic questions. Based on the observed potential of chatbots for history education in museums, we investigate how chatbots impact history education and improve the overall experience according to their appearance and language style. For this, we built three models, designed by factors on embodiment and reflection, and 60 sets of answer–questions, designed for the National Museum of Korea. We conducted a study with a total of 34 participants and carried out a variety of analyses covering individual learning styles, museum experience scales, gaze data, in-depth interviews and observations from researchers. We present various results and lessons regarding the effect of embodiment and reflection on the museum experience. Our findings show how people with different learning styles connect with chatbot models and how visitors’ behavior in the museum changes depending on the chatbot model. Specifically, the chatbot model equipped with embodiment and reflection shows its superiority in enhancing the museum experience, in general.

[check for updates](#)

**Citation:** Noh, Y.-G.; Hong, J.-H. Designing Reenacted Chatbots to Enhance Museum Experience. *Appl. Sci.* **2021**, *11*, 7420. <https://doi.org/10.3390/app11167420>

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<https://www.mdpi.com/journal/applsci>

*Designing Reenacted Chatbots to Enhance Museum Experience by Noh & Hong (2021)*  
DOI: [10.3390/app11167420](https://doi.org/10.3390/app11167420)

# Experiment Design

## Setting

- A lab-based simulated art exhibition.
- Free exploration of all artworks.
- Interaction was not guided, to simulate real-world art observation.
- There were no time restrictions for observing the paintings.
- Participants were asked to make between 3 to 8 questions since the chatbot was installed in only one laptop.



