SIMUSPACE

Designing Inclusive Entertainment Spaces with AI

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OVERIVIEW

SimuSpace is an AI-integrated design software developed to help designers engage users with diverse needs early in the design process, ensuring that entertainment environments are more inclusive, emotionally engaging, and memorable. The project emerged from the growing need to move beyond traditional accessibility checklists toward design processes that consider how spaces make people feel and how different users interact with them. At its core, SimuSpace bridges emotional intelligence with architectural precision. It connects real human data, such as emotional reactions, movement patterns, and comfort levels, to digital design tools like Revit, AutoCAD, and SketchUp. This allows designers to visualize user experiences before construction begins, reducing the gap between intention and real-world accessibility.

The system is composed of three interconnected components that work together as one seamless ecosystem:

Emotion Tracking System:
Captures real-time emotional and behavioral data from users through cameras and sensors. The system detects emotions such as comfort, stress, and excitement, translating this data into visual heatmaps that reveal how people respond to specific spatial features.

Persona Generator:
Converts collected emotional data into adaptive digital personas that represent diverse physical and psychological needs. Each persona such as a child, an elderly visitor, or a wheelchair user, reflects distinct interaction patterns, enabling designers to test decisions from multiple viewpoints and ensure inclusivity.

Environment Simulator:
Integrates directly with design platforms to allow designers to “walk through” virtual spaces from each persona’s perspective. The simulator identifies emotional or accessibility barriers and provides AI-driven recommendations for improvement, ensuring designs are both empathetic and efficient.

By combining these three layers, SimuSpace transforms abstract emotional feedback into measurable design insights. It empowers designers to make informed decisions about lighting, circulation, visibility, and comfort, ultimately producing spaces that evoke positive emotions while meeting accessibility standards. SimuSpace represents a new step in experiential and inclusive design, merging technology, empathy, and data-driven intelligence into one cohesive platform. It redefines how spaces are conceived by centering human emotion and diversity as essential parameters early on in the creative process, rather than as afterthoughts.

PHASE 1

DISCOVER

EXPLORING THE INTERSECTION OF AI, ENTERTAINMENT, AND WELL-BEING

Our project began with a broad curiosity: How is AI reshaping human experiences?
Within the three: AI, Entertainment, and Well-Being, we saw an opportunity to explore how technology could influence the way people feel inside entertainment environments such as theme parks, exhibitions, or immersive installations.
At this stage, our goal was not yet to design a tool.
Instead, we wanted to understand the emotional and experiential dimensions of entertainment, and whether AI could meaningfully support or enhance them.

EARLY EXPLORATION: WHAT MAKES EXPERIENCES “GOOD” FOR PEOPLE?

Through our early exploration, we aimed to understand what defines a “good” experience for people within entertainment spaces. Initially, we assumed it was linked to well-being , comfort, relaxation, and emotional balance. However, through our interviews with many professionals in different fields we discovered that well-being alone does not define a positive experience.

What truly makes an experience “good” is its memorability, the moments that stay with visitors long after they leave, and the emotional resonance that makes them want to return. A successful experience is one that sparks curiosity, evokes strong emotions, and encourages repeat visits.

This insight shifted our focus from designing for well-being to designing for impact and satisfaction. Instead of asking how AI can improve well-being, we began asking how AI can help designers create environments that are memorable, inclusive, and emotionally engaging , spaces that people connect with and choose to revisit

RESEARCH FOCUS & RATIONALE

Our research began with a broad exploration of AI, entertainment, and well-being, aiming to understand how artificial intelligence is currently shaping immersive experiences and how it might enhance emotional and human-centered design.
As we progressed, our focus shifted from well-being alone to a deeper investigation of emotion, inclusivity, and designer support, the elements that most strongly influence meaningful entertainment experiences.

We initially asked:
“How can AI improve entertainment experiences?”
However, early findings revealed a larger challenge:
Designers lack early insight into how different people emotionally experience a space.
This realization reframed Phase 1 toward understanding:

- How people feel inside entertainment spaces
- What makes experiences emotionally memorable
- Where inclusivity and accessibility break down
- How AI could support designers without replacing their creative intuition

PRIMARY RESEARCH

To build a holistic understanding, we examined perspectives from different age groups through our expert interviews, exploring how each generation views AI-driven entertainment, their level of comfort with technology, and how these experiences affect their sense of enjoyment and belonging. Through this process, we were also able to identify key gaps within the industry, uncovering what is currently missing and what designers and professionals believe is needed to create more inclusive, emotionally engaging, and well-being-centered entertainment experiences. As the research progressed, our focus evolved toward the emotional aspects of design, revealing how AI-driven experiences not only entertain but also create meaningful, human-centered interactions that support well-being and inclusivity.

Our team collected first-hand data through a site visit, five expert interviews, and a survey distributed to 36 participants aged between 19 and 35 across the UAE. Each research method provided unique perspectives on how people experience emotion, inclusivity, and personalization through design and technology. The survey allowed us to capture the attitudes of younger audiences toward AI in entertainment, while the expert interviews offered deeper insights from professionals who design and manage these experiences. These designers revealed the underlying factors that drive user satisfaction, what makes visitors feel emotionally fulfilled, engaged, and motivated to return. Rather than focusing solely on well-being, the interviews highlighted how emotional connection, storytelling, and atmosphere play a vital role in shaping memorable and satisfying entertainment experiences.

SITE VISIT

Museum of the future Site Visit “Exploring Immersive Experiences”

SURVEY

Collected insights from young adults about AI and entertainment.

5 INTERVIEWS

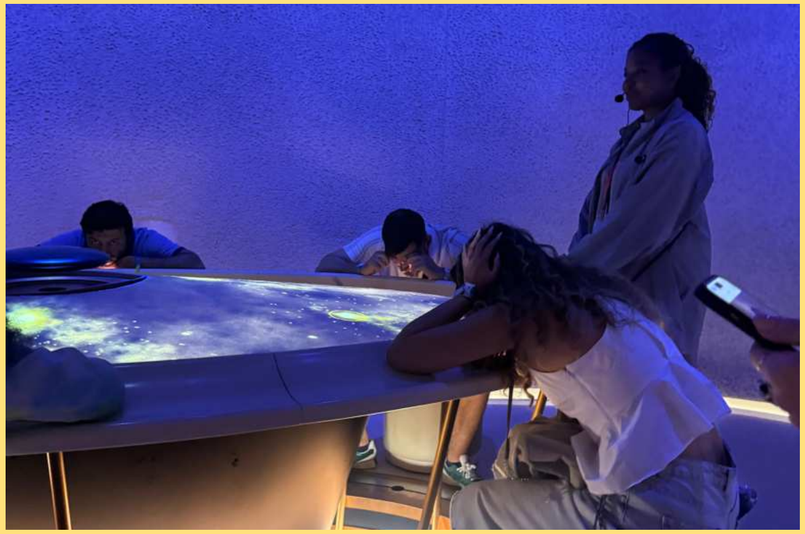
Insights from directors, designers, and a sociologist.

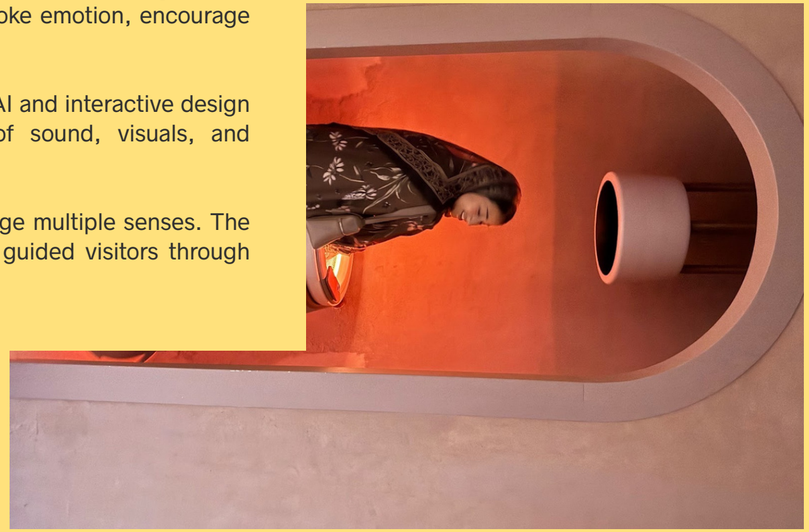
MUSEUM OF THE FUTURE – SITE VISIT

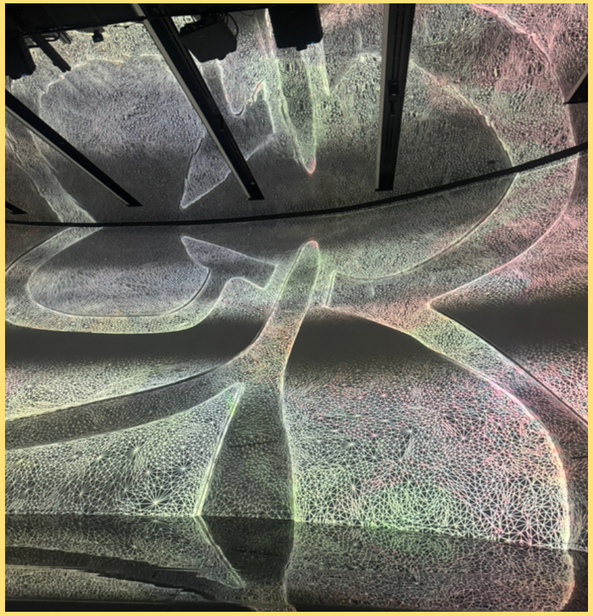
As part of our primary research, our team conducted a site visit to the Museum of the Future in Dubai to explore how AI and emotional design are used to create immersive, human-centered experiences. The visit provided valuable insights into how sensory elements and technology work together to evoke emotion, encourage reflection, and strengthen user engagement.

The museum offered a unique opportunity to observe how AI and interactive design shape visitors' emotional responses through a blend of sound, visuals, and atmosphere.

• Immersive exhibitions: Each space was designed to engage multiple senses. The combination of sound, light, and interactive touch points guided visitors through experiences that encouraged curiosity and imagination.







• **AI integration:** The museum uses AI in subtle yet impactful ways, such as AI tour guides and bilingual robots that respond to visitors, personalizing interactions and making the experience more inclusive.

• **Emotional design:** Spaces like AI Waha were intentionally designed to disconnect visitors from technology and reconnect them with their senses. The warm lighting, rhythmic movement, and tactile surfaces encouraged feelings of calmness, mindfulness, and presence.

From these observations, the team concluded that emotional engagement is not created by technology alone, but by how it is applied to support comfort, curiosity, and belonging. The museum demonstrated that successful AI-driven experiences balance innovation with empathy, allowing visitors to feel part of a narrative rather than passive spectators.

This site visit helped us understand that emotionally powerful experiences emerge from sensory depth and inclusion, not just visual spectacle. It became a key reference point for identifying how AI and emotional design can work together to enhance well-being and create lasting impact in entertainment and hospitality contexts.

“People don’t remember luxury; they remember how the experience made them feel.”

JAMIE MOORE

Director of Fitness at SIRO Hotels

EXPLORING HOW AI AND EMOTIONAL DESIGN CAN CREATE MEANINGFUL, HUMAN-CENTERED EXPERIENCES.

He sees entertainment as the atmosphere that surrounds people, where sound, rhythm, and energy shape how they feel.

Authentic emotion and empathy transform entertainment into a shared journey, something technology alone can’t achieve.

People don’t just remember how a hotel looked, they remember how the experience made them feel.

There’s a gap between AI’s data and its emotional use , the challenge is turning guest information into meaningful, personalized experiences.

Jamie believes emotion influences energy and behavior, the right sensory environment (sound, rhythm, lighting) can lift mood, calm stress, or motivate action.

“ Service always wins, when something feels made for you, that’s what people remember.”

“Culture is ever-evolving , not just what is old but what we live today”.

MOHAMMED HARIB

Director of the animated children’s series FREEJ & the Founder of Mystère Events

EXPLORING HOW AI INFLUENCES STORYTELLING AND EMOTION IN ENTERTAINMENT.

He sees AI as a creative partner that enhances emotion but can never replace human feeling.

He builds personal connections by understanding his clients’ stories and turning them into emotionally rich experiences.

Harib sees entertainment as an emotional journey, not just visuals, it’s about making people feel something real through sound, story, and detail

For him, personalization turns storytelling into connection, every detail reflects the people behind it.

The goal of his shows is to create emotional attachment, he wants people to remember the feeling, not just the episode.

AI makes his workflow faster and smoother, freeing his team to focus more on the emotional and narrative side of a project.

“Adapting to AI is inevitable, we should be open to learning “it.

DR.YUTNG WANG

Head of psychology and sociology

EXPLORING HOW DIFFERENT USERS PERCEIVE AI AND ENTERTAINMENT.

The type of entertainment you like and satisfies you depends on your preference, for example whether you like classical music or rock

She explained that younger generations adapt quickly to AI because they grew up with digital tools, while older generations resist due to skepticism and fear of being replaced

We visitied Shuzou museum in shanghai and the VR , lights sound everything was too overwhelming and distorientating

How satisfying or memorable AI feels will depend on cultural attitudes. In more conservative contexts, AI-driven entertainment may face skepticism, while in progressive ones, it may be celebrated.

Resistance to AI is not about rejecting technology itself, but about concerns over losing personal identity, control, and effort in the process.

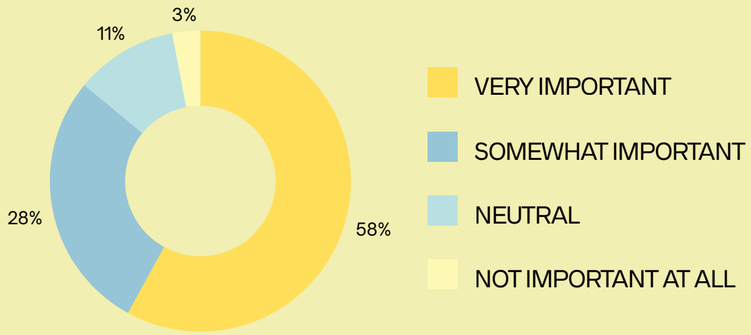
SURVEY FINDINGS

Goal: To Identify what audiences value most and where experiences fall short

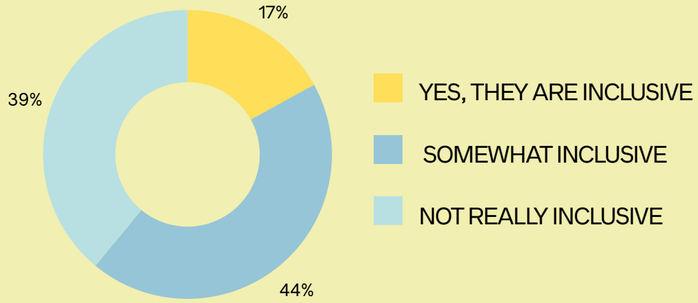
36 PEOPLE

AGES 19-45

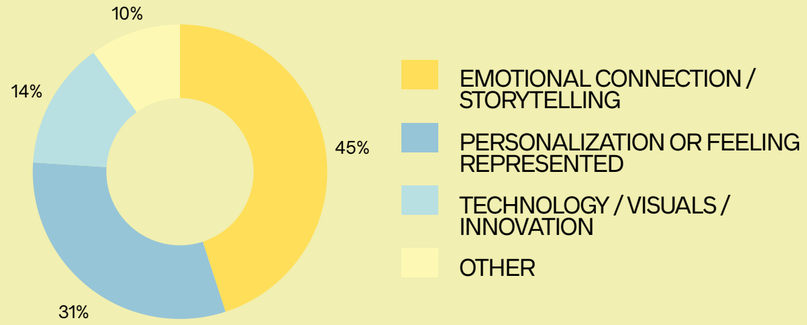
How important is personalization in entertainment experiences?



Do you feel current entertainment experiences are inclusive of people with different needs or abilities?



What makes an entertainment experience memorable for you?



INSIGHTS

Across interviews, site visits, and surveys, five main insights emerged:

1.Emotional Connection Shapes Memory
People remember how an experience made them feel, not how it looked. Emotional storytelling and atmosphere create stronger engagement than visuals alone.

2.Personalization Matters More Than Luxury
Users value tailored experiences that feel meaningful and human, rather than material or aesthetic extravagance.

3. AI Enhances but Cannot Replace Human Emotion
AI supports efficiency and personalization but lacks empathy and warmth. It should amplify emotion, not automate it.

4. Inclusivity Is Still Limited
While designers acknowledge accessibility, many experiences still partially include users with different needs or backgrounds.

5. Collaboration Creates Meaningful Design
The most successful emotional experiences arise when designers, technologists, and storytellers work together from the beginning.

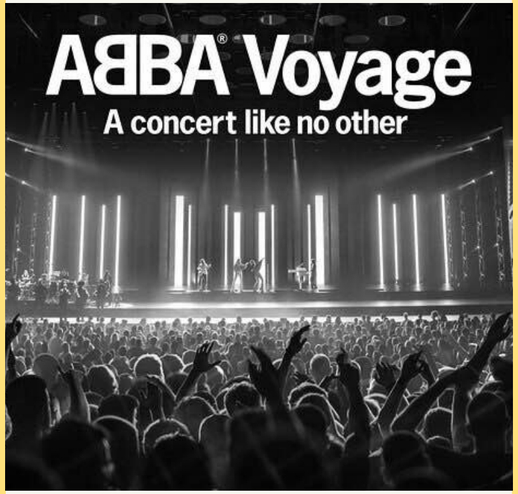
SECONDARY RESEARCH

TOP RESEARCH INSIGHTS

THE SPHERE- LAS VEGAS

DIGITAL TWINS

ABBA VOYAGE LONDON



Our secondary research helped us fill the gaps that we couldn’t fully explore through our primary research. While the interviews and surveys gave us insight into how designers think and what challenges they face, the secondary research allowed us to look outward studying how AI and immersive technologies are being used in real projects around the world. We explored case studies like the Sphere in Las Vegas, ABBA Voyage in London, and the Disney Genie+ app, Digital twins and more to understand how technology can enhance engagement, accessibility, and emotional response in physical entertainment spaces.

Online reviews revealed that while users found the Sphere's shows deeply immersive and emotional, many also felt sensory overload , showing the need to balance excitement with accessibility.

"BEST CONCERT VENUE EVER, COMPLETELY IMMERSIVE EXPERIENCE SO HIGHLY RECOMMEND"

"FROM THE MOMENT THE LIGHTS DIMMED, IT WAS FULL-BODY NOSTALGIA"

"COOLEST SHOW EVER, FULL BODY EXPERIENCE "

"VISUALS ARE INTENSE... I WOULD ABSOLUTELY NOT SEE THIS FROM THE 300 OR 400S LEVEL SEATS"

"THE VISUALS WERE WILD ... BUT THEY WERE ALSO DISTRACTING. AT TIMES, KIND OF ODD..."

"SENSORY OVERLOAD!"

SECONDARY RESEARCH

1.DIGITAL TWINS IN CONSTRUCTION AND DESIGN

A digital twin is defined by IBM as a “virtual representation of an object or system that spans its lifecycle, is updated from real-time data, and uses simulation, machine learning, and reasoning to help decision-making.” Originally developed for industrial engineering, digital twins are now being used within architecture and entertainment design to simulate how people move and feel within a physical space. Designers can use these virtual models to test spatial comfort, crowd flow, lighting conditions, and accessibility before construction even begins. This technology bridges the gap between physical design and user experience, allowing designers to predict how visitors might interact with a space and adjust accordingly. In entertainment, digital twins are used to pre-visualize immersive attractions or concerts, improving both functionality and emotional engagement. By merging technical precision with human-centred design, digital twins help ensure that immersive environments are not only efficient but also emotionally and sensorially impactful.

Source: https://www.ibm.com/think/topics/what-is-a-digital-twin

2. SPHERE AT THE VENETIAN RESORT, LAS VEGAS

The Sphere at The Venetian Resort in Las Vegas is one of the world’s most advanced entertainment venues, standing 366 feet tall and 516 feet wide. It contains a 16K wraparound LED screen, over 167,000 speakers, and a programmable exterior LED shell spanning 580,000 square feet. Designed to host concerts, immersive films, and interactive events, it provides audiences with a 360-degree multisensory experience that combines sight, sound, vibration, and even scent. The Sphere represents a new generation of architectural entertainment one where technology and design collaborate to transform the audience from passive spectators into active participants. For experience designers, this venue is an example of how immersive spaces can be engineered to amplify emotion through synchronized sensory cues. However, such large-scale experiences also pose challenges: ensuring accessibility, preventing overstimulation, and designing for inclusivity are crucial considerations when creating spaces intended to engage every sense simultaneously.

Source:
https://www.venetianlasvegas.com/entertainment/sphere-at-the-venetian.html

SECONDARY RESEARCH

3.ABBA VOYAGE, LONDON

ABBA Voyage is a groundbreaking concert residency in London that merges digital performance with live experience. In a purpose-built arena, the members of ABBA appear as hyper-realistic digital avatars or “ABBAtars” created through motion capture, CGI, and AI-assisted rendering. Accompanied by a live band and dynamic lighting, the show allows audiences to experience ABBA performing as they looked in 1979. What makes this experience unique is its ability to merge nostalgia, innovation, and immersion into one cohesive performance. The arena design incorporates accessibility from the ground up, offering wheelchair spaces, transfer-friendly seating, and clear visual pathways. ABBA Voyage exemplifies how digital design can create emotionally resonant, inclusive entertainment while using technology as a storytelling medium. It demonstrates that human connection can be maintained and even enhanced through virtual representation, as long as empathy and audience experience remain central to design.

Source: https://abbavoyage.com/accessibility/

4.DISNEY GENIE APP

Disney’s Genie App represents one of the most direct uses of AI to personalize real-world entertainment experiences. Integrated into the My Disney Experience app, it analyses live data such as queue times, attraction popularity, and user preferences to generate customized itineraries for park visitors. By dynamically adapting to real-time conditions , including weather, traffic, and crowd density the app optimizes guests’ time and enhances their overall satisfaction. The Disney Genie App transforms theme park navigation into a data-driven, stress-free experience where visitors can focus on enjoyment rather than logistics. It demonstrates how AI can support human-centered design by understanding behavioural patterns and using predictive modelling to improve emotional well-being. For designers, it highlights how algorithms can enhance, rather than replace, creativity and empathy in experience planning.

Source:https://cdn1.dtamedia.wdprapps.disney.com/dtap/dtn/media/1c055316-e89f-4f15-a72e-284aaf854496.pdf

SECONDARY RESEARCH

5. THEME PARKS AND IMMERSIVE SPACES

The global theme park industry continues to evolve through the integration of AI, sensor networks, and immersive storytelling techniques. Many modern parks now use AI-driven systems to track visitor movement, optimize crowd management, and personalize experiences in real time. These innovations help designers simulate guest journeys, manage emotional engagement, and ensure operational efficiency. However, despite these advancements, accessibility continues to be a major issue. Many parks still rely on reactive measures rather than inclusive design principles from the start. For example, attractions often lack adequate accommodations for guests with mobility impairments or sensory sensitivities. According to IAAPA, prioritizing accessibility requires a cultural shift, one that views inclusion not as an afterthought but as an integral part of entertainment design. The rise of AI offers an opportunity to model inclusivity more effectively by predicting diverse needs and responses before a design is implemented.

Source: https://iaapa.org/news-funworld/prioritizing-accessibility-experiences-theme-parks-industry

6.ACCESSIBILITY IN IMMERSIVE SPACES

Recent studies highlight a critical gap in immersive entertainment design: the lack of accessibility for users with disabilities. Many virtual and augmented reality systems are not designed with diverse bodies or abilities in mind, often assuming that all users can see, hear, and move in conventional ways. Research by Dudley (2023) and Creed et al. (2023) identifies that most immersive systems lack features like captioning, tactile feedback, and simplified navigation, creating digital experiences that unintentionally exclude certain groups. These findings mirror the physical accessibility issues seen in theme parks and large entertainment venues. As the line between digital and physical experiences continues to blur, inclusive design becomes essential not only for equity but also for emotional impact. Immersive entertainment depends on the audience's ability to engage freely; therefore, accessibility should be treated as a core design parameter, one that enhances memorability, satisfaction, and user trust.

Source:
https://arxiv.org/abs/2304.13465
https://link.springer.com/article/10.1007/s10055-023-00850-8

SECONDARY RESEARCH

7.AUTODESK BIM 360

Autodesk BIM 360 is a cloud-based common data environment (CDE) and collaboration platform that supports architectural, engineering and construction workflows from design through to completion. The platform enables multidisciplinary teams to co-author models, manage documents, perform coordination tasks, track issues and visualize updates in real time from anywhere. In the context of designing large-scale immersive spaces, such as theme parks, museums or concert venues, BIM 360 offers a unified framework for managing the complex data, changes and stakeholder coordination inherent in such projects. For example, designers can simulate spatial configurations, monitor constructability, integrate accessibility features and track timelines, all in one system. The benefit is improved decision-making, reduced rework, better alignment between experience designers and technical teams, and an enhanced ability to ensure that immersive spaces are built with both creative intent and operational clarity.

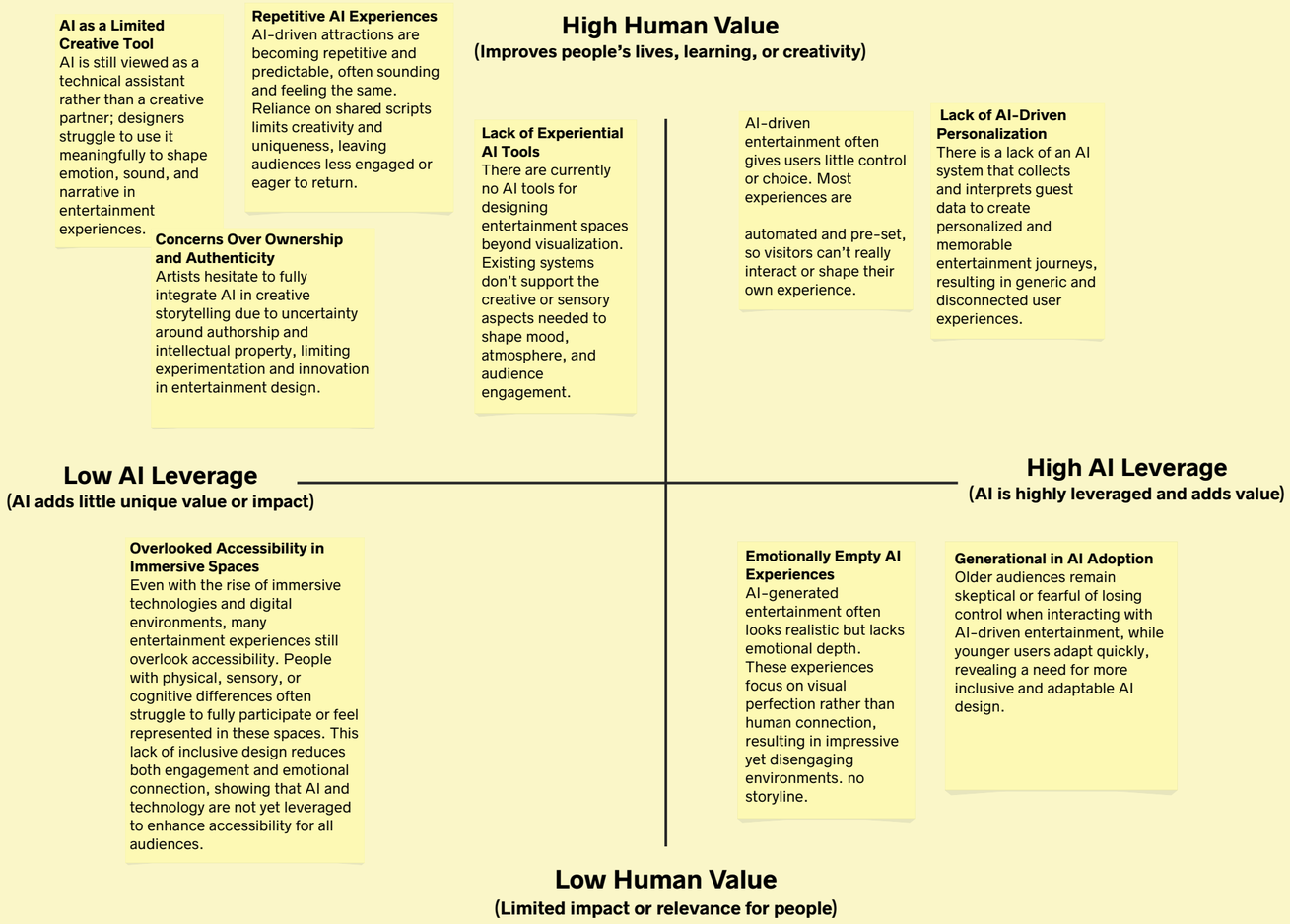
Source: https://www.autodesk.com/products/bim-360-field Autodesk

8. THINGLINK AR SOLUTION

The ThingLink AR Solution is a platform designed for museums, galleries and heritage sites to enhance visitor engagement and accessibility through immersive digital layers. The platform allows curators to overlay 2D, 3D and 360° media onto physical spaces, enabling visitors to use mobile devices or tablets to access rich contextual information—such as audio narration, interactive visuals and multilingual translations, superimposed on real exhibits. By doing so, ThingLink aims to make cultural content more reachable for remote users, inclusive of different abilities, and adaptable for educational purposes. Its use extends beyond virtual tours; it helps create augmented-reality experiences in real world settings, enabling designers of immersive environments (such as museums or interactive zones in theme parks) to prototype how exhibits might engage users, ensure way-finding is intuitive, and test how sensory overlays affect comfort and understanding.

source: https://www.thinglink.com/museums-and-galleries ThingLink

VISIONARY THINKING FRAMEWORK

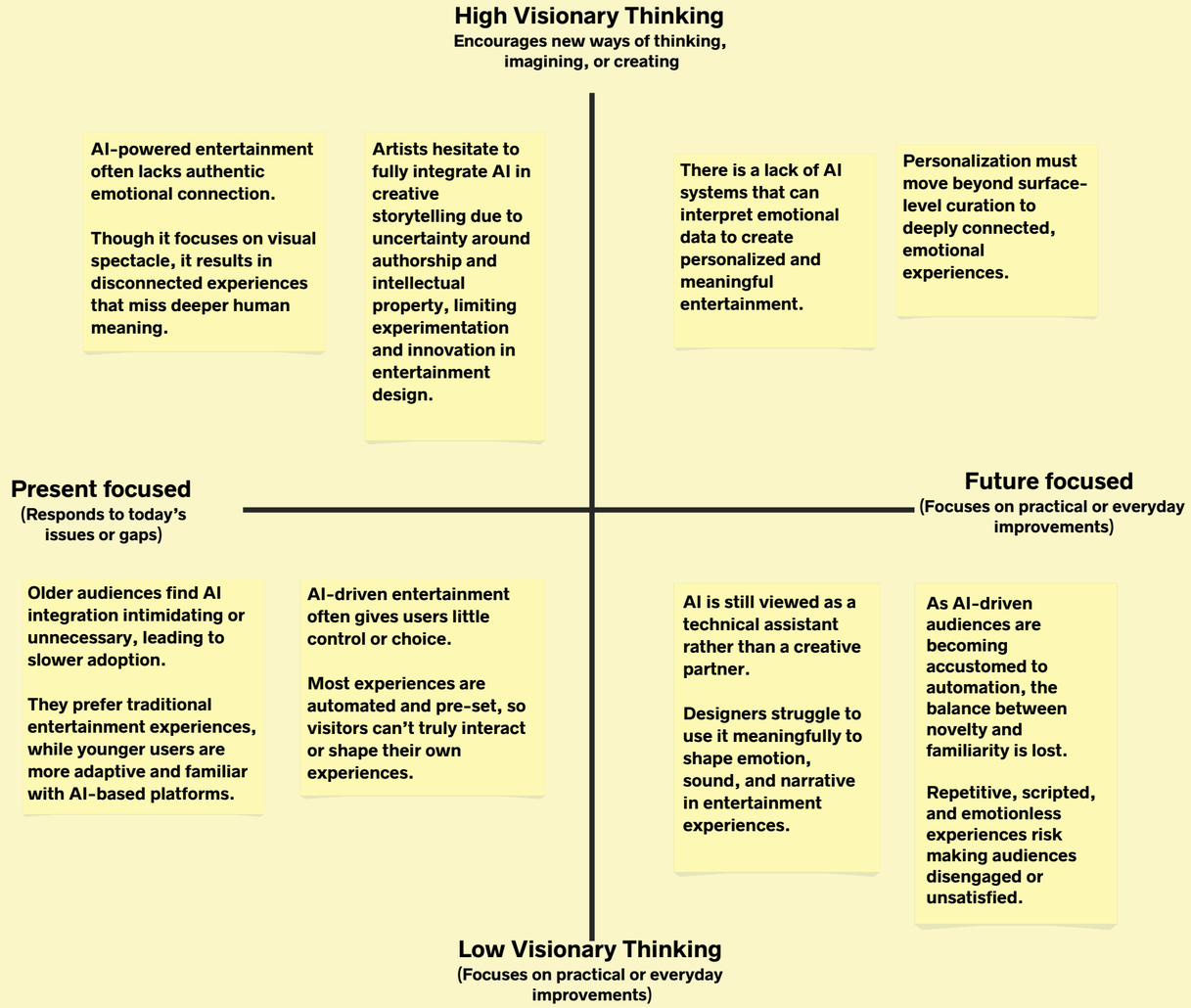


When we mapped our insights, we found that the lack of accessibility, the weak use of AI tools, and the fragmented nature of software systems all fall under high visionary thinking and future-focused areas. This means these issues are not yet fully solved but hold major potential for innovation.

They represent spaces where emerging technologies could transform how designers create and manage immersive environments. In particular, AI can help bridge these gaps making systems more connected, experiences more inclusive, and design processes more responsive to different user needs.

This positioning shows that the future of immersive spaces lies in integrating empathy, technology, and accessibility from the very start.