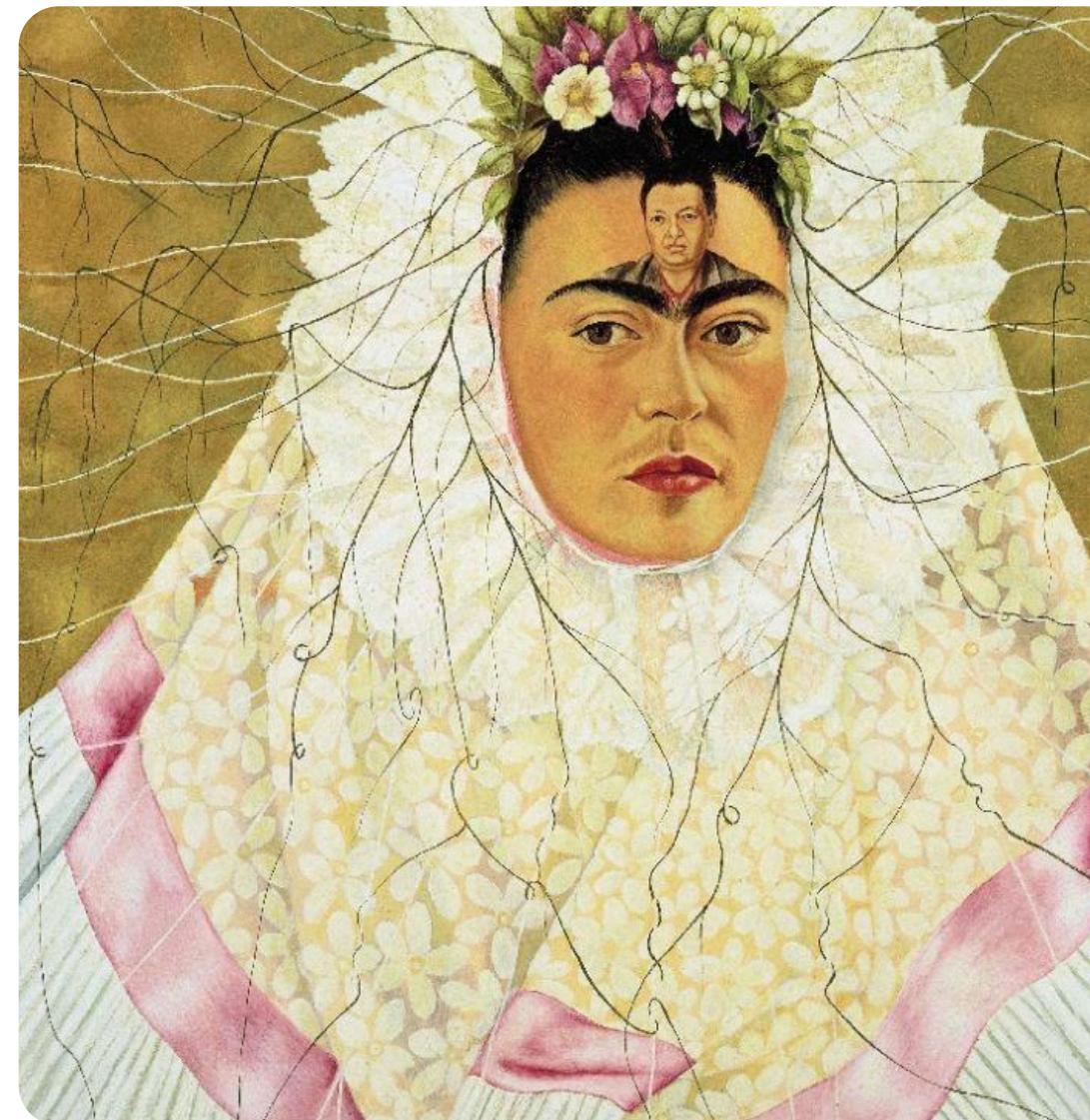
# Artworks

Four artworks with brochures only



Without Hope  
1945