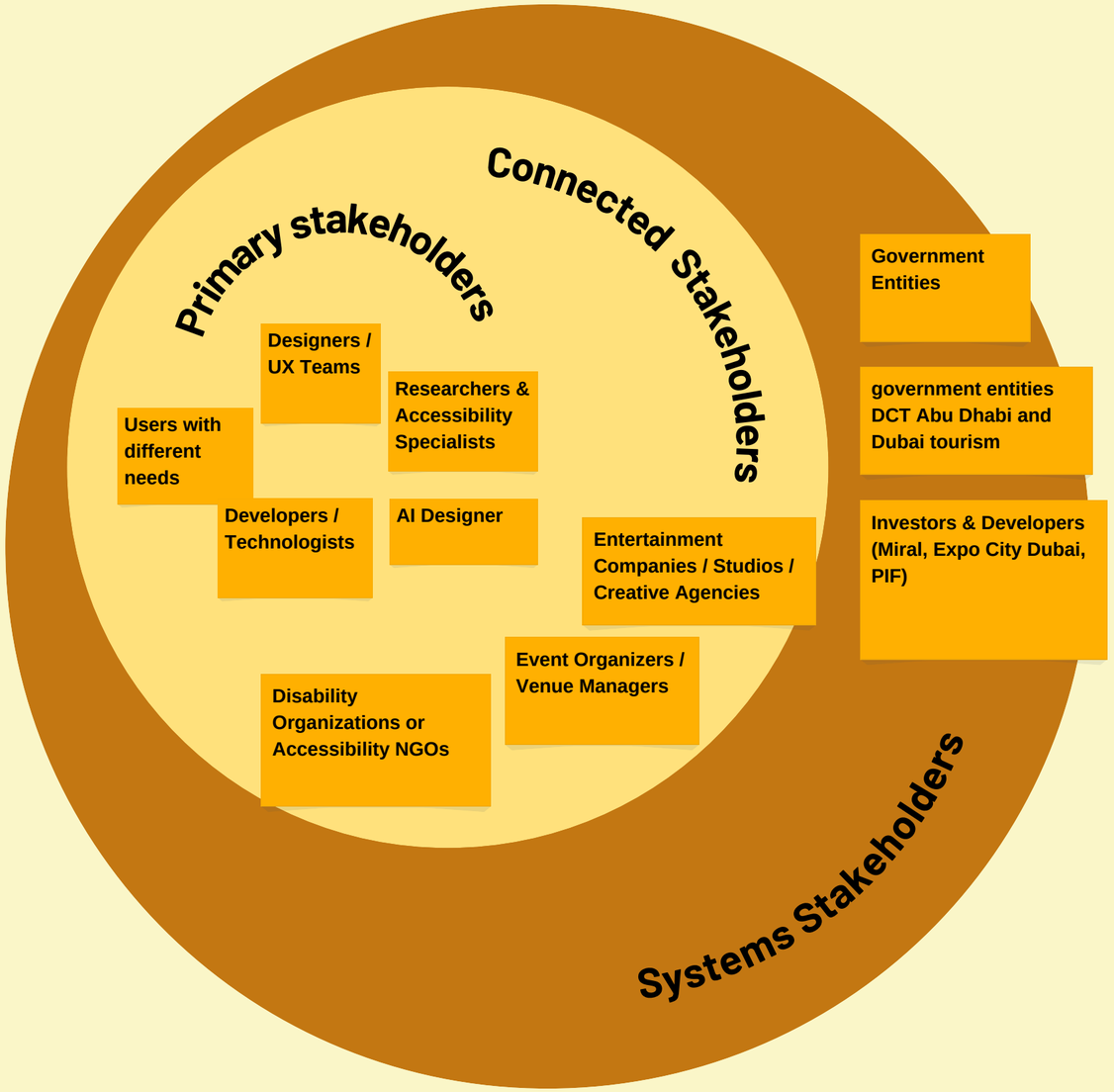
OPPORTUNITY MAPPING



When we mapped our insights, we found that most entertainment experiences remain in the present-focused and low visionary thinking zones, where AI is used mainly for automation rather than creativity.

Many users still face limited interaction and emotional connection, as AI-driven experiences often feel repetitive and detached. However, the future-focused and high visionary thinking areas reveal strong potential for innovation.

These opportunities include developing AI systems that interpret emotion, enabling deeper personalization and storytelling. Moving forward, true progress lies in using AI as a creative collaborator that helps designers craft meaningful, emotionally engaging, and human-centered entertainment experiences.



STAKEHOLDERS MAP

We decided to create a stakeholder map to understand everyone involved in designing and experiencing AI-driven immersive environments. At first, it seemed like a simple exercise, just identifying the people and systems that play a role, but as we built it, we started to see how deeply connected everything really is. Every decision, whether technical or creative, affects someone else in the process. Doing this helped us realize that immersive design isn't just about the physical space itself. It's about how people, technology, and systems all interact to shape that space. By mapping these relationships, we started noticing where things often go wrong, where communication drops, where users are left out, or where accessibility is overlooked. It showed us that AI's impact depends entirely on how these connections are managed. This map became one of the most important steps in our project. It changed the way we looked at design, not as separate roles working in isolation, but as a system where collaboration defines the outcome. It made us more aware of where designers can make change and where they need support from others to create immersive environments that actually include everyone.

Primary Stakeholders

The primary stakeholders are the people who are most directly involved in creating or experiencing immersive spaces.

UX Designers: sit at the center of this process. They interpret how people interact with physical environments and use tools to test and visualize how experiences can become more inclusive and emotionally engaging. They think about every step that users will take.

Architects and Design Teams shape how the environment looks and functions. They work closely with designers to make sure ideas about accessibility, lighting, movement, and comfort translate into real spaces.

Visitors and End Users are the people who experience these environments. Their emotions, reactions, and accessibility needs help designers understand what works, what doesn't, and what truly leaves a lasting impression.

Seeing these groups together showed us that immersive design relies on constant feedback. Designers respond to user experiences, architects turn those insights into physical form, and users continue to shape how spaces evolve.

Connected Stakeholders

The connected stakeholders support the design process through technical, strategic, and data-driven roles.

AI Developers build the systems that allow environments to react to users in real time. Their work helps designers test interactions and visualize how spaces might adapt to different needs.

Project Managers and BIM Coordinators keep creative and technical teams aligned. They make sure that the design vision stays consistent while the technical side runs smoothly.

Marketing and Data Teams collect insights from user behavior and emotional responses, which help designers understand how people actually engage with a space.

Consultant Firms and Design Studios bring specialized knowledge, offering guidance on accessibility, sensory design, or new technologies that can improve the user experience.

These people might not be directly visible in the final design, but without them, the process would fall apart. Their coordination and technical insight are what allow creative ideas to turn into functioning immersive environments.

System Stakeholders

System stakeholders operate at a broader level and influence how immersive projects are planned, approved, and developed.

Government Entities such as DCT Abu Dhabi and Dubai Tourism play a major role in setting standards for accessibility, safety, and cultural representation. Their regulations shape how inclusive design is implemented in real spaces.

Educational Institutions prepare designers and engineers to work across disciplines, combining creativity with technology in responsible ways and teach them how to design and think in certain ways.

Technology Providers like Autodesk and Adobe create the tools that make collaboration possible, from 3D visualization to digital simulation.

Investors and Developers fund and manage large-scale projects, influencing how much room there is for experimentation, technology integration, and inclusivity.

Even though these stakeholders aren’t always directly involved in the design process, their decisions set the direction for what becomes possible, from the technology used to the level of inclusivity expected.

PHASE 1- KEY TAKEAWAYS

SECONDARY RESEARCH

Our secondary research helped us understand how AI is being integrated into entertainment and design industries. We explored case studies such as The Sphere in Las Vegas, ABBA Voyage in London, Disney Genie App, and the use of Digital Twins in immersive spaces. These examples showed how AI can enhance personalization, prediction, and engagement ,but also revealed key gaps. Most systems still focus on technology over empathy, creating experiences that are visually impressive but not always inclusive or emotionally engaging. Accessibility and human connection were often treated as afterthoughts rather than design priorities.

PRIMARY RESEARCH

To ground our findings in real-world insights, we conducted interviews, surveys, and site visits to physical entertainment spaces such as The Museum of the Future and SINO One Za'abeel. Participants described memorable experiences as those that made them feel emotionally connected and comfortable within a space. Many also pointed out issues like sensory overload, confusing navigation, and limited inclusivity for users with physical or sensory differences. These insights showed us that satisfaction in immersive spaces is shaped more by emotional awareness and spatial comfort than by visual or technical innovation alone.

STAKEHOLDER MAPPING

We then created a stakeholder map to visualize how different roles interact within the ecosystem of immersive design. We identified how designers, AI developers, accessibility experts, consultants, and policymakers all influence the outcome of a project, yet often operate separately. Designers and architects depend on technology to bring ideas to life, but accessibility specialists are usually consulted too late in the process. This mapping helped us pinpoint where communication breaks down and where stronger collaboration could lead to more inclusive outcomes.

OPPORTUNITY MAPPING

When we mapped our insights, we found that the lack of accessibility, the weak use of AI tools, and the fragmented nature of software systems all fall under high visionary thinking and future focused areas. This means these challenges are not yet fully solved but hold major potential for innovation. They represent spaces where emerging technologies could redefine how designers create and manage immersive environments. In particular, AI can help bridge these gaps making systems more connected, experiences more inclusive, and design processes more responsive to diverse user needs. This positioning highlights that the future of immersive design lies in merging empathy, accessibility, and intelligent systems from the very beginning.

REFLECTION

Looking back on Phase 1, our biggest takeaway was that meaningful innovation doesn't come from technology alone , it comes from understanding people. Our research revealed how often inclusivity and accessibility are overlooked in "immersive" experiences and how crucial it is to bring users into the process early. We learned that the future of entertainment design depends on how well designers can balance creativity, empathy, and data. As we move forward, we see a clear opportunity to explore how AI can act as a creative partner that enhances emotional connection, spatial awareness, and inclusivity within physical entertainment environments.

PHASE 2

DEFINE

USER PERSONAS

OVERVIEW

After conducting our primary and secondary research, we began synthesizing our findings to identify key user types. We noticed clear patterns among designers and audiences in how they interact with AI, creativity, and entertainment experiences.

From these insights, we developed three personas to represent the main perspectives we observed:

LINA

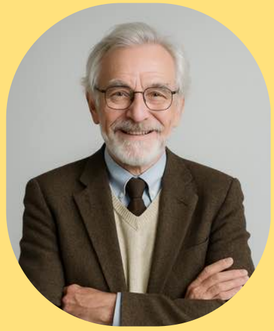
The Designer That Cares Too Much

AMANDA

The Visitor Who Values Independence

ALI

The Designer Behind the Experience



MARK

The traditional thinker

AMNA

The Experience Seeker

AMANDA

- 27 years old
- customer service
- Sharjah

ABOUT THE USER

Age: 27
Occupation: Customer Service Representative at a Telecom Company
Location: Sharjah
UAE Disability: Uses a wheelchair due to a spinal cord injury from a car accident

GOALS AND MOTIVATIONS

- To move around independently without needing assistance.
- To find inclusive entertainment spaces and community events.
- To be treated equally and respectfully by service providers.
- Feels inspired by people who prove that disability doesn’t mean limitation.
- Believes good design and accessibility can improve confidence and wellbeing.

PAIN POINTS & BARRIERS

- Entertainment spaces often lack ramps, wide entrances, or wheelchair seating.
- Public areas like sidewalks, parking lots, and bathrooms are poorly designed for accessibility.
- Most venues don’t mention accessibility features on their websites or event pages.
- Feels overlooked when accessibility is treated as an afterthought.

BEHAVIORS & CONTEXT

- Morning: Takes a ride to work, often facing limited parking or narrow ramps.
- Afternoon: Works at her desk, enjoys chatting with coworkers during lunch.
- Evening: Tries to attend a movie or event with friends but sometimes can’t enter comfortably due to steps or lack of accessible seating.

AI ADOPTION

- Stage: Curious → Adopter
- Finds AI appealing for convenience and emotional security
- Feels hesitant about overreliance on technology that lacks genuine understanding of her needs.
- Appreciates AI when it helps identify accessible spaces quickly and reliably.

EMPATHY MAP

WHO ARE WE EMPATHIZING WITH?

Amanda is a 27-year-old customer service representative living in Sharjah.

WHAT DOES SHE NEED TO DO?

- Find entertainment venues and events that are fully accessible — accurate info upfront

.

- Make decisions with confidence knowing a space will accommodate her wheelchair.

WHAT DOES SHE HEAR?

- Friends saying “It should be fine — it’s only one step.”
- Staff saying “We can help carry you or the wheelchair” instead of offering proper access.
- Stories from others facing similar challenges and frustrations.

WHAT DOES SHE SEE?

- Many venues that ignore accessibility in their design.
- • Lack of ramps, narrow entrances, difficult parking, or steps with no alternative routes.
- • Marketing that rarely shows people with disabilities included.

WHAT DOES SHE SAY AND THINK?

- “I just want to enjoy a place like everyone else.”
- “Why isn’t accessibility mentioned anywhere?”
- “I hate asking for help — it should already be there.”

“Sometimes I skip plans because I’m worried the venue won’t work for me.”

WHAT DOES SHE THINK AND FEEL?

PAIN

- Feels excluded when venues treat accessibility as optional.
- Worries about being embarrassed if a place isn’t accessible.
- Frustrated with lack of accurate, reliable accessibility information.

GAIN

- Wants to enjoy outings spontaneously — not after heavy planning.
- Believes accessibility can empower confidence and mental wellbeing.
- Feels inspired by inclusive design and communities who “get it.”

JOURNEY MAP

Stage / Phase	Actions	Thoughts & Feelings	Pain Points	Opportunities
Searching for Experiences	Looks online for concerts, museums, or entertainment spaces that are accessible and inclusive.	Feels hopeful but cautious, knowing many places overlook accessibility details.	Finds accessibility information unclear or missing from websites.	Use AI to personalize recommendations based on accessibility preferences and needs.
Arriving at the Venue	Navigates the space with her wheelchair, following signage or staff instructions.	Feels nervous about potential barriers but excited to participate.	Encounters ramps that are too steep, inaccessible seating, or poor crowd flow.	Use AI and sensors to map crowd movement and improve accessibility in real time.
During the Experience	Watches performances or interacts with installations designed for general audiences.	Enjoys the creativity but sometimes feels excluded from interactive parts.	Technology and visuals are not always designed for different physical abilities.	Encourage designers to use AI simulations to test inclusivity for different user needs.
Post-Experience Reflection	Shares feedback online or through accessibility reviews.	Feels satisfied if her needs were considered and visible in the design.	Disappointed when feedback is ignored or not acted upon.	Use AI to collect and analyze accessibility feedback to continuously improve user experience.

ALI

- 35 years old
- Architect
- Abu Dhabi

ABOUT THE USER

- Ali Oversees the design and development of immersive entertainment spaces and attractions.
- Manages teams of architects, engineers, and creatives to deliver engaging, memorable experiences.
- Uses tools like Revit, Rhino, and BIM 360 to coordinate design workflows.

BEHAVIORS & CONTEXT

- Oversees the design of large entertainment spaces, coordinating reviewing designs and creative teams
- Works under tight deadlines and budget pressure.

GOALS AND MOTIVATIONS

- Create entertainment experiences that connect emotionally with visitors.
- Use technology to enhance design quality and reduce time and costs.
- ease communication between all departments when it comes to work
- Bridge the gap between creative ideas and data-driven design.

AI ADOPTION

- Excited about how AI can save time, reduce cost, and improve design accuracy.
- Believes AI should act as a servant tool, helping designers think smarter, not faster.

PAIN POINTS & BARRIERS

- AI tools are still in testing stages, with no clear framework or direction on how to use them effectively in design.
- Feels pressure to deliver projects quickly and reduce costs while maintaining innovation and quality.
- Finds it difficult to tailor experiences to different users since feedback is generic and collected only after projects are completed.

EMPATHY MAP

WHO ARE WE EMPATHIZING WITH?

Ali is a 35-year-old architect in Abu Dhabi who oversees the development of immersive entertainment spaces

WHAT DOES HE NEED TO DO?

- Coordinate design workflows smoothly across teams.
- Use AI to speed up production without sacrificing creativity.
- Make informed design decisions early to avoid costly revisions.

WHAT DOES HE HEAR?

- Executives pushing for cheaper and faster delivery.
- Creative teams worried AI may limit artistic expression.
- Industry talk about “future-proofing” with automation.
- Feedback arriving too late to make design changes.

WHAT DOES HE SEE?

- Pressure to adopt technology to stay competitive.
- AI tools emerging but without clear best practices.
- Clients demanding faster results and lower costs.

WHAT DOES HE SAY AND THINK?

- “AI should help us make smarter decisions, not replace creativity.”
- “We need tools that reduce time without reducing quality.”
- “We never know if visitors will emotionally connect until it’s too late.”

WHAT DOES HE THINK AND FEEL?

PAIN

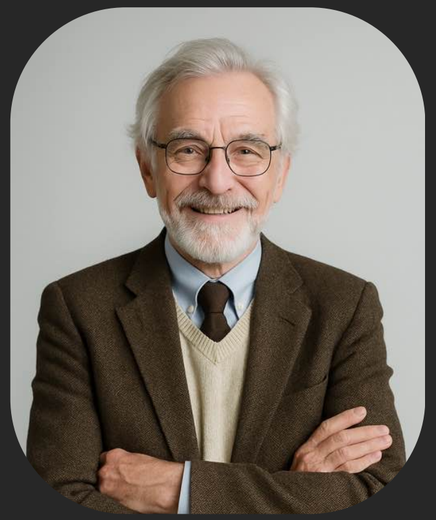
- AI tools feel unfinished and risky to rely on.
- Struggles to tailor spaces to diverse audiences’ emotions.
- Stress balancing innovation, cost, and deadlines.
- Hard to predict real user reactions pre-launch.

GAIN

- Wants AI to reveal what truly engages visitors.
- Dreams of smoother workflows and fewer redesigns.
- Believes tech + creativity can deliver stronger emotional experiences.
- Motivated by seeing visitors deeply immersed in the spaces he designs.

JOURNEY MAP

Stage / Phase	Actions	Thoughts & Feelings	Pain Points	Opportunities
Planning and Researching	Studies global examples of AI-integrated entertainment spaces and reviews case studies.	Feels inspired by innovation and how AI can transform design efficiency.	Finds limited local examples or frameworks to guide AI use in spatial design.	Provide accessible resources or databases showing successful AI applications in design.
Design Development	Uses tools like Revit or Rhino and integrates AI plugins to enhance visualizations and efficiency.	Excited about faster workflows and data accuracy.	Feels overwhelmed by learning new tools without clear design guidelines.	Develop standardized AI tools tailored for designers to bridge creativity and functionality.
Collaboration and Coordination	Communicates with engineers, designers, and clients to align AI features with creative goals.	Motivated by collaboration but frustrated when technical language causes confusion.	Feels that creative vision sometimes gets lost in technical execution.	Create AI platforms that simplify communication between creative and technical teams.
Delivering the Experience	Oversees final installation or construction of AI-enhanced spaces.	Proud to see his design come to life and engage audiences emotionally.	Feels pressure to balance innovation, budget, and time constraints.	Use AI to predict user engagement or optimize spatial experience during the design phase.



MARK

- 60 years old
- Professor
- Sharjah

ABOUT THE USER

- Comes from an academic and artistic background, with years spent teaching, painting, and attending cultural events.
- Values mindfulness, human connection, and experiences that feel slow, intentional, and emotionally rich.
- Appreciates art and entertainment that engage the senses without overwhelming them.
- Believes creativity should come from human emotion and time, not from algorithms or automation.