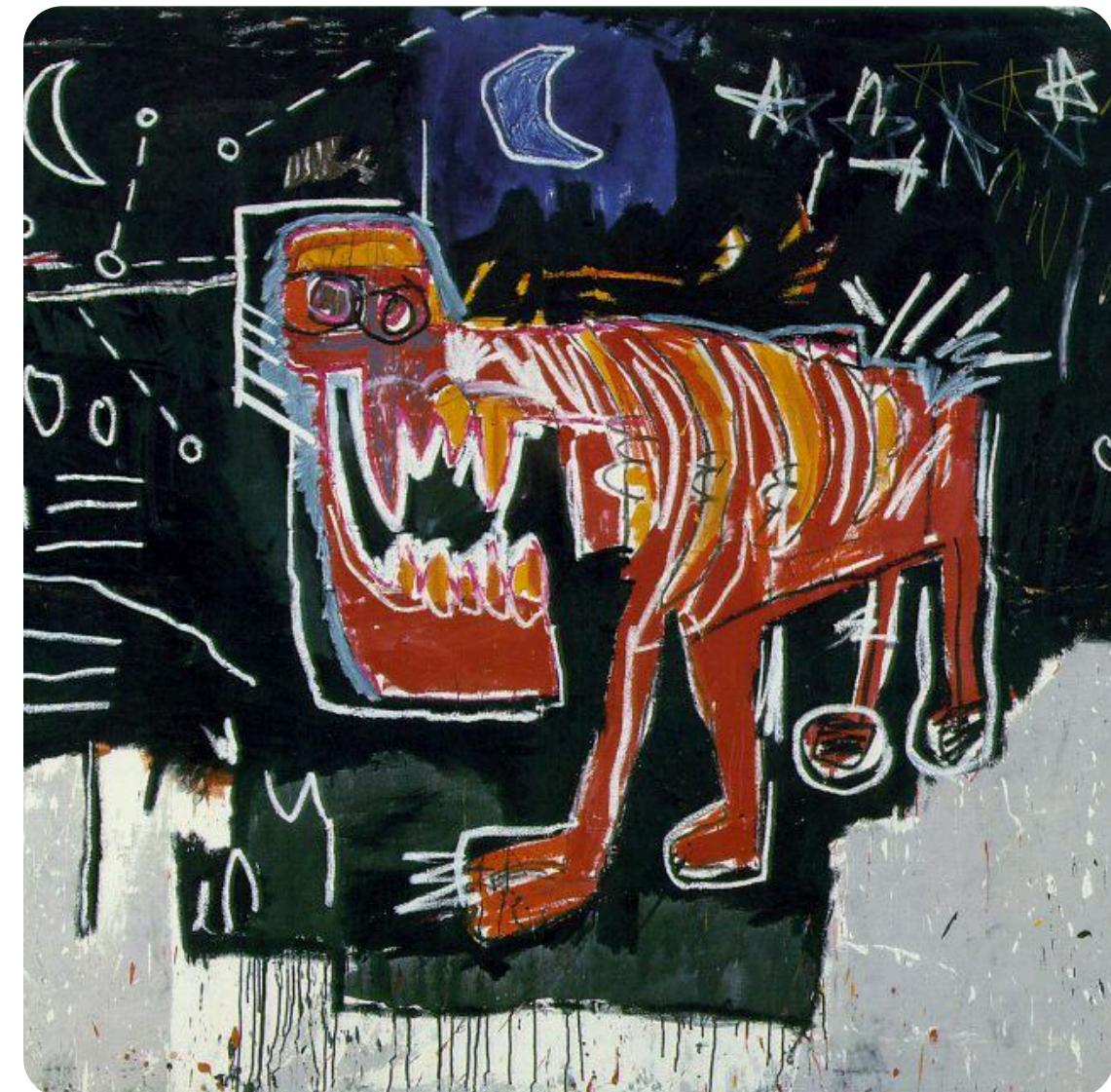
Private Collection, formerly  
in sold Kahlo Collection,  
Mexico