BEHAVIORS & CONTEXT

- Spends time painting, reading, and attending small local exhibitions.
- Watches documentaries or classical performances rather than fast-paced media.

GOALS AND MOTIVATIONS

- Wants to feel emotionally connected to experiences rather than overstimulated.
- Seeks comfort in authenticity, tradition, and craftsmanship.
- Values experiences that reflect cultural and human depth rather than automation.
- Appreciates technology only when it helps preserve or showcase art meaningfully (e.g., archiving, accessibility).

AI ADOPTION

- Comfort Level: Avoider → Curious
- Finds AI fascinating but overwhelming.
- Feels that AI-generated experiences lack emotional sincerity.
- Worries about technology replacing human creativity and slowing genuine connection.

PAIN POINTS & BARRIERS

- Feels overwhelmed by sensory-heavy digital experiences (too much light, sound, or information).
- Finds AI-generated art emotionally flat and repetitive.
- Lacks trust in AI's ability to create something "real."
- Believes society is losing appreciation for slow, mindful creativity.

EMPATHY MAP

WHO ARE WE EMPATHIZING WITH?

Mark is a 60-year-old professor and artist who values slow, intentional, culturally rich experiences.

WHAT DOES HE NEED TO DO?

- Feel emotionally connected to entertainment rather than overwhelmed.
- Adopt technology only when it enhances human creativity.
- Continue enjoying cultural events without losing personal meaning.

WHAT DOES HE HEAR?

- Students excited about AI-driven art trends.
- Society pushing innovation over emotional value.
- Friends worrying about losing traditional craft.
- Media highlighting the speed of automation.

WHAT DOES HE SEE?

- Increasing automation in creative fields.
- Experiences designed for spectacle rather than emotion.
- Fewer opportunities for mindful, human-led art.

WHAT DOES HE SAY AND THINK?

- • “Art needs time and emotion — not just algorithms.”
- “Technology should preserve culture, not replace it.”
- “AI lacks the human touch that makes creativity feel real.”
- “I’m curious, but also cautious about where AI is heading.”

WHAT DOES HE THINK AND FEEL?

PAIN

- Overstimulated by loud, fast digital experiences.
- Distrusts AI’s ability to be emotionally authentic.
- Concerned that creativity may become machine-driven.
- Feels the world is losing touch with soulful art.

GAIN

- Enjoys technology that archives and preserves culture.
- Hopes to see AI enhance — not replace — human creativity.
- Seeks peaceful, reflective, sensory-balanced experiences.
- Appreciates art that tells personal and emotional stories.

JOURNEY MAP

Stage / Phase	Actions	Thoughts & Feelings	Pain Points	Opportunities
Searching for Entertainment	Looks for live concerts, theater shows, or cultural events that remind him of older, simpler experiences.	Feels nostalgic and values emotional storytelling.	Finds it difficult to relate to modern, tech-heavy experiences that lack warmth.	Use AI to adapt content based on user preferences for tone, pacing, and nostalgia.
During the Experience	Attends new immersive or AI-integrated shows, often recommended by family or friends.	Feels curious but sometimes overwhelmed by digital visuals and fast-paced environments.	Sensory overload makes him feel disconnected rather than immersed.	Design experiences that balance innovation with comfort and simplicity.
Engaging with Technology	Tries to understand how AI or interactive tools work but feels intimidated by them.	Worries about losing the “human touch” in art and entertainment.	Struggles with accessibility and intuitive use of new interfaces.	Simplify technology onboarding and use AI to personalize guidance for older users.
Reflecting Afterwards	Discusses the experience with friends or family, comparing it to traditional performances.	Appreciates creativity but still misses human presence and live emotion.	Feels that technology can sometimes overshadow meaning.	Create AI-enhanced entertainment that supports not replaces human connection.

AMNA

- 25 years old
- Design Student
- Dubai

ABOUT THE USER

- Design student in her mid-20s who enjoys exploring creative and immersive experiences.
- Frequently visits AI-driven exhibitions, digital art shows, and interactive museums with friends.
- Curious about how technology can make experiences more meaningful and memorable.

BEHAVIORS & CONTEXT

- Amna Starts her day scrolling through social media for creative inspiration and event updates.
- Attends university during the day, working on design projects.
- In the evenings or weekends, visits pop-ups, exhibitions, or immersive shows with friends.

GOALS AND MOTIVATIONS

- Wants to feel emotionally connected and surprised by experiences.
- Enjoys sharing unique entertainment moments on social media.
- Seeks activities that blend technology, creativity, and storytelling.

AI ADOPTION

- How comfortable are they with AI? Comfortable using AI for fun and creativity but still prefers experiences that feel personal and human.
- what excites or scares them about adopting it?
- Excited by how AI can make experiences more interactive and visually stunning,

PAIN POINTS & BARRIERS

- Finds AI-generated attractions repetitive and predictable.
- Experiences feel too automated, little control or interaction.
- Lack of personalization makes it hard to feel emotionally engaged.

EMPATHY MAP

WHO ARE WE EMPATHIZING WITH?

Amna is a 25-year-old design student in Dubai who loves creative and immersive entertainment.

WHAT DOES SHE NEED TO DO?

- Have personalized entertainment that feels emotional, not generic.
- Discover new AI-driven attractions that surprise and excite her.
- Share her experiences easily with followers on social media.

WHAT DOES SHE HEAR?

- Friends encouraging her to try the newest exhibits.
- Influencers hyping immersive technology.
- Designers discussing creativity and user experience.
- Media promoting AI as the future of entertainment.

WHAT DOES SHE SEE?

- Growing number of digital art shows and immersive pop-ups.
- Experiences that could be more interactive and unique.
- Trends spreading fast on Instagram and TikTok.
- Friends constantly seeking the “next new thing.”

WHAT DOES SHE SAY AND THINK?

- “I want experiences that feel personal and creative.”
- “Some AI stuff looks cool but feels repetitive.”
- “I love things that I can share on my feed.”
- “Make it immersive — make me part of it!”

WHAT DOES SHE THINK AND FEEL?

PAIN

- AI experiences often feel repetitive or predictable.
- Lack of personalization reduces emotional engagement.
- Sometimes feels more like watching than participating.
- Wants more interaction, control, and storytelling.

GAIN

- Loves being surprised by new sensory experiences.
- Excited by AI for visual impact and interactivity.
- Wants to feel creative and connected to the experience.
- Enjoys sharing “wow” moments that stand out socially.

JOURNEY MAP

Stage / Phase	Actions	Thoughts & Feelings	Pain Points	Opportunities
Discovering New Experiences	Scrolls through social media to find AI-based exhibitions, pop-ups, and shows to attend with friends.	Feels curious and excited about trying something new and visually stunning.	Finds many experiences look similar and lack uniqueness.	Create more personalized AI-driven experiences that adapt to visitor interests and emotions.
Experiencing the Event	Visits an immersive AI exhibition or concert and interacts with digital installations.	Feels amazed at first, but sometimes detached if it feels too automated.	Feels that experiences can lack authenticity or emotional connection.	Blend storytelling and human interaction within AI experiences to make them feel more personal.
Sharing the Moment	Takes photos and videos to post online or share with friends.	Feels proud and inspired when others react positively to her posts.	Feels frustrated when visuals look better online than in person or when meaning is unclear.	Use AI to create shareable, meaningful visuals that communicate emotion both online and offline.
Reflecting on the Experience	Thinks about what made the experience memorable and if she would return.	Appreciates creative design and innovation but values emotional connection more.	Feels that some experiences focus too much on technology rather than meaning.	Design AI experiences that balance creativity, emotion, and innovation to foster deeper engagement.

CORE PERSONA

LINA

- 28 years old
- Experience Designer
- Dubai

ABOUT THE USER

Lina is an experience designer who believes every detail shapes how people feel inside a space.
She notices everything: color contrast, textures, lighting, to make sure no one feels left out.
Her perfectionism comes from empathy; she wants design to feel human and meaningful.

BEHAVIORS & CONTEXT

- Very social and curious, listens to feedback and real stories.
- Spends time refining emotional and visual details until they feel right.
- Cares deeply about how people feel in her designs, not just how things look.

GOALS AND MOTIVATIONS

- Create experiences that are emotional and inclusive.
- Make sure no user or detail is ever overlooked.
- Design spaces that feel human and memorable.

AI ADOPTION

- Uses AI to analyze feedback ETC.
- Open to using AI if it helps her better understand users' emotions and needs.
- Worries that relying too much on AI could make designs feel less human.
- Sees AI as a tool not a replacement for empathy or creativity.

PAIN POINTS & BARRIERS

- When rushed, she feels like she loses the emotional depth of her work.
- Worries about missing small details that affect user experience.
- Finds it hard to balance empathy and perfection with tight deadlines.
- Feels frustrated when meaning gets lost in the pressure to deliver fast.

JOURNEY MAP

Stage / Phase	Actions	Thoughts & Feelings	Pain Points	Opportunities
Exploring Inspiration	Visits AI-based concerts or exhibitions to observe emotional impact and audience reactions.	Feels inspired but also critical about whether these experiences feel authentic.	Finds that many AI-driven experiences look impressive but lack emotional depth.	Use AI to design more emotionally balanced experiences that combine technology with storytelling.
Designing and Prototyping	Uses AI tools for visuals, layout, or accessibility testing in her projects.	Excited to try new tools but worries they may overlook human emotion.	Struggles to translate empathy and inclusivity into data-driven design.	Develop AI systems that help designers visualize emotional and inclusive outcomes early in the process.
Testing and Feedback	Shares prototypes or experiences with peers and collects user reactions.	Feels anxious but motivated to understand how others perceive her work.	Receives surface-level feedback that focuses on visuals, not emotional experience.	Introduce AI tools that can capture emotional responses or user sentiment in real time.
Reflection and Iteration	Revises her work to balance efficiency with creativity and empathy.	Feels fulfilled when her designs make people feel seen and included.	Deadlines and pressure make it hard to refine deeper emotional aspects.	Use AI to automate repetitive tasks so designers can focus more on meaning and human connection.

PROBLEM STATEMENT

Designers need a way to engage a diverse pool of users early in the process to design more inclusive entertainment experiences

Designers need a way to engage users with different needs early in the design process to create more inclusive and memorable entertainment experiences.

Users of different needs are not being considered early in the design process of entertainment experiences

HMW STATEMENT

How might the integration of AI into the design process contribute to the creation of immersive physical environments that promote inclusivity, adaptability, and meaningful user engagement?

PHASE 2- KEY TAKEAWAYS

Team Reflection – Define Phase

During the define phase, our team moved from exploration to synthesis, transforming scattered insights into a clear design direction. We learned that entertainment experiences become memorable not because of technology alone, but because of the emotions they evoke. Through interviews, surveys, and site visits, we discovered that both designers and audiences value connection, empathy, and inclusion over luxury or innovation. This phase taught us how emotional storytelling and accessibility must coexist for true impact.

Main Takeaways and Surprises

One of the most surprising findings was how AI is viewed as a creative assistant rather than a replacement for human emotion. While it can personalize and enhance design efficiency, experts repeatedly stressed that empathy, intuition, and cultural understanding remain irreplaceable. We were also surprised by how limited inclusivity still is in entertainment, as many experiences unintentionally exclude users with different needs, reinforcing the importance of early user engagement in design.

Our synthesis revealed four key insights:

1. Emotional connection defines memorability.
2. Personalization matters more than visual appeal or luxury.
3. AI enhances but cannot replace human warmth.
4. Inclusivity remains an ongoing challenge.

These insights reframed our understanding of memorable design from aesthetics toward emotional depth and accessibility.

PHASE 3

DEVELOP

OVERVIEW / INTRODUCTION

Phase 3 focuses on transforming the insights from the Discover and Define phases into actionable design directions. This stage documents how the team generated a wide range of ideas, evaluated them against clear design criteria, and refined them based on early user testing. The goal of Phase 3 was to narrow down possible solutions and shape a coherent service concept that responds directly to user needs—specifically the silent discomfort of users like Hamda and the workflow challenges of designers like Firas.

Through ideation, early prototyping, and user feedback, we developed SimuSpace into a system that combines emotional tracking, data-driven personas, AI-powered recommendations, and immersive simulation. Phase 3 shows the evolution of this system and the reasoning behind selecting the final direction.

1. Insight Translation → “How Might We” Statements

Insights from Phase 1 and 2 were translated into design opportunities using HMW prompts, such as:

- How might we reveal discomfort for users who never speak up?
- How might we help designers detect emotional and accessibility issues early?
- How might we integrate emotional data into designers’ existing tools?

These statements helped expand our thinking beyond traditional accessibility tools.

3. Theme Clustering

Ideas were grouped into four major system components:

- Emotion Tracking
- Persona Generator
- AI Error Detection & Recommendations
- Environment Simulator

These clusters provided the foundation for SimuSpace’s integrated system.

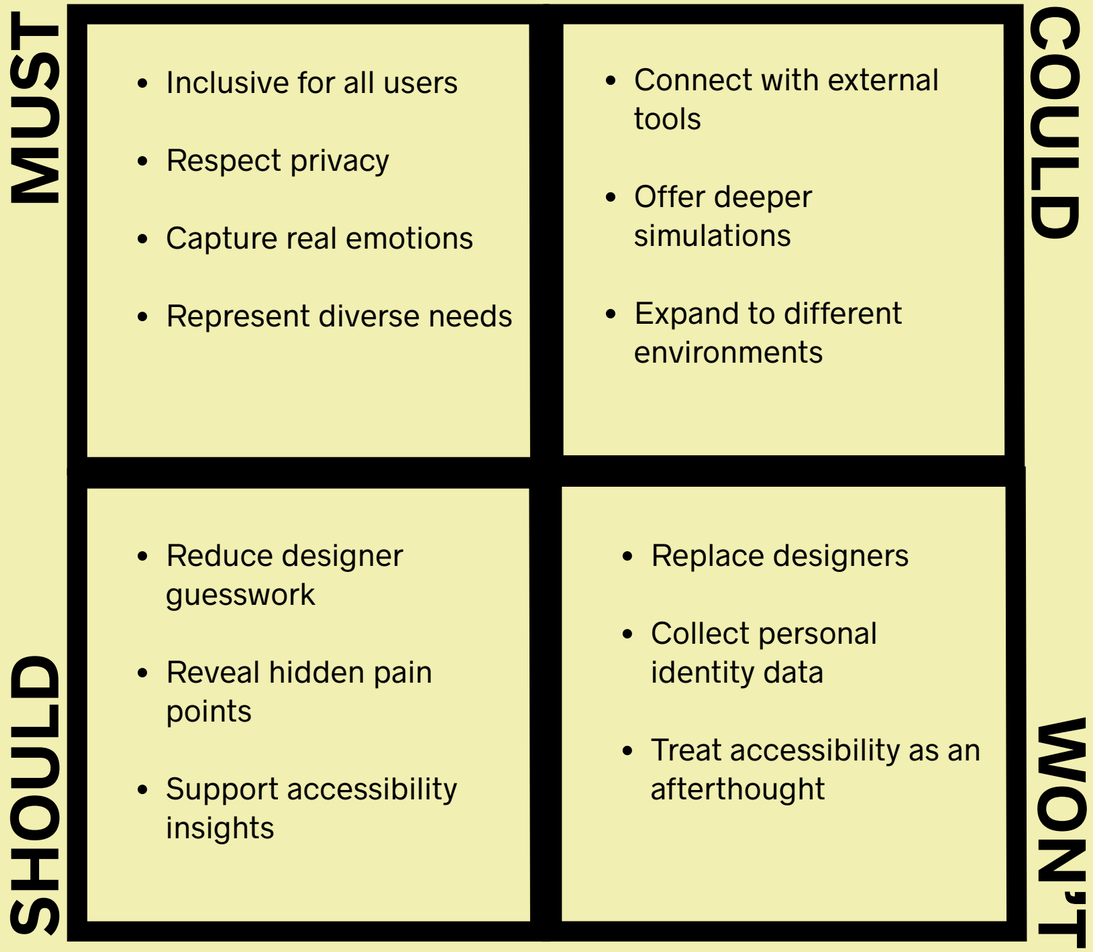
2. Brainstorming & Sketching

We generated quick sketches focusing on:

emotional hotspots and heatmaps
adaptive personas
AI-driven fixes
simulation pathways
designer workflows

This produced a large pool of rough ideas that were later clustered.

DESIGN CRITERIA



MUST
These are non-negotiable requirements that the final concept must fulfill. The service must be inclusive for all user groups, especially those with sensory or accessibility needs. It must respect privacy, capturing only emotional and behavioral patterns without collecting personal identity data. The system must capture real, authentic emotions from users and represent diverse needs to ensure the design outcomes support children, wheelchair users, anxious guests, and low-vision participants.

SHOULD
These criteria reflect important goals that significantly improve the designer's workflow. The service should reduce guesswork by providing clear, data-driven insights. It should reveal hidden pain points, especially discomfort that users like Hamda would never verbalize, and it should support accessibility insights so designers can catch issues early in the process.

COULD
These are desirable but not essential features. The system could connect with external tools for expanded functionality, offer deeper simulations for richer testing environments, and scale into different types of spaces beyond theme parks, such as museums, hospitals, or retail environments.

WON'T
These outline what the service must deliberately avoid. SimuSpace will not replace designers or remove human decision-making. It will not collect personal identity data to protect privacy. Finally, it will not treat accessibility as an afterthought, ensuring it remains embedded throughout the design process.

SHORTLISTED IDEAS

From the initial pool of ideas generated during ideation, four concepts were shortlisted based on their feasibility, relevance, and alignment with the key insights gathered in Phases 1 and 2. These concepts demonstrated strong potential to address users' emotional discomfort, support designers' workflows, and enhance inclusive decision-making. The shortlisted concepts became the foundation for early concept testing.

1. Emotional Heatmap Analyzer1. Emotional Heatmap Analyzer

This concept visualizes emotional intensity, stress levels, and behavior patterns across the environment using real-time camera data. It makes invisible emotions visible, helping designers quickly identify areas where users experience discomfort or confusion.

Reason for shortlisting: It directly addresses the problem of silent discomfort by translating emotional data into a clear, visual tool.

2. Adaptive Persona Generator

This concept transforms emotional and behavioral data into adaptive personas such as children, wheelchair users, anxious guests, or low-vision visitors. Each persona highlights unique needs and experiences.

Reason for shortlisting: It encourages empathy and inclusive decision-making by allowing designers to test spaces through the perspectives of diverse users.

These four concepts were taken forward for early user testing to evaluate clarity, relevance, and impact.

3. AI Accessibility & Comfort Checker

This feature scans CAD/Revit files and automatically identifies accessibility gaps, circulation bottlenecks, poor lighting, or areas that may cause sensory overload.

Reason for shortlisting: It addresses a major designer pain point by reducing guesswork and catching issues early, especially those that are difficult to detect manually.

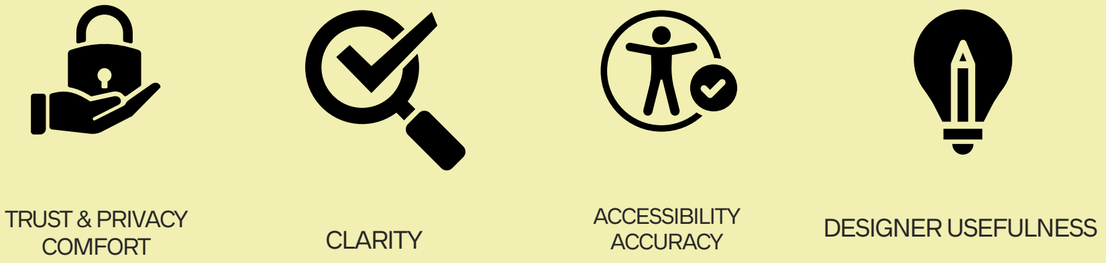
4. Environment Simulation Engine

This concept allows designers to "walk through" their spaces using different personas' perspectives. The simulation highlights emotional responses and accessibility challenges within the 3D model.

Reason for shortlisting: It supports immersive, user-centered evaluation and provides designers with a realistic understanding of how different users experience the space.

EARLY CONCEPT TESTING

Early concept testing was conducted to evaluate the clarity, relevance, and potential impact of the shortlisted ideas before selecting a final direction. This stage helped validate whether each concept addressed real user needs and aligned with designer workflows.



Testing Approach

1. Hamda — Inclusive User (Low Vision & Sensory-Sensitive)
Hamda represents users who do not verbalize discomfort, especially in overstimulating environments.
She provided feedback on accessibility, comfort, sensory overwhelm, lighting, sound, and the need for automatic emotional detection.
Her perspective validated why SimuSpace must detect issues non-verbally and adjust designs automatically.

2. Rayana — Visitor (Privacy & Trust Focus)
Rayana tested how non-designers perceive AI and cameras in public spaces.
She emphasized the importance of privacy, anonymity, transparency, and explaining how data is treated.
Her feedback shaped SimuSpace's guidelines for clear communication, non-recorded data, and non-intrusive emotional tracking.

3. Mariam Karji — Architect (Designer Usefulness)
Mariam tested the experience from a professional design viewpoint.
She assessed simulation clarity, persona logic, tool integration, workflow usefulness, and real-time edits.
Her input strengthened the need for a combined simulation + AI layer, and highlighted the importance of saving designer time through early issue detection.

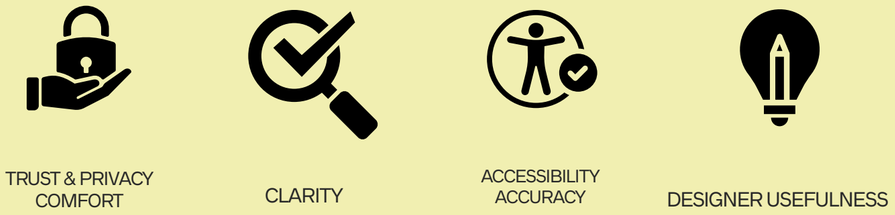
4. Firas — Engineer (Accuracy & Technical Reliability)
Firas focused on precision, BIM accuracy, accessibility code compliance, and seamless integration with tools like Revit, AutoCAD, and Navisworks.
He evaluated whether SimuSpace maintains accurate spatial dimensions, highlights accessibility issues properly, and supports cross-team coordination.
His feedback reinforced the need for AI-driven accuracy checks.

EARLY CONCEPT TESTING

Ideas Presented to Users for Feedback

Participants evaluated four core ideas:

1. Emotional Heatmap Analyzer
2. Visualized color-coded emotional data of real visitors.
3. Adaptive Persona Generator
4. Generated personas such as child, wheelchair user, low-vision user, or anxious guest.
5. AI Accessibility & Comfort Checker
6. Flagged issues such as lighting, circulation, noise, bottlenecks, and sensory triggers.
7. Environment Simulation Engine
8. Allowed walk-through experiences from each persona's point of view.
9. These concepts formed the foundation for comparison and feedback analysis.



What Was Tested

Participants reviewed multiple early representations of the concepts, including:

1. Concept cards for each shortlisted idea
2. Visual sketches of emotional heatmaps
3. Persona examples (child, wheelchair user, anxious guest)
4. Mock-ups of AI error detection screens
5. Storyboard-style simulation walkthroughs

This allowed users to respond to both functional ideas and potential interfaces.

Where & How Testing Was Conducted

- Testing was carried out through:
- One-on-one interviews (both in-person and online)
- Direct questions about clarity, relevance, impact, and desirability
- Observation and note-taking to capture reactions and behaviors

All feedback was transcribed or documented immediately after sessions to ensure accuracy.

FEEDBACK SUMMARY PER IDEA

(RELEVANCE, CLARITY, IMPACT, DESIRABILITY)

Early feedback from participants was analyzed across four criteria: relevance, clarity, impact, and desirability. This helped determine which concepts had the strongest potential to move forward.

1. Emotional Heatmap Analyzer

Relevance: Very high — participants felt this directly addressed hidden emotional experiences that users rarely express.

Clarity: Easy to understand through the visual sketches and heatmap examples.

Impact: Strong — helps designers detect stress points early in the design process.

Desirability: Designers appreciated its simplicity and power, describing it as an “instant insight tool.”

2. Adaptive Persona Generator

Relevance: Extremely high — participants valued seeing how diverse users experience the environment.

Clarity: Clear once sample personas (child, wheelchair user, anxious guest) were shown.

Impact: Strong — encouraged inclusive and empathy-driven decision-making.

Desirability: Highly desirable, especially for designers wanting grounded, data-driven personas.

FEEDBACK SUMMARY PER IDEA
(RELEVANCE, CLARITY, IMPACT, DESIRABILITY)

Early feedback from participants was analyzed across four criteria: relevance, clarity, impact, and desirability. This helped determine which concepts had the strongest potential to move forward.

3. AI Accessibility & Comfort Checker

Relevance: High — aligned closely with designers' technical needs.

Clarity: Moderate — some participants needed more explanation on how the AI identifies issues.

Impact: Very high — reduces time, rework, and guesswork in identifying accessibility gaps.

Desirability: Ranked by designers as "the most powerful feature" due to its direct integration with Revit workflows.

4. Environment Simulation Engine

Relevance: High — supports immersive testing for different personas.

Clarity: Clear through storyboard sketches and walkthrough visuals.

Impact: Useful but seen as less critical compared to the AI checker and heatmaps.

Desirability: Designers liked the feature but viewed it as a supporting tool rather than a primary one.

FEEDBACK EXAMPLE:

TRUST & PRIVACY
COMFORT

RAYANA (VISITOR)

She needs:

- Clear transparency about camera use
- Anonymous, non-recorded data
- Emotion tracking that doesn't feel intrusive
- Comfort + stress reduction in crowded spaces
- Personalization only if privacy is protected

Main takeaway:

Visitors accept AI only when it feels safe, anonymous, and clearly explained.

FEEDBACK EXAMPLE:

ARCHITECT (MARIAM KARJI)

Key Points

- Simulation + AI personas together is a strong, valuable idea
- Simulations alone already exist, AI layer makes it meaningful.
- Emphasized the need for real-time edits inside the simulation, not just suggestions
- The system should connect to their existing software so updates aren't done twice
- Appreciates tools that save time and help designers spot things they might miss

DESIGNER USEFULNESS

Main takeaway:

Designers value SimuSpace for real-time AI support, seamless tool integration, and early issue detection that saves time.

FEEDBACK EXAMPLE:

ACCESSIBILITY
ACCURACY

HAMDA (INCLUSIVE USER)

Key Points

- The system to detect discomfort automatically since she doesn’t speak up
- Sensory-friendly adjustments (softer lighting, reduced noise, calmer flow)
- Spacious, predictable layouts your simulation can test
- Real-time changes when overstimulation increases
- Staff supported by your system’s alerts for sensitive interaction
- Visual settings adapted for low-vision users
- Reassurance through comfort ratings and clear accessibility signals

Main takeaway:

Our system must detect and respond to discomfort automatically, because users like Hamda won’t speak up.

FEEDBACK EXAMPLE:

DESIGNER USEFULNESS

FIRAS (ENGINEER)

He needs:

- High technical precision between simulations and real Revit dimensions for design accuracy.
- Clear accessibility indicators (ramps, corridor widths, reach ranges) aligned with code standards
- Seamless integration with CAD/BIM platforms (Revit, AutoCAD, Navisworks) to avoid rework or data loss.
- Cross-departmental connectivity so all teams so everyone can view updates and coordinate in real time.

Main takeaway:

Firas stressed that SimuSpace should enable precise, accessible, and collaborative BIM integration with an AI check for code compliance.

INSIGHTS GATHERED

Early concept testing provided key insights that shaped the direction of SimuSpace and confirmed the importance of integrating emotional and accessibility data into the design workflow. Feedback from both designers and end-users revealed critical needs, gaps, and expectations that guided the refinement of the service.

1. EMOTIONAL DISCOMFORT MUST BE DETECTED AUTOMATICALLY

Hamda's feedback reinforced that many users—especially those with sensory sensitivities or low vision—do not verbally express discomfort. This confirmed that emotional discomfort cannot rely on self-reporting and must be captured through automated, non-verbal detection.

2. REVIT INTEGRATION AND TECHNICAL ACCURACY ARE ESSENTIAL

Firas and other designers emphasized that any new tool must seamlessly fit into existing BIM workflows. Accuracy, file compatibility, and the ability to preserve real-world dimensions were highlighted as non-negotiable requirements.

3. PERSONA-BASED INSIGHTS IMPROVE EMPATHY AND DECISION-MAKING

Participants responded strongly to adaptive personas. They noted that personas help them understand diverse needs and justify design decisions to clients more effectively. Personas made data feel more human and actionable.

4. HEATMAPS COMMUNICATE INVISIBLE USER STRUGGLES INSTANTLY

Designers found heatmaps to be one of the clearest ways to visualize emotional and accessibility challenges. They appreciated how color-coded zones quickly revealed stress, confusion, bottlenecks, or sensory overload areas without needing long explanations

5. AI-GENERATED RECOMMENDATIONS REDUCE STRESS AND SUPPORT BETTER DESIGN OUTCOMES

Participants highlighted that automatic suggestions—especially for circulation, lighting, or accessibility issues—helped reduce cognitive load. Designers valued AI as a supportive tool that saves time, prevents errors, and improves workflow efficiency without replacing human judgment.

COMPARISON IDEA MATRIX

Stage / Phase	Actions	Feedback and summary	Opportunities
Concept Exploration	Tested three early ideas ,Emotion Tracking System, AI Persona Generator, and Environment Simulator ,with Miral's design, engineering, and experience teams.	Users were intrigued by AI's potential to improve engagement and accessibility but struggled to see how the ideas connected as one system.	Combine emotional, behavioral, and spatial feedback in a single integrated tool for designers
Idea Evaluation	Presented low-fidelity concept cards to gather early reactions on clarity, desirability, and usefulness.	Emotion Tracking was most preferred for its innovation; Environment Simulator was seen as the most practical; Persona Generator worked best as a supportive feature..	Merge the strongest aspects of all three ideas into one cohesive platform.
Iteration and Refinement	Communicate adjusted the concepts based on user input and began mapping technical integration with Revit/BIM tools.	Designers valued real-time analytics and collaboration features but wanted simplicity and workflow compatibility..	Simplify the interface and ensure data visualization is clear and easy to interpret.
Concept Integration	Combined the three concepts into a unified system, SimuSpace, focusing on real-time emotion tracking, persona generation, and simulation.	Participants found this direction comprehensive and realistic for design professionals.	Position SimuSpace as a bridge between creativity, empathy, and data-driven design.

PHASE 3 KEY TAKEAWAYS

Phase 3 allowed the team to translate insights into tangible service directions and validate them through early concept testing. Throughout this phase, several important realizations shaped the final direction of SimuSpace

1. Emotional and accessibility insights must work together
Testing revealed that emotional discomfort, accessibility challenges, and circulation issues cannot be separated. Designers need a system that shows both emotional and functional barriers in the same workflow. This confirmed the value of combining heatmaps, personas, and AI accessibility checks into one integrated service.

2. Automatic detection is essential for silent users
Hamda's experience highlighted that many users do not express discomfort verbally. This reinforced that the system must detect emotional and sensory overload automatically, without relying on user reporting. This insight became a foundational requirement for the final concept.

3. Designers prioritize accuracy and workflow compatibility
Feedback from Firas and other designers emphasized that any new system must respect existing workflows and technical expectations. This validated the decision to anchor the service around Revit/AutoCAD integration, precise dimensions, and BIM-friendly outputs.

4. Visual tools communicate user struggles most effectively
Heatmaps and personas were consistently seen as the clearest way to visualize user needs. Designers responded strongly to tools that help them "see" invisible issues immediately, supporting faster decision-making and stronger communication with clients.

5. AI recommendations reduce stress and improve efficiency
Participants valued AI suggestions because they minimize guesswork, prevent rework, and provide justifications for design decisions. This confirmed that the system should not only detect issues but also propose solutions based on standards and user comfort.

6. The strongest concept emerged from combining multiple ideas
The comparison matrix reinforced that no single feature was sufficient. The most impactful concept was a unified system that connects emotion tracking, persona generation, accessibility checking, and simulation. This integration became the core of SimuSpace.

FINAL CONCEPT SELECTION RATIONALE

The final direction for SimuSpace was selected after evaluating all shortlisted ideas through user feedback, expert insights, and the comparison matrix.

The decision focused on choosing a concept that best addressed the core problem identified in earlier phases: designers lack real, measurable insight into how diverse users emotionally and physically experience a space.

1. Strong Alignment With User Needs

Testing showed that designers and end-users require more than a single tool or feature. Instead, they need a system that connects emotional insights, accessibility issues, and spatial behavior into one unified workflow.

- Hamda highlighted the need for automatic emotional detection.
- Designers stressed the importance of accuracy, seamless BIM integration, and clear visualization tools.
- The chosen concept directly responds to both perspectives.

2. Highest Scoring Features in the Comparison Matrix

Across relevance, clarity, impact, desirability, and feasibility, three ideas consistently ranked at the top:

- AI Accessibility & Comfort Checker
- Adaptive Persona Generator
- Emotional Heatmap Analyzer

Each of these features addressed a different critical aspect of inclusive design—technical, emotional, and behavioral. Together, they formed a strong foundation for the system.

3. The Ideas Were More Powerful When Combined

While each concept offered value on its own, testing revealed that their real strength emerged when integrated:

- Heatmaps showed where stress or discomfort occurred.
- Adaptive personas explained who struggled and why.
- The AI checker identified what to fix and how to fix it.
- The simulator validated whether the fix worked.

This ecosystem approach created a more complete, evidence-based workflow that designers could trust.

4. Supports Designers' Existing Workflows Without Adding Complexity

Feedback confirmed that designers do not want a tool that replaces their current software—they want one that supports and enhances it.
By integrating with Revit, AutoCAD, and SketchUp, the final concept allows designers to keep working with familiar tools while benefiting from added emotional and accessibility insights.

5. Delivers the Highest Impact With Clear Feasibility

The selected direction balances innovation with practicality:

- Emotional analysis and heatmaps are technically feasible.
- Personas can be modeled using existing behavioral clustering methods.
- AI accessibility checks align with established code standards.
- Designers can easily interpret and apply the system's recommendations.

This ensures the service can be meaningfully implemented without unrealistic technological assumptions.

SERVICE CONCEPT — FINAL DIRECTION

Definition of the Service

SimuSpace is an AI-integrated design software that supports architects and interior designers in creating inclusive, emotionally responsive environments. The system analyzes real human behavior—captured through cameras and sensors in public spaces—and converts it into adaptive personas, emotional heatmaps, and AI-generated design recommendations. Designers can upload CAD/Revit files, simulate multiple user experiences, and receive immediate suggestions that address accessibility, comfort, and compliance. SimuSpace allows designers to validate and refine their layouts using real behavioral data rather than assumptions.

User Needs Addressed

SimuSpace responds to several key gaps identified in our research:

- Silent discomfort, especially from users like Hamda who do not verbalize their needs.
- Lack of emotional visibility, making it difficult for designers to understand user reactions.
- Hidden accessibility issues, such as tight circulation, poor lighting, and sensory overload.
- Increased designer stress and inefficiency caused by manual error detection.
- The need for accurate, real-time data to justify inclusive design choices to stake

Who It Serves

SimuSpace is designed for a range of professional and public users, including:

- Architects and interior designers who rely on tools like Revit, AutoCAD, and 3D modeling platforms.
- Theme park, museum, retail, and public space developers who require evidence-based design decisions.
- End-users with diverse needs, such as children, older adults, wheelchair users, individuals with low vision, anxious visitors, and anyone sensitive to lighting, noise, or crowd density.