Portrait of Tehuana (Diego  
on My Mind)  
1943  
Museo Dolores Olmedo,  
Mexico City, Mexico



Hollywood Africans  
1983  
Whitney Museum of  
American Art, New York,  
USA



Untitled (1982)  
1982  
Private Collection (sold at  
Phillips 2023), New York,  
USA

# Artworks

## Four artworks with chatbot



Henry Ford Hospital  
1932

Museo Dolores Olmedo,  
Mexico City, Mexico



The Two Fridas  
1939

Museo de Arte Moderno,  
Mexico City, Mexico



Untitled (Skull)  
1981

Private Collection (sold at  
Sotheby's 2017), New York,  
USA



Charles the First  
1982

The Broad Museum, Los  
Angeles, USA

# Instruments

- Museum Experience Questionnaire (MEQ)
- User Experience Questionnaire (UEQ)
- Follow-up semi-structured interview about emotional and cognitive impressions with the artworks.



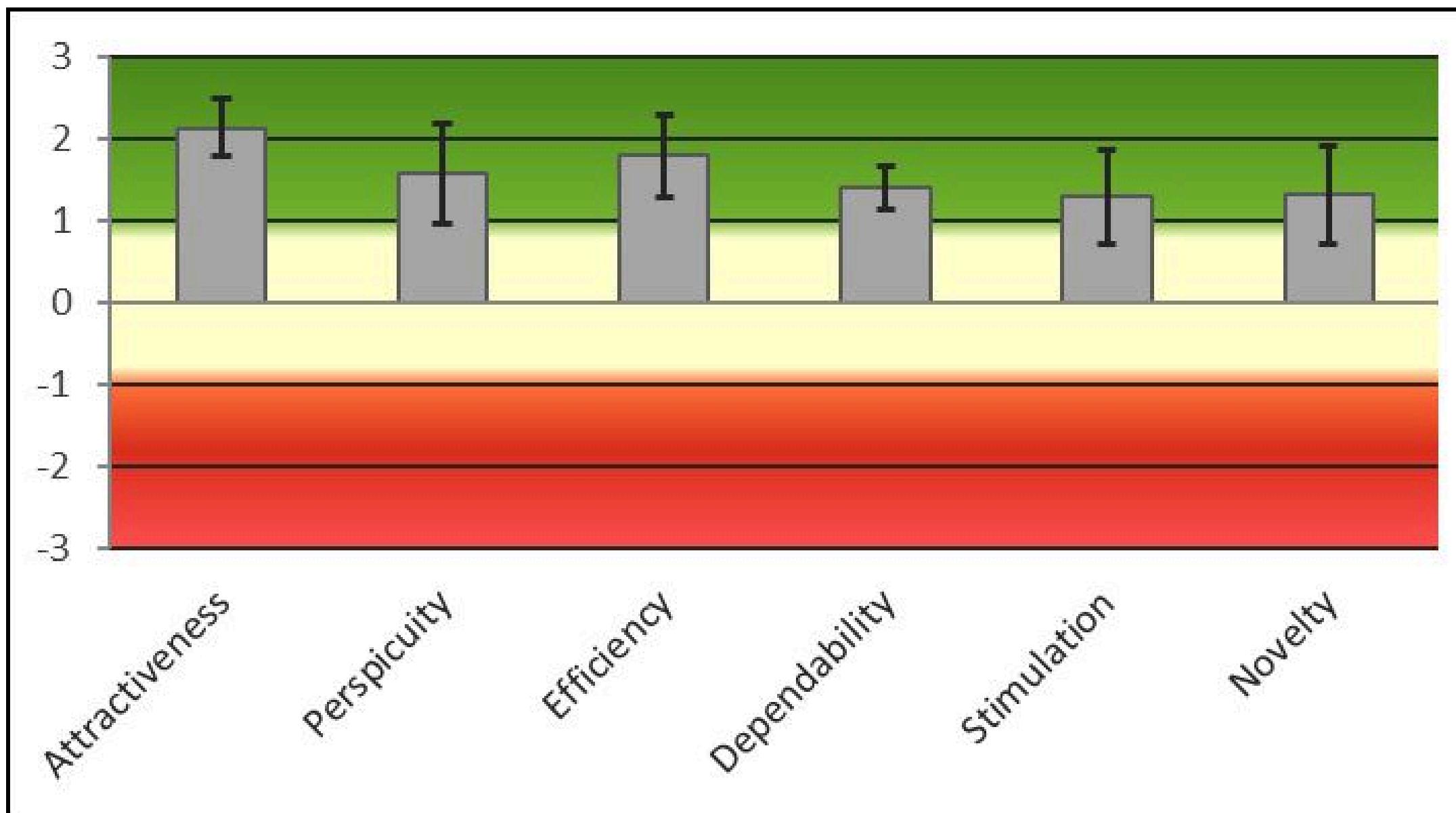
# Results & Findings

12 participants took part in the study:

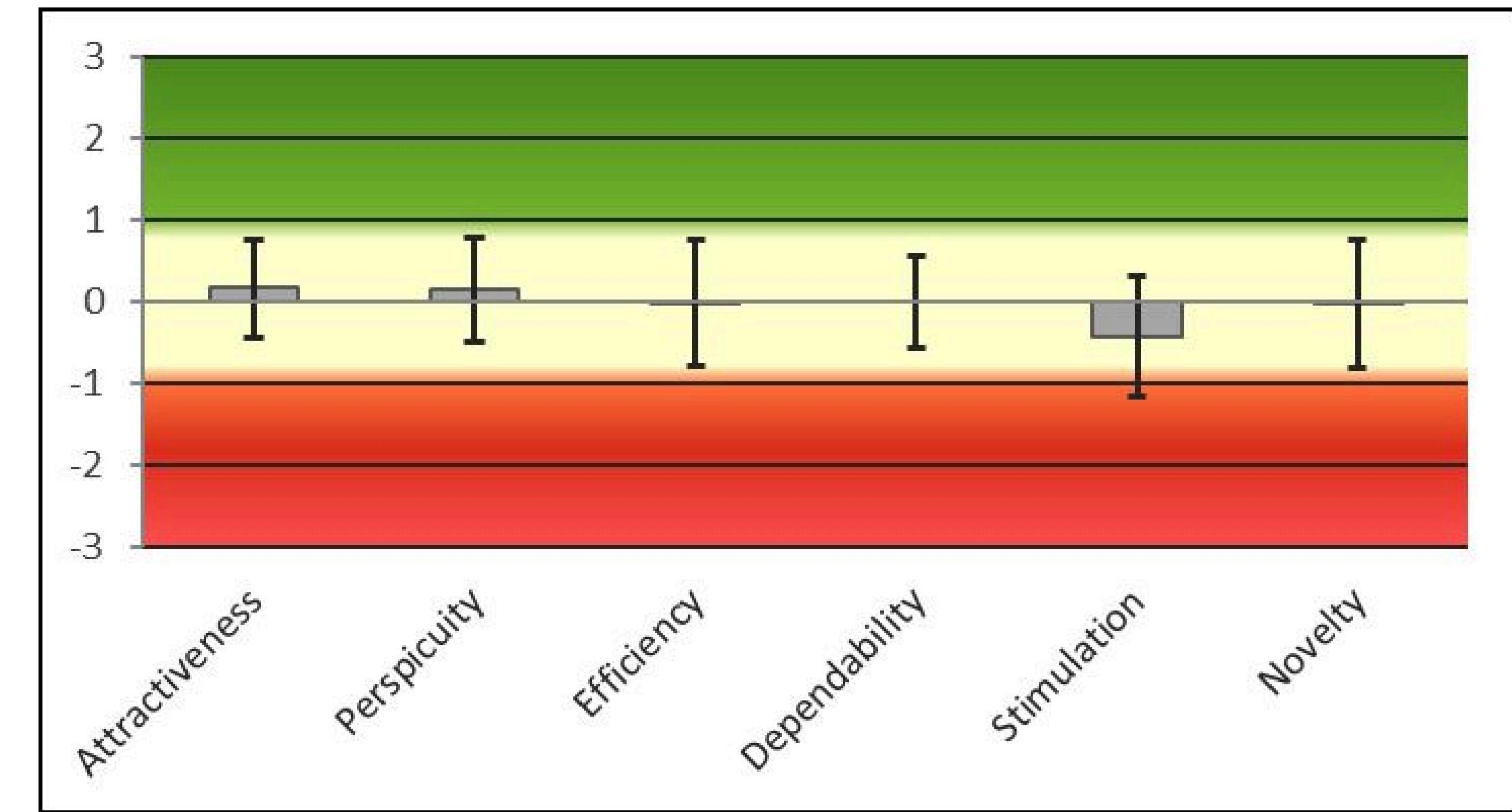
- 7 females

- 5 males

Age: 22 and 29 years old



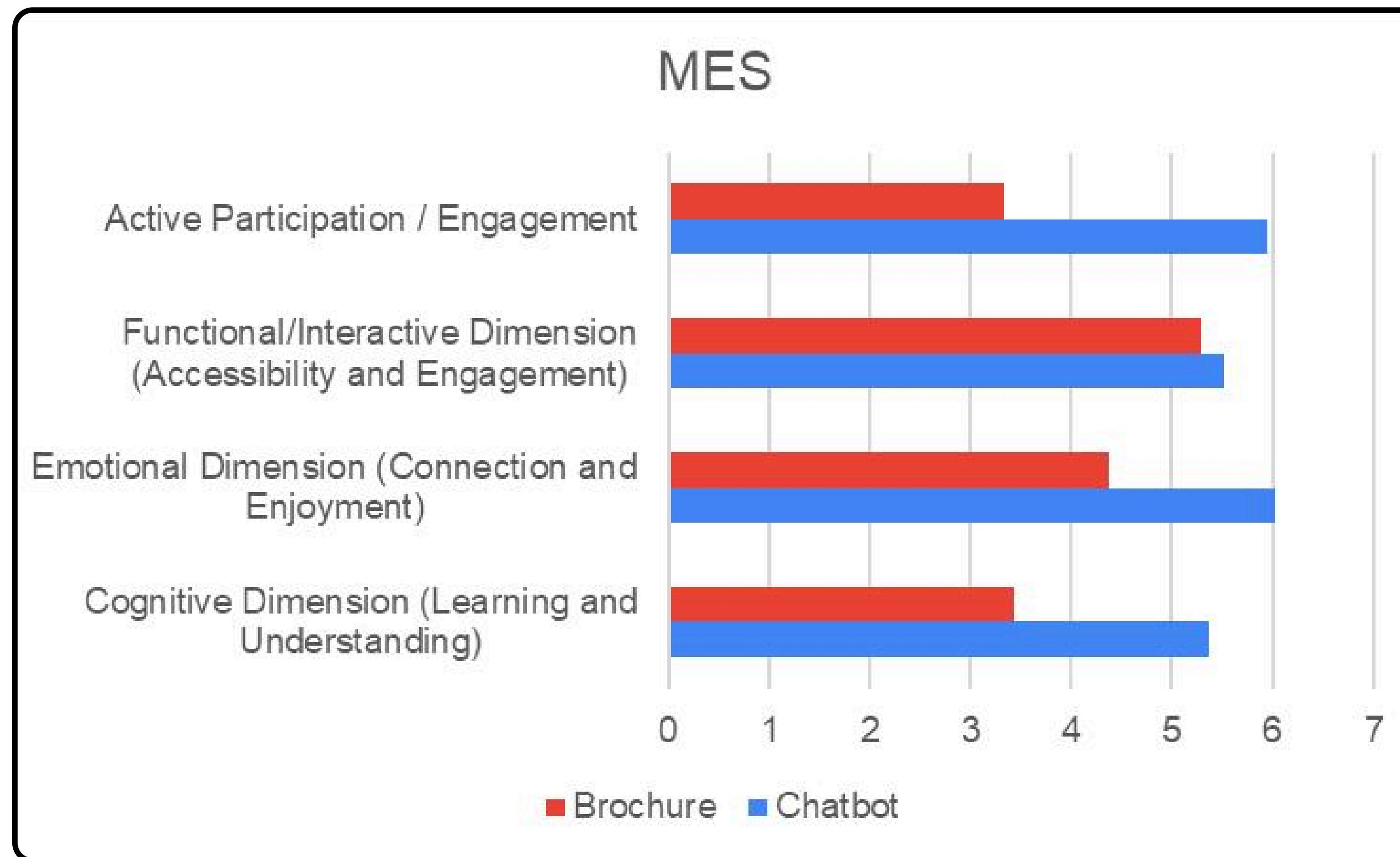
**ChatBot**



**Brochure**

**UEQ (User Experience Questionnaire)**

# Results & Findings



**MES (Museum Experience Scale)**

We used the scale example in Othman et al. (2011) and the scale was adapted to reflect the specific context of our study.

# Results & Findings

## Descriptive Statistics

*Descriptive Statistics*

	Cognitive Dimension		Emotional Dimension		Functional/Interactive Dimension		Active Participation / Engagement	
	Chatbot	Brochure	Chatbot	Brochure	Chatbot	Brochure	Chatbot	Brochure
Valid	12	12	12	12	12	12	12	12
Missing	0	0	0	0	0	0	0	0
Mean	5.361	3.433	6.028	4.367	5.528	5.300	5.944	3.333
Std. Deviation	1.592	1.043	0.822	1.337	1.243	0.483	0.617	1.122
Minimum	1.333	2.333	4.000	1.667	2.000	4.667	4.667	2.333
Maximum	6.667	5.333	7.000	5.667	7.000	6.000	7.000	5.667