Key Features & Interactions

- Real-time emotion and behavior detection using cameras and sensors.
- Adaptive persona generator that creates personas grounded in real behavioral patterns.
- Emotional and accessibility heatmaps that visually highlight problem areas.
- AI-driven recommendations for comfort, safety, accessibility, and code compliance.
- Simulation engine that lets designers experience their project through different persona perspectives.
- Re-simulation to confirm that changes effectively improve the user experience.
- Exportable reports summarizing insights, personas, flagged zones, and recommended fixes.

PHASE 4

DELIVER

SERVICE BLUEPRINT

The following service blueprint maps how SimuSpace operates from start to finish, showing the complete workflow that supports designers throughout the process.

It breaks down each stage of the system from early discovery, camera installation, data collection, AI processing, persona simulation, error detection, design recommendations, and re-simulation into clear layers:

- Designer / Studio Actions: what Lina and her team do at each stage.
- Frontstage Actions: what users directly see and interact with on the platform.
- Backstage Actions: the hidden system processes such as AI clustering, data validation, and simulation preparation.
- Supporting Systems: the tools, engines, sensors, and cloud infrastructure that power the experience.

This blueprint reveals how emotional data moves through the system, how AI transforms it into personas and insights, and how SimuSpace integrates smoothly into the designer's workflow to create more inclusive, human-centered spaces.




SERVICE BLUEPRINT

Journey Phase	Stage 1 — Discovery / Awareness	Stage 2 — Setup & Installation	Stage 3 — Data Collection & AI Processing	Stage 4 – AI Processing
Designer / Studio Actions	Identify potential partners for the first pilot project. Review SimuSpace's purpose, capabilities, and case examples.	Approve camera locations, share floor plan, allow installation, complete onboarding.	Run space normally, monitor dashboard, view raw behavior/ emotion data.	View AI-generated personas , Review heatmaps , Check behavior clusters
Front Stage Actions	• Present SimuSpace demo to themepark developer design teams. • Align on project goals, pilot location, and expected outcomes.	Technician installs cameras, platform onboarding, dashboard walkthrough.	Platform displays real time metrics, emotional readings collected.	AI clusters personas Heatmaps displayed to designer
Back Stage Actions	• Prepare proposal materials and partnership documentation. • Internal coordination between SimuSpace development, marketing, and legal teams.	configure cameras, secure stoarge set up, run initial test captures.	AI validates sensor input & stores data in cloud	AI analyzes emotions, Creates persona clusters , Detects behavior patterns
Supporting Systems	• Presentation tools for demo and project briefings. • Secure NDA and collaboration platforms.	camera hardware, sensor calibation tools.	• Cloud database. • Device management.	AI emotion engine , Persona generator.

SERVICE BLUEPRINT

Journey Phase	Stage 5 – Upload Design File	Stage 6 – Persona Selection & Simulation	Stage 7 – AI Error Detection	Stage 8 – Designer Confirms + Selects Recommendations
Designer / Studio Actions	Upload CAD/RVT files or design layouts	• Select different personas • Run simulations • Observe persona pathways	• Review AI-detected issues • Check emotional hotspots & accessibility gaps	• Confirm recommendations • Select which AI recommendations to apply
Front Stage Actions	• Upload feature available on dashboard • File processing bar	• Select different personas • Run simulations • Observe persona pathways	• System automatically flags errors in design	• AI shows recommended fixes • Designer selects options
Back Stage Actions	• File processing engine reads layouts • Prepares data for simulation	• Simulation engine prepares 3D paths • Calculates persona behaviors	• AI compares design with real data • Flags problem zones	• Recommendation engine generates solutions • Updates library
Supporting Systems	• File uploader • CAD/RVT compatibility tools	• Simulation engine • Behavior mapping tool	• Error-detection engine • Hotspot analytics	• AI recommendation engine • Fix-selection interface

SERVICE BLUEPRINT

Journey Phase	Stage 9 – AI Re-Simulation (Improved Version)	Stage 10 – Save, Export & Reporting	
Designer / Studio Actions	Review improved simulation Test updated scenario Validate changes	Save file , Export reports , Share insights with team/client	
Front Stage Actions	Improved simulation displayed , Updated journey visualized	Reports generated , Support team available	
Back Stage Actions	System runs corrected simulation automatically	System logs updates , Monitors AI performance	
Supporting Systems	Re-simulation engine Optimization tools	Reporting tools , Help center Export functions	

SERVICE BLUEPRINT

The service blueprint outlines the full operational workflow of SimuSpace, showing how the system supports designers from the earliest stages of project initiation to the final delivery of improved, inclusive design solutions. The blueprint is divided into ten stages, each highlighting the interactions between the designer, the visible frontstage experience, the invisible backstage processes, and the supporting systems required to make the service function. This detailed map illustrates how emotional data becomes actionable insights through a coordinated sequence of actions.

Stages 1–4: Discovery, Setup, Data Collection & AI Processing
The first part of the blueprint shows how SimuSpace begins before any design files are uploaded.

I**n Stage 1**, designers explore SimuSpace, review its capabilities, and align on project goals with theme park teams. The front stage focuses on presenting demos and establishing expectations, while the backstage includes preparing materials, partnership documents, and internal coordination. Supporting systems here are mainly presentation tools and secure collaboration platforms.

In Stage 2, the focus shifts to installing the technology in the physical environment. Technicians approve camera locations, install equipment, and complete onboarding. Backstage, the team configures sensors, secures data storage, and runs initial calibrations. Supporting systems include camera hardware and calibration tools. This stage establishes the infrastructure for accurate data collection.

In Stage 3, the theme park operates as usual while the system captures real emotional and behavioral data. Designers monitor live dashboards, while backstage the AI validates sensor input and stores it in the cloud. Supporting systems such as databases and device management ensure stable data handling.

Stage 4 introduces AI processing, where raw data is converted into persona clusters and emotional heatmaps. Designers view AI-generated personas and behavioral groupings on the dashboard. Meanwhile, backstage the AI analyzes patterns, detects behavior clusters, and creates persona profiles. Supporting systems include the AI emotion engine and persona generator.

In Stage 5, the designer uploads CAD or Revit files into the dashboard. The frontstage includes visible features like the upload interface and processing bar, while backstage the system reads architectural layouts and prepares them for simulation. Supporting systems include file-processing engines and CAD/RVT compatibility tools.

In Stage 6, designers select personas created in earlier stages and run simulations to see how different user groups experience the space. The frontstage displays simulated paths, movement patterns, and accessibility interactions. Backstage, the simulation engine calculates 3D pathways and persona behaviors. Supporting systems include behavior mapping tools and the simulation engine.

Stage 7 marks the point when the AI automatically detects design issues. Designers see flagged emotional hotspots, accessibility gaps, and circulation problems. Backstage, the AI compares the existing design with real behavior data and identifies mismatches. Supporting systems include the error-detection engine and hotspot analytics.

SERVICE BLUEPRINT

The service blueprint outlines the full operational workflow of SimuSpace, showing how the system supports designers from the earliest stages of project initiation to the final delivery of improved, inclusive design solutions. The blueprint is divided into ten stages, each highlighting the interactions between the designer, the visible frontstage experience, the invisible backstage processes, and the supporting systems required to make the service function. This detailed map illustrates how emotional data becomes actionable insights through a coordinated sequence of actions.

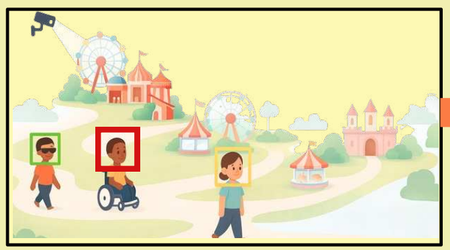
In Stage 8, designers review AI-generated recommendations and choose which adjustments to apply. Frontstage actions include confirming fixes and selecting design options. Backstage, the recommendation engine creates solutions and updates the design library, supported by the AI recommendation system and fix-selection interface.

In Stage 9, SimuSpace runs an updated version of the simulation using the corrected design. Designers observe improvements, and the system validates whether changes have reduced emotional stress or accessibility conflicts. Backstage processes include re-running calculations and updating the simulation. Supporting systems include optimization tools and the re-simulation engine.

Finally, Stage 10 covers saving, exporting, and reporting. Designers export summaries, heatmaps, persona insights, and final recommendations for client presentations. Backstage, the system logs updates and monitors performance. Supporting systems include reporting tools, help-center resources, and export functions.

FUTURE JOURNEY MAP

Lina’s Experience with SimuSpace



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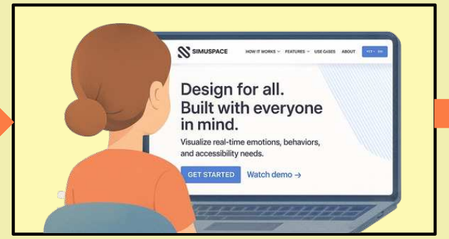

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10

FUTURE JOURNEY MAP

The following journey map illustrates Lina's end-to-end experience using SimuSpace. It shows how raw emotional data collected from visitors transforms into actionable design improvements inside her workflow. Each stage reflects a moment in her interaction with the system and highlights how SimuSpace supports more inclusive, data-driven design decisions. **Lina's Experience with SimuSpace**

1

1. Cameras capture real-time emotional and behavioral data

As visitors move through the theme park, overhead cameras and sensors detect their emotions, facial expressions, movement patterns, and behavior. These inputs reveal how different users—including children, guests with sensory sensitivity, wheelchair users, and anxious individuals—interact with the environment. This step ensures that the emotional reality of the space is captured without requiring users to speak or self-report discomfort.

2

2. Emotions and behaviors are monitored and collected into data

The system continuously monitors fluctuating emotional responses such as stress, confusion, comfort, and engagement. These readings are consolidated into structured datasets that represent patterns over time. This allows the platform to identify where guests struggle, hesitate, or experience sensory overload—insights that human observers would easily miss.

3

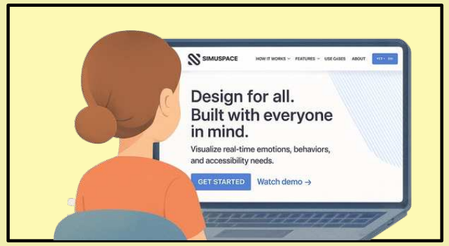
3. Data is processed and prepared for designer review

SimuSpace organizes, filters, and analyzes the raw information before sending a processed version to Lina. This step translates complex emotional metrics into a form that designers can use. It prepares Lina to explore possible solutions with clarity, ensuring she starts with meaningful, refined insights rather than overwhelming raw data.

FUTURE JOURNEY MAP

Lina’s Experience with SimuSpace

4



4. Lina logs into SimuSpace and accesses the main dashboard

Lina enters the software through a centralized interface where she can upload files, access simulations, and view emotional metrics. This step marks the transition from data collection to design analysis. SimuSpace provides her with an organized workspace for understanding user emotions, accessibility patterns, and behavior clusters.

5

5. The system converts data into adaptive personas

SimuSpace transforms the collected emotional and behavioral data into adaptive personas—realistic user profiles that represent different needs. This may include a child experiencing overstimulation, a wheelchair user navigating tight pathways, or an anxious guest reacting to crowded areas. These personas allow Lina to view the space through diverse perspectives and ensure no user is overlooked.

6

6. Lina loads personas into her 3D environment and views emotional heatmaps

Lina integrates these personas into her CAD/Revit 3D model. Emotional heatmaps appear across the environment, visualizing levels of stress, discomfort, confusion, or ease. The heatmaps highlight areas where the space does not support user needs—such as narrow hallways, obstructed views, high-glare zones, or overwhelming lighting.

FUTURE JOURNEY MAP

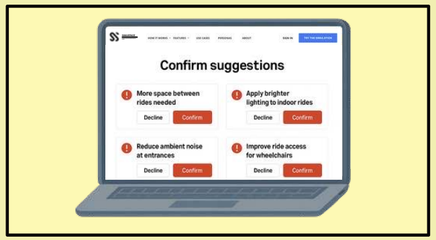
Lina's Experience with SimuSpace

7

7. SimuSpace identifies accessibility and emotional issues

The platform automatically detects design-related challenges such as poor lighting, narrow circulation paths, bottlenecks, sensory overstimulation, or inaccessible layouts. Lina is able to see exactly where emotional discomfort spikes and where accessibility fails. SimuSpace also suggests initial opportunities for improvement, blending emotional data with spatial performance.

8



8. The AI assistant recommends design fixes

The AI proposes adjustments that improve comfort, safety, and accessibility—either by suggesting optimal changes or automatically adjusting certain elements. These recommendations align with comfort guidelines and code standards, ensuring Lina's design meets professional requirements. This step reduces guesswork and accelerates decision-making.

9

9. Lina reviews the AI fixes, refines details, and re-tests

Lina evaluates the AI-generated changes directly in Revit, making additional refinements based on her design judgment. She then re-runs the simulation to confirm that the updated layout resolves the identified emotional and accessibility challenges. This iterative process validates design decisions through real user data.

10

10. The updated design supports all users better

After applying the recommended fixes and validating improvements, Lina achieves a more inclusive and user-friendly environment. The space now accommodates diverse needs more effectively, decreases designer uncertainty, and ensures that no user's experience is overlooked. The updated design reflects SimuSpace's goal: creating emotionally supportive, accessible, and human-centered environments.

FUTURE JOURNEY MAP

Lina’s Experience with SimuSpace

01

Summary

This future journey map demonstrates how Lina’s workflow is transformed through SimuSpace.
It shows the movement from raw emotional data → to insights → to simulation → to AI-supported corrections → to final inclusive design.

02

Key Insights from the Journey Map

- the power of emotional detection,
- the importance of adaptive personas,
- Key Insights from the Journey Map
- Emotional discomfort is often hidden and needs automated detection.
- Designers rely on visual clarity (heatmaps, pathways) to identify problems.
- AI support reduces trial-and-error and increases confidence in decisions.
- Adaptive personas help designers understand diverse user needs.
- Re-simulation is essential to validate improvements effectively.

SERVICE CONCEPT — FINAL DIRECTION

High-Level Visualization (Process Summary)

The core workflow of SimuSpace can be summarized as:

1. Cameras detect emotions and behaviors
2. → Data is processed and converted into personas
3. → Personas are loaded into the designer's 3D environment
4. → Heatmaps reveal emotional and accessibility challenges
5. → AI flags issues and suggests improvements
6. → Designer applies changes and refines the layout
7. → Improved simulation validates the updated design

This sequence shows how raw emotional data transforms into actionable design insights.

Why This Concept Works

SimuSpace's final service concept works because it unifies technical accuracy with human-centered insight. By combining emotional data, persona-based testing, accessibility detection, and immersive simulation, the system supports both the designer's workflow and the needs of diverse users. Instead of relying on assumptions or guesswork, the service provides real evidence that guides more inclusive and emotionally supportive design outcomes.

SimuSpace enables designers to make informed decisions early in the process by providing:

Evidence-based emotional and accessibility insights
Automatic AI detection of hidden issues
A faster and more reliable design workflow
Tools that justify decisions to clients
More inclusive and comfortable environments for diverse users

This makes the service concept page feel complete and polished.

PROTOTYPE

Overview / Introduction

In this final phase, our focus was on translating SimuSpace from a conceptual framework into a tangible, visualized system. The goal was to prototype how designers, engineers, and visitors would interact with the software , capturing the workflow from emotional data collection to AI-assisted design recommendations. Our emphasis was on clarity, inclusivity, and realism, ensuring that every component of the system reflected how it would function in a real design environment.

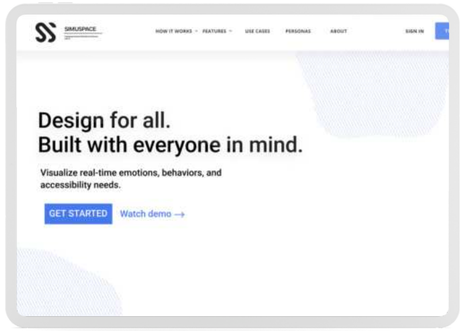
Prototyping & Visualization

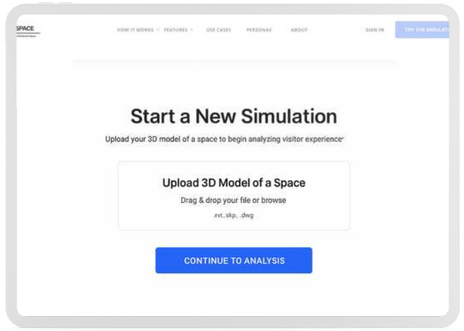
We began by sketching our three separate ideas using low-fidelity prototypes to visualize the core functions of each concept. At this stage, we created journey boards and storyboards to communicate our ideas clearly to the professionals we interviewed.

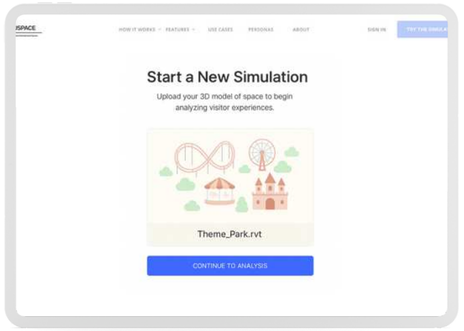
After several iterations on paper, we started prototyping with AI-generated visuals to better illustrate what each system could look like in real life. This helped us refine the visual direction and functionality of our ideas. Eventually, we moved into Figma, where we experimented with interactive digital prototypes, designing interface layouts and testing user flows, until we developed a fully functioning website prototype that brought all components together.

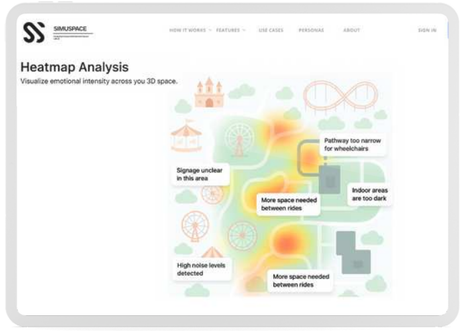
Our prototyping process focused on mapping and refining the three integrated components of SimuSpace: Emotion Tracking, Persona Generator, and Environment Simulator. We explored various ways to visually represent how each part connects seamlessly with professional design tools such as Revit, AutoCAD, and SketchUp.
The early stages included low-fidelity system diagrams that mapped how data flows between sensors, the AI database, and design software. As we progressed, these evolved into medium-fidelity interface screens where designers could view emotional heatmaps, access persona dashboards, and run AI-powered simulations directly on their 3D models.

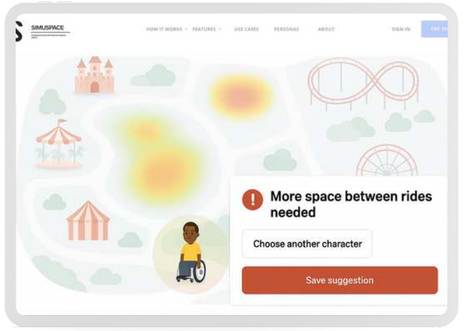
Our visualization exploration also included Lina’s user journey, a detailed storyboard that shows how a design manager interacts with the software from setup to receiving AI recommendations, with emphasis on accessibility testing and emotional insight integration.
Finally, the service blueprint and future journey map helped us clarify both the frontstage (designer experience) and backstage (AI processing, persona generation, and data handling) layers of the system, resulting in a comprehensive visualization of how SimuSpace operates as a complete ecosystem.

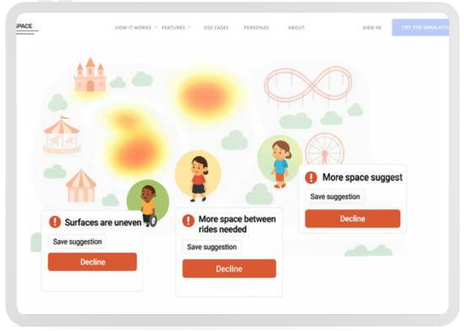




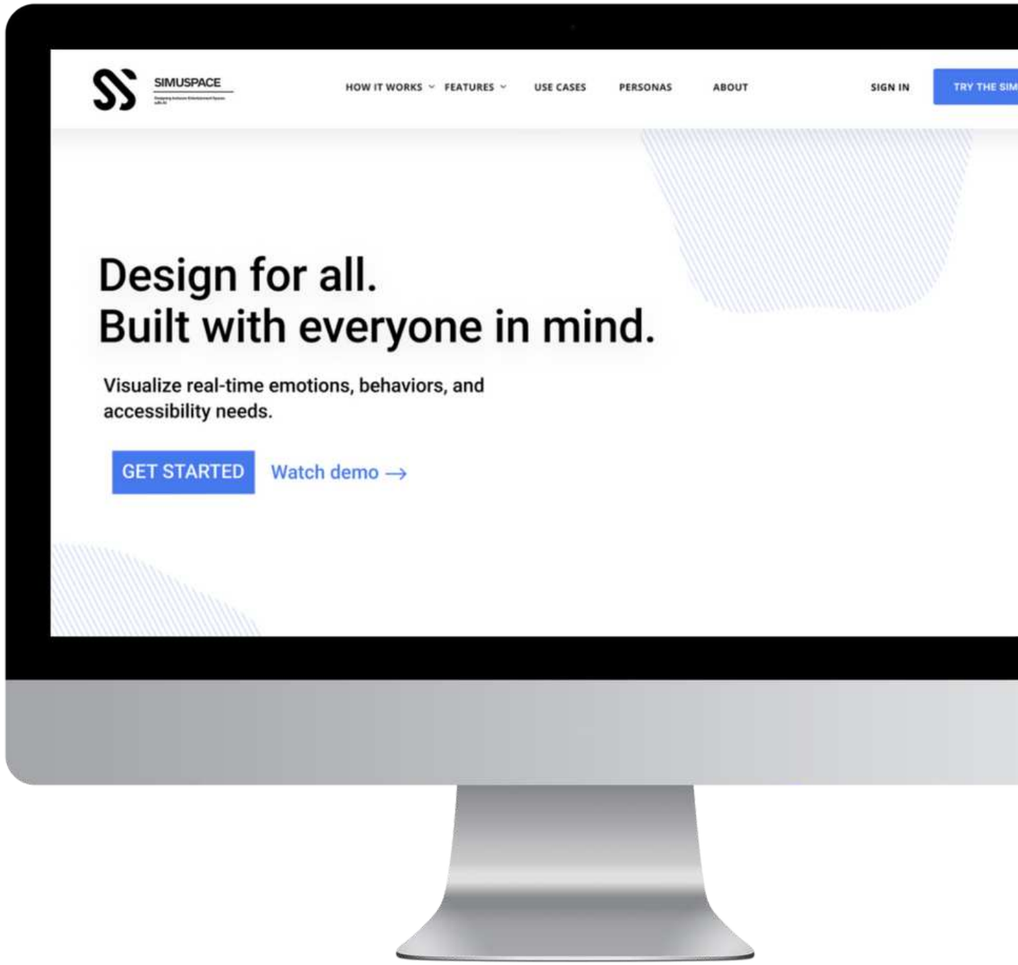








We developed two SimuSpace prototypes. The first was a low-fidelity version used to gather insights from interviewees and test concept clarity.



ITERATIONS & IMPROVEMENTS

Throughout the testing and feedback stages, multiple refinements were made to strengthen both the usability and technical realism of SimuSpace. These changes were guided by professional input from engineers, designers, and accessibility-focused users to ensure that the system could operate effectively in real-world design environments.

Integration refinement:
Feedback from Firas, a civil engineer, emphasized the importance of interoperability between SimuSpace and existing BIM platforms to support multidisciplinary collaboration. In response, the system was restructured to include full cross-departmental connectivity across civil, structural, and design management teams. This enhancement ensures that all disciplines can view live updates, track AI-suggested design modifications, and work within a synchronized digital environment , minimizing errors and promoting seamless coordination.

Accessibility focus:
To strengthen inclusivity and compliance with accessibility standards, SimuSpace introduced a visual accessibility indicator system. This feature highlights ramps, corridor widths, reach ranges, and other spatial parameters directly within the design environment. Designers can instantly identify non-compliant areas and view AI-generated recommendations for correction. These adjustments allow accessibility considerations to be integrated early in the design process rather than during late-stage revisions, reducing rework and ensuring universal usability.

AI validation system:
Based on professional recommendations, an AI validation module was added to verify that all accessibility adjustments meet relevant code and safety requirements. This feature provides designers and engineers with confidence that the proposed modifications align with regulatory standards before construction or approval, making the system more reliable and industry-ready.

Clarity of insights:
Emotional data visualization was refined using color-coded heatmaps that convert user reactions , such as stress, confusion, or comfort , into measurable spatial metrics. These metrics, including visibility range, lighting comfort, and movement flow, enable designers to assess emotional engagement quantitatively. This improvement ensures that SimuSpace moves beyond subjective interpretation, offering concrete data-driven insights that inform better design decisions.

Efficiency improvement:
To enhance workflow efficiency, an adaptive feedback loop was added. This allows the AI design assistant to automatically suggest edits or enable the designer to apply them manually. The dual-option approach supports both creative flexibility and time-saving automation, giving designers full control over how they implement AI recommendations while maintaining productivity.

Together, these refinements transformed SimuSpace into a more realistic, collaborative, and technically grounded tool, one capable of addressing the complex needs of inclusive and emotionally intelligent design in professional practice.

FINAL CONCEPT

SimuSpace is the refined and consolidated version of our three original ideas — the Emotion Tracking System, Persona Generator, and Environment Simulator — now combined into a single AI-integrated design platform. It was developed to help designers understand and design for diverse users by bridging emotional, behavioral, and spatial data within one cohesive ecosystem.

The final system enables designers to test how different types of users experience a space before it is built. Through the integration of real human data, AI-driven insights, and simulation tools, SimuSpace allows designers to identify design challenges early and make informed, inclusive, and emotionally intelligent decisions. The platform directly connects to widely used design programs such as Revit, AutoCAD, and SketchUp, ensuring that it fits naturally into existing workflows.

SimuSpace addresses a core industry gap, the lack of tools that allow designers to understand diverse user experiences early in the design process. Traditional design reviews often overlook accessibility and emotional engagement until late stages, leading to costly revisions and missed opportunities for inclusion. SimuSpace closes that gap by embedding empathy and data-driven feedback directly into the design workflow.

Final List of Features:

- Emotion Tracking System: Uses AI-enabled cameras in real environments to collect user reactions such as stress, excitement, or confusion. These reactions are analyzed and translated into emotional data that inform future design simulations.
- Persona Generator: Converts collected data into adaptive, AI-generated personas representing diverse users , for example, a child, an elderly visitor, or a wheelchair user. Designers can test designs through each persona’s perspective to identify accessibility or emotional barriers.
- Environment Simulator: Connects with design software (Revit, AutoCAD, SketchUp) to simulate real user interactions and experiences within digital spaces. Designers can walk through their models as if they were the persona, visualizing how lighting, signage, or spatial layout affects usability and comfort.
- AI Design Assistant: An integrated feedback system that provides recommendations for improvement, offers before-and-after comparisons, and validates whether design changes meet accessibility codes and safety standards.
- Cross-Departmental Integration: Supports collaboration across civil, structural, and design management teams by allowing all disciplines to view real-time updates and AI-generated suggestions in shared BIM environments.

In its final refined form, SimuSpace operates as an intelligent ecosystem transforming emotional and accessibility data into actionable design decisions. It empowers designers to create spaces that are not only functional and efficient but also emotionally engaging and inclusive for every user.

FINAL CONCEPT

Core problems addressed

SimuSpace directly addresses the lack of accessible, data-driven tools that allow designers to understand diverse user needs early in the design process. Current workflows often overlook emotional experience and accessibility until the late design stages, leading to exclusion, inefficiency, and costly revisions. SimuSpace bridges this gap by integrating real emotional data, adaptive personas, and AI validation into one platform ensuring that entertainment and public spaces are designed to be inclusive, efficient, and emotionally resonant for every visitor.

FINAL PROTOTYPE

For the final stage of the project, we developed a high-fidelity prototype of SimuSpace to visualize how designers would interact with the system and experience its key functions in a realistic workflow. The goal was to demonstrate how the platform integrates emotion tracking, persona generation, and environment simulation into one cohesive, user-centered interface.

What we decided to prototype and why

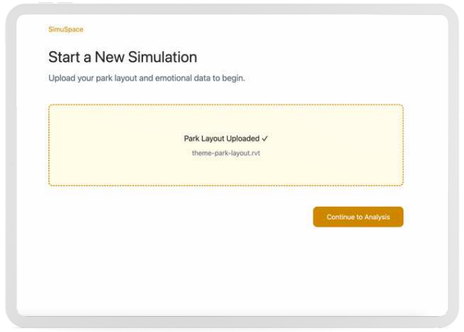
We chose to prototype the designer-facing interface of SimuSpace, the part of the system that allows users to upload their design files, view emotional and accessibility insights, and interact with AI-generated personas within a simulated environment. This decision was made because it represents the most critical touchpoint between the designer and the technology. By focusing on this, we were able to test the system's usability, clarity, and perceived value in real design workflows.

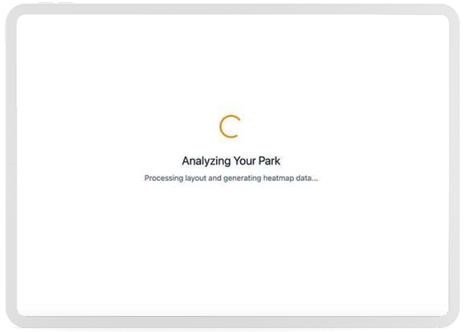
The prototype showcases how SimuSpace links with professional tools such as Revit, AutoCAD, and SketchUp, creating a direct bridge between technical design and human experience. We also visualized the AI recommendation system, which provides feedback and allows designers to either manually apply or automatically implement AI-suggested changes.

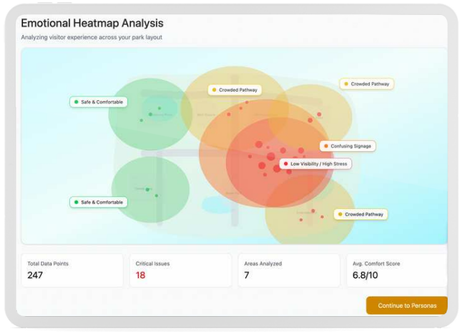
The Level of Fidelity

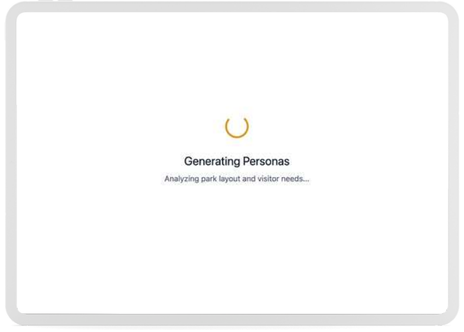
The prototype is medium-fidelity , it presents the real layout, interface, and navigation system of SimuSpace but does not include working simulations, data-driven heatmaps, or 3D motion.The interface was created in Figma, showing an accurate visual structure that communicates functionality, hierarchy, and user flow without simulating complex back-end systems or visual realism.

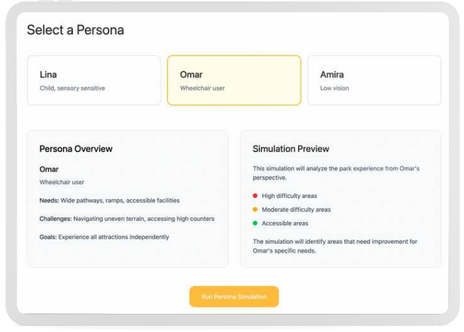
The prototype is medium-fidelity , it presents the real layout, interface, and navigation system of SimuSpace but does not include working simulations, data-driven heatmaps, or 3D motion.The interface was created in Figma, showing an accurate visual structure that communicates functionality, hierarchy, and user flow without simulating complex back-end systems or visual realism.

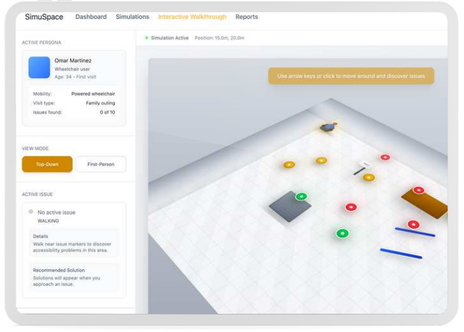

SimuSpace
Start a New Simulation
Upload your park layout and emotional data to begin.
Park Layout Uploaded ✓
theme-park-layout.rvt
Continue to Analysis

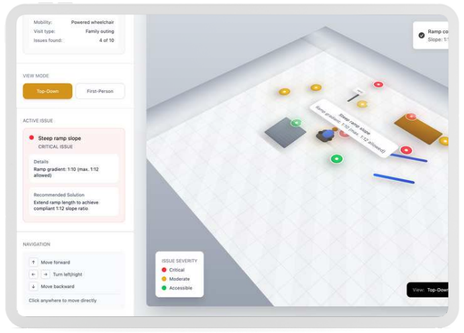

Analyzing Your Park
Processing layout and generating heatmap data...

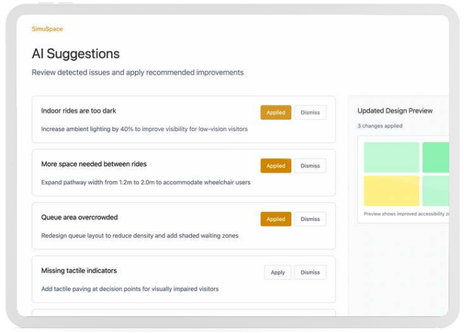

Emotional Heatmap Analysis
Analyzing visitor experience across your park layout
Safe & Comfortable
Crowded Pathway
Crowded Pathway
Confusing Signage
Low Visibility / High Stress
Safe & Comfortable
Crowded Pathway
Total Data Points
247
Critical Issues
18
Areas Analyzed
7
Avg. Comfort Score
6.8/10
Continue to Personas

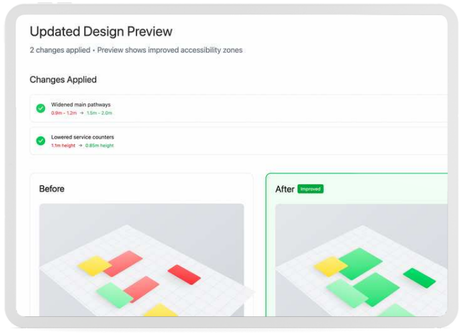

Generating Personas
Analyzing park layout and visitor needs...