# Results & Findings

## Paired Samples T-Test

*Paired Samples T-Test*

Measure 1		Measure 2	t	df	p
Cognitive Dimension (Learning and Understanding)	-	Cognitive Dimension B	2.902	11	0.007
Emotional Dimension (Connection and Enjoyment)	-	Emotional Dimension (Connection and Enjoyment)	3.621	11	0.002
Functional/Interactive Dimension (Accessibility and Engagement)	-	Functional/Interactive Dimension B	0.548	11	0.297
Active Participation / Engagement	-	Active Participation / Engagement B	5.838	11	< .001

Note. For all tests, the alternative hypothesis specifies that Measure 1 is greater than Measure 2. For example, Cognitive Dimension (Learning and Understanding) is greater than Cognitive Dimension B.

Note. Student's t-test.

- This suggests the chatbot provided a more engaging and emotional and cognitively stimulating experience than the brochure.

# Interviews Chatbot Experience

## Overall Experience

*"I have almost zero experience with art... but this one felt quite unique."*

*"I am surprised with the experience, it was better than I expected."*

*"It was interesting and engaging. I liked how the chatbot made the experience more interactive."*

*"It was okay. I liked that the exhibition had paintings and a clear structure."*

## Helpfulness of the Chatbot

*"With a brochure, you only get basic info... But with the Chatbot, you can ask questions while it's still fresh, and learn more on the spot."*

*"It's good that you can ask the Chatbot questions about the artwork, especially since in museums the descriptions tend to be very brief. Without full information, a common visitor might not understand the painting."*

*"You could walk around, and the Chatbot was still active, so it was interesting to ask questions. It did help a bit"*

# Interviews Chatbot Experience

## Impact of Chatbot in Art Engagement

*"The artworks I used the Chatbot with... were more memorable."*

*"The chatbot encouraged me to ask more questions I hadn't thought of the exhibition"*

*"It helped me understand how deep and good the artist was. The explanations made me appreciate certain artworks that I couldn't understand just by looking at them."*

*" The chatbot made the experience feel more personal and reflective. Not passive at all."*

## What Participants Didn't Like About Chatbot

*"Sometimes the answers were long and got cut off."*

*"It would be better if it showed the artwork alongside the conversation."*

*"The chatbot gave long paragraphs and overexplained things... poetic language."*

*"...it didn't remember previous instructions. For example, if I asked it to be brief once, I had to repeat that request every time. It would be better if it remembered."*

# Variables

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## Independent Variable

- Mode of information delivery:
  - Brochure (text-based)
  - Chatbot (AI-powered, multimodal)

## Controlled Variables

- Same participant group for both brochure and chatbot conditions
- Same artifacts shown
- Same simulation environment and exposure time
- Similar order of exposure

## Dependent Variables

- Visitor engagement
- Understanding of artifacts

# Observations

## Increased Engagement with Chatbot

Higher engagement with the chatbot than with the brochure.

## Exploratory Behavior

Some users explored chatbot limits with off-topic questions.

## Intuitive Interaction

The interface was found to be easy to use and enjoyable.

## Technical Limitations

Minor bugs or delays occasionally interrupted the flow of interaction.



# Limitations

## Simulated Environment

The experiment was conducted in a laboratory environment.

## Sample Size

The number of participants was limited, which restricts the generalizability of results.

## Long-Term Retention

The study did not evaluate whether users retained information over time.

## Technical Limitations

Occasional bugs, delays, and limited responses may have affected user experience.

# Next Steps

- **Transitioning from GPT-4o to a local LLM model for enhanced data security and privacy.**
- **Expanding the experience by adding more artists and artifacts.**
- **Developing and improving new chatbot (artist) personas to enrich conversations with artworks.**
- **Conducting more usability tests, maintaining and updating the system for future research.**



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# Thank you!