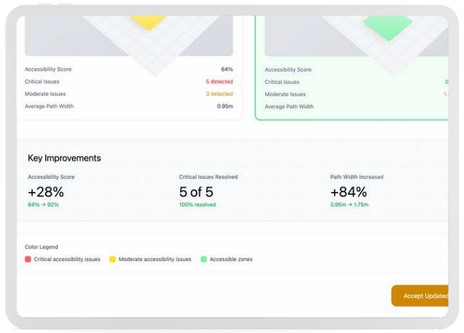

Select a Persona
Lina
Child, sensory sensitive
Omar
Wheelchair user
Amira
Low vision
Persona Overview
Omar
Wheelchair user
Needs: Wide pathways, ramps, accessible facilities
Challenges: Navigating uneven terrain, accessing high counters
Goals: Experience all attractions independently
Simulation Preview
This simulation will analyze the park experience from Omar's perspective.
High difficulty areas
Moderate difficulty areas
Accessible areas
The simulation will identify areas that need improvement for Omar's specific needs.
Run Persona Simulation

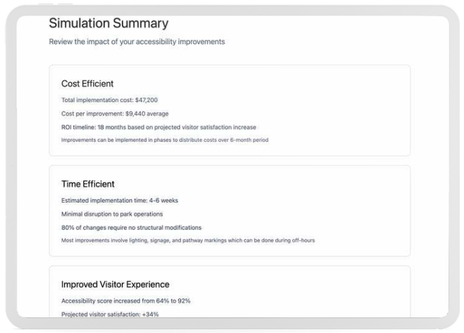

SimuSpace
Dashboard
Simulations
Interactive Walkthrough
Reports
Use arrow keys or click to move around and discover issues

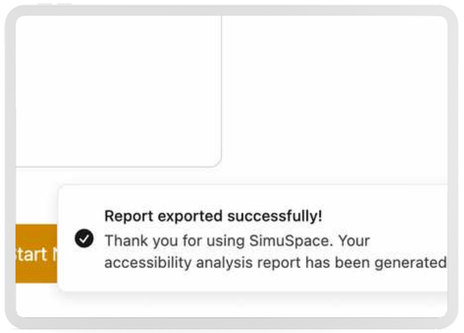

Powered wheelchair
Family outing
4 of 10
Top-Down
First-Person
Steep ramp slope
CRITICAL ISSUE
Ramp gradient: 1:10 (max. 1:12 allowed)
Extend ramp length to achieve compliant 1:12 slope ratio
Move forward
Turn left/right
Move backward
Click anywhere to move directly
ISSUE SEVERITY
Critical
Moderate
Accessible


SimuSpace
AI Suggestions
Review detected issues and apply recommended improvements
Indoor rides are too dark
Applied
Dismiss
Increase ambient lighting by 40% to improve visibility for low-vision visitors
More space needed between rides
Applied
Dismiss
Expand pathway width from 1.2m to 2.0m to accommodate wheelchair users
Queue area overcrowded
Applied
Dismiss
Redesign queue layout to reduce density and add shaded waiting zones
Missing tactile indicators
Apply
Dismiss
Add tactile paving at decision points for visually impaired visitors
Updated Design Preview
3 changes applied

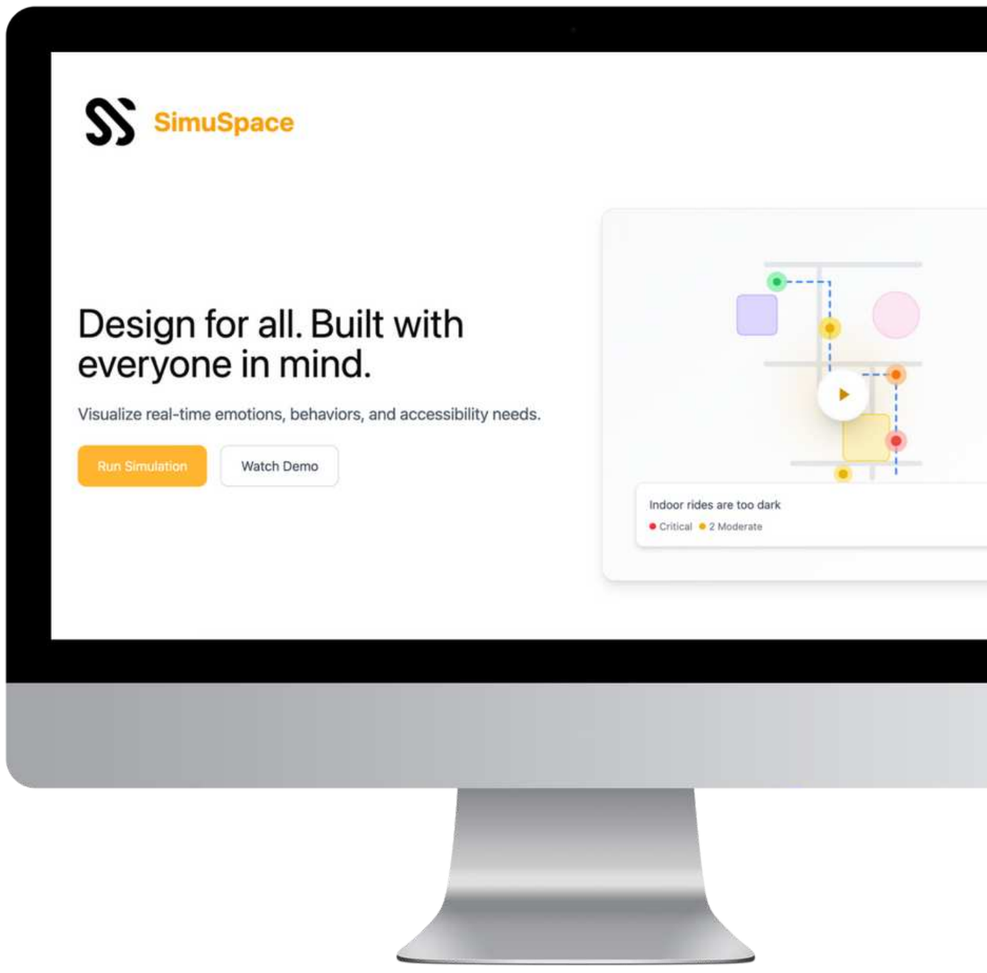

Updated Design Preview
2 changes applied - Preview shows improved accessibility zones
Changes Applied
Widened main pathways
0.9m - 1.2m → 1.5m - 2.0m
Lowered service counters
1.1m height → 0.85m height
Before
After
Improved


Accessibility Score
64%
Critical Issues
5 detected
Moderate Issues
3 detected
Average Path Width
0.95m
Accessibility Score
Critical Issues
Moderate Issues
Average Path Width
Key Improvements
Accessibility Score
+28%
64% → 92%
Critical Issues Resolved
5 of 5
100% resolved
Path Width Increased
+84%
0.95m → 1.75m
Color Legend
Critical accessibility issues
Moderate accessibility issues
Accessible zones
Accept Updated


Simulation Summary
Review the impact of your accessibility improvements
Cost Efficient
Total implementation cost: $47,200
Cost per improvement: $9,440 average
ROI timeline: 18 months based on projected visitor satisfaction increase
Improvements can be implemented in phases to distribute costs over 6-month period
Time Efficient
Estimated implementation time: 4-6 weeks
Minimal disruption to park operations
80% of changes require no structural modifications
Most improvements involve lighting, signage, and pathway markings which can be done during off-hours
Improved Visitor Experience
Accessibility score increased from 64% to 92%
Projected visitor satisfaction: +34%


Report exported successfully!
Thank you for using SimuSpace. Your accessibility analysis report has been generated

SimuSpace


SimuSpace
Design for all. Built with everyone in mind.
Visualize real-time emotions, behaviors, and accessibility needs.
Run Simulation
Watch Demo
Indoor rides are too dark
Critical
2 Moderate

FINAL PROTOTYPE

Prototype Screens and Touchpoints

The prototype illustrates a step-by-step designer experience through several key screens:

- Homepage
- Presents SimuSpace's main identity and purpose: "Design for all. Built with everyone in mind."
- Encourages users to get started, highlighting inclusivity and data-driven design for accessibility.
- Start a New Simulation
- Designers are prompted to upload their 3D model file (e.g., .rvt, .skp, .dwg).
- Represents the entry point for integrating spatial data into SimuSpace for analysis.
- Simulation Setup
- Visualized through a theme park example (Theme_Park.rvt) to demonstrate real-world application.
- The system begins processing emotional and spatial data.
- Persona Generation Screen
- AI generates diverse personas (e.g., child, elderly, wheelchair user, low-vision visitor).
- Designers select which persona they want to simulate to test how different users experience the space.
- Heatmap Analysis
- Displays emotional and accessibility intensity zones across the park layout.
- Highlights areas with issues such as "pathway too narrow," "indoor areas too dark," or "high noise levels."
- Interactive Suggestions
- Designers receive AI-generated alerts (e.g., "More space between rides needed," "Surfaces are uneven," "Signage unclear").
- Users can save, decline, or adjust recommendations manually.
- AI Suggestion Panel
- Lists all issues and proposed solutions (e.g., "Increase ambient lighting by 40%," "Expand pathway width to 2m,""Add tactile indicators").
- Designers can mark suggestions as "Applied" or "Dismissed."
- Before and After Simulation View
- Visually compares the environment before and after applying AI suggestions.
- Demonstrates improved accessibility, reduced stress zones, and enhanced user satisfaction.

FINAL PROTOTYPE

key interactions and components

- Uploading 3D design files directly from Revit or SketchUp.
- AI generation of personas and simulation environments.
- Interactive emotional heatmap visualization with problem areas.
- Real-time accessibility insights and AI recommendations.
- Before-and-after design comparison showcasing measurable improvement.

The prototype clearly communicates how SimuSpace operates as an inclusive and intelligent design companion , helping designers visualize accessibility barriers, understand emotional responses, and refine spaces before they are built. While conceptual in functionality, the medium-fidelity prototype successfully demonstrates the system's workflow, logic, and potential impact on future AI-integrated design processes.

PHASE 4 KEY TAKEAWAYS

Phase 4 marked the transition from conceptual exploration to tangible prototyping. This stage allowed the team to refine SimuSpace's functionality, strengthen its design logic, and evaluate how the system could realistically integrate with professional design workflows. Several major insights guided both the refinement of the service and its roadmap for future development.

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1. Realism and Integration Are the Next Priority

Our medium-fidelity prototype effectively communicated the concept but revealed the need for higher technical accuracy. The next step is to evolve SimuSpace into a high-fidelity platform that directly connects with design software such as Revit, AutoCAD, and BIM systems. This will allow real 3D model uploads, live accessibility simulations, and data-backed design validation, bridging the gap between conceptual visualization and industry application.

3. Personas Should Behave, Not Just Represent

The static personas in our current prototype successfully illustrated inclusivity but lacked the behavioral realism needed to simulate true user journeys. In future iterations, adaptive AI personas will move through 3D spaces dynamically walking, navigating ramps, waiting in queues providing designers with a deeper understanding of how accessibility and emotional comfort change in real-time.

5. Visualization Strengthens Decision-Making

Prototyping demonstrated that clear, visual feedback , such as heatmaps, persona movements, and AI recommendations , helps designers immediately identify and fix problem areas. Visual storytelling proved to be one of SimuSpace's strongest assets, transforming complex emotional and accessibility data into intuitive, design-ready insights.

2. Emotional Data Must Be Actionable, Not Abstract

Testing showed that emotional heatmaps are powerful only when designers can connect them to practical design actions. This insight led to the idea of linking emotion tracking results with measurable spatial parameters such as lighting, circulation, and visibility. Future versions of SimuSpace will translate user reactions into quantifiable metrics to help teams make informed, evidence-based design decisions.

4. Designers Value Seamless Workflow and Efficiency

Feedback from professionals emphasized that designers prefer systems that enhance, not complicate, their existing workflow. This realization reaffirmed the need for SimuSpace to remain intuitive, fast, and compatible with established design environments. Future development will focus on smoother integration and one-click synchronization between SimuSpace and external design tools.

6. From Concept to System: Building Technical Depth

Phase 4 clarified that SimuSpace's true value lies in its system logic, not just its interface. The next milestone involves developing a live simulation engine that connects emotional sensors, AI processing, and visual rendering into one cohesive ecosystem.

7. Preparing for High-Fidelity Developmen

Moving forward, the focus will be on transforming SimuSpace into a high-fidelity prototype with:

- Real Revit/BIM file processing
- Accurate heatmaps generated from real emotional datasets
- Animated persona simulations based on behavior mapping
- A functioning AI validation system that cross-checks designs with accessibility codes

FUTURE VISION

IMPLEMENTATION

- Partnership Phase: Collaborate with a real estate or entertainment developer to conduct the first SimuSpace pilot on an ongoing design project. This will validate system accuracy in detecting emotional and accessibility barriers within live BIM environments.

- Pilot Installation: Install the AI detection module in selected 3D model spaces to collect emotion and behavior data during simulated walkthroughs. These insights will guide refinements to the accuracy of heatmaps, adaptive personas, and AI-driven recommendations.

- Software Launch: Deploy SimuSpace as a high-fidelity prototype integrated into Revit and AutoCAD. Designers and engineers will test how real 3D models (.rvt, .dwg) translate into emotional analysis and accessibility feedback.

- Training & Onboarding: Conduct targeted training sessions for design teams, engineers, and accessibility consultants to ensure a strong understanding of AI interpretation and human-centered simulation. Onboarding will emphasize ethical use, accuracy, and workflow compatibility.

- Post-Design Evaluation: Compare outcomes from projects that applied SimuSpace with previous design outcomes to assess measurable improvement in accessibility, emotional comfort, and efficiency. This evaluation will determine calibration needs before large-scale release.

- Integration & Scaling: Once validated, SimuSpace will integrate into multidisciplinary design ecosystems it will be used in other real estate companies, not only to design entertainment spaces but will expand its use across architecture, interior, experience, and urban design fields as well as entetrainment spaces lie museums, immersive experiences, etc.. Its compatibility with BIM and cross-platform software will enable long-term scalability across the region’s built-environment sector.

The implementation of SimuSpace is not only about testing a digital tool, but about introducing a new design mindset. Each phase, from pilot testing to large-scale integration, marks a shift toward data-informed empathy in spatial design. By embedding the system within existing workflows and training professionals to interpret emotional and accessibility data, SimuSpace moves closer to becoming an indispensable part of inclusive design practice. This gradual rollout ensures both technical precision and human understanding remain at the core of every implementation stage

FUTURE VISION

Future Recommendations

Cross-Platform Integration Expansion: Further develop SimuSpace integration with Rhino, SketchUp, and Unreal Engine to ensure a seamless design workflow. This will allow designers from multiple disciplines,architecture, landscape, interior, and entertainment, to use the system simultaneously, improving collaboration and reducing data loss during model transfer.

AI Validation and Compliance Module: Introduce an automated AI validation layer that reviews every design iteration for accessibility, safety, and comfort standards before approval. This feature would reference universal design and ADA/ADIAS guidelines, ensuring that proposed changes are both inclusive and regulation-compliant before implementation.

Collaborative Live Dashboard: Build an interactive online dashboard where project teams can view real-time AI insights, emotional heatmaps, and persona behavior data. This dashboard would connect all stakeholders, designers, engineers, and clients under one shared interface, improving transparency and decision-making.

Adaptive Persona Intelligence: Evolve the persona system into a living database of human profiles generated through ongoing research and user feedback. Personas will continuously adapt to reflect new data on physical abilities, emotions, and cultural behaviors, allowing the simulations to become more human and contextually accurate over time.

Immersive VR/AR Simulation Layer: Integrate VR and AR extensions into SimuSpace, enabling users to “walk through” environments as different personas in real time. This immersive experience will help designers test accessibility, lighting, visibility, and emotional resonance more intuitively—bridging the gap between virtual design and lived experience.

Professional Training and Certification Program: Establish a structured certification track for architects, engineers, and accessibility specialists. The program would teach how to interpret emotional data, validate AI recommendations, and ethically apply findings in practice. This will position SimuSpace not only as a software tool but as an educational standard for empathetic design.

Ethical Data Framework: Develop an internal code of ethics and data governance policy that ensures privacy, transparency, and consent in emotion-tracking technology. This framework will guide how user data is collected, stored, and applied, ensuring SimuSpace maintains human-centered integrity as it scales.

FUTURE VISION

Risks & Mitigation

Risks
• Privacy Concerns: Emotion tracking involves collecting behavioral data, which may raise concerns about consent and personal privacy.
• Bias in AI Interpretation: Emotional analytics may misread expressions or behaviors, leading to inaccurate insights if not regularly monitored.
• Integration Challenges: Linking SimuSpace to multiple software platforms such as Revit and BIM may cause compatibility or data-transfer issues.
• Overreliance on AI: Designers might depend too heavily on AI recommendations, overlooking creative or human-centered judgment.
• Data Security: Sharing design and emotional data across systems can pose risks of unauthorized access or data breaches.

Mitigation
•Anonymous Data Use: Collect emotional data anonymously and display clear signage to ensure user awareness and consent.
• Ethical Oversight: Conduct regular AI ethics reviews and monitor data-processing standards to reduce bias and misinterpretation.
• Human Validation: Require final design approval by human reviewers before applying AI-generated changes.
• Technical Testing: Perform continuous testing to ensure compatibility across Revit, Rhino, and BIM systems.
• Security Protocols: Use encrypted data storage and limited-access systems to protect sensitive design and emotional data.

VISION

WHAT ARE WE PLANNING ON DOING AND WHAT IS THE IMPACT ?

SimuSpace envisions a future where emotional intelligence becomes a core part of spatial design , where data doesn't just measure efficiency, but captures how people feel in a space. The next stage of development focuses on evolving the system from a conceptual prototype into a fully functional design intelligence platform that seamlessly integrates emotion tracking, persona simulation, and environmental analytics.

Our goal is to shift the design process from assumption to understanding. We aim to empower designers to view their environments through every visitor's perspective translating emotions, accessibility needs, and comfort levels into tangible design actions. This evolution will allow teams to make data-informed, human-centered decisions with precision and empathy.

In the long term, SimuSpace seeks to become a collaborative ecosystem that connects AI insights, designer intuition, and user diversity. By linking with professional tools such as BIM, Revit, and SketchUp, the system will become a standard step in pre-construction testing, helping designers anticipate emotional and accessibility gaps before spaces are built.

CORE FEATURES OF THE IMPACT

01 DESIGNER EMPOWERMENT

02 INCLUSIVE DESIGN

03 MEMORABLE JOURNEYS

1. Equip designers with advanced simulation tools that transform emotional and accessibility data into creative decision-making power.

2. Expand AI capabilities to address a wider range of physical, emotional, and cultural needs, promoting truly inclusive design practices across industries.

3. Enhance the ability to design experiences that are not just functional but meaningful environments that users connect with, remember, and want to revisit.

Prepared By:
Haya Alshamsi — Design Management, 4th Year
Tuleen Damiri — Design Management, 4th Year
Noura Alqassimi — Design Management, 4th Year
Sara Al Ali — Design Management, 4th Year