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Augmenting Social Engagement for Students: Leveraging AR for interactive student experiences, promoting overall well being.

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RIT

Augmenting Social Engagement for Students:

Leveraging AR for interactive student experiences, promoting overall well being.

by

Aditi Singh

A Thesis Submitted in Partial Fulfillment of the Requirements for the Degree of
Master of Fine Arts in Visual Communication Design

School/Department of Design
College of Art and Design

Rochester Institute of Technology Rochester, NY
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RIT | College of Art and Design

Thesis Approval

Augmenting Social Engagement for Students

Thesis Title

Aditi Singh

Thesis Author

Submitted in partial fulfillment of the requirements for the degree of Master of Fine Arts

The School of Design | Visual Communication Design

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Name — Title

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ABSTRACT

This thesis explores the concept of an Augmented Reality Application designed to enhance student's social engagement with their peers in campus activities at universities. It uses AR Technology and futuristic interface design to create a fun and interactive environment that motivates graduate students to socialize more often and maintain a balanced lifestyle. The problem addressed here is the lack of motivation and resources among students to engage in activities due to academic pressures which also adversely affects students mental and emotional wellbeing. The proposed solution involves integrating AR interfaces and elements that immerse them in an enjoyable environment and encourage them to participate in activities between classes. It helps them engage mentally, physically and socially in activities as a way for them to not only manage stress but also make friends. It uses the design strategy of gamification to further enhance the user experience. The results demonstrate the ability of AR and Futuristic UI to transform the student experience by making campus life more vibrant and providing them with resources to manage stress and isolation. In conclusion, the paper discusses future possibilities, throwing light on the solution's impact on human wellbeing and its dynamic application in the area of education and social interaction.

KEYWORDS

Augmented Reality, Social Interaction, Student Engagement, Gamification, Mental and Emotional Student health

INTRODUCTION:

The life of a college student should be a balance between academics and social life. However, the reality is far from that for a Graduate Student. Graduate life can be difficult and stressful to manage, juggling several academic responsibilities and performance pressures where they find it difficult to create a balance and to find the motivation to engage in activities other than academics. Everyday routine can be mundane and monotonous. With social media being an intrinsic part of people's lives today, students are habituated to interacting from behind the screens, lacking the skills for in person human interaction. As social beings, social engagement is an indispensable part of our human lives. So when that is removed, even though temporarily, there is an immediate feeling of loss. Those undergoing this loss begin to experience a sense of an indefinable state of panic or stress (Sadasivan et. al, 2021). Humans as social beings are also closely related to establishing communication and relationships with their environment, both in the family and in the community, so that a person will find groups of people who are considered able to understand the conditions and needs they want so that they make themselves feel confident and dare to mingle in the midst of society amidst the surrounding community (Mawadha & Yulianti, 2023).

We can now leverage advanced technologies such as AR to bring back human engagement in a student's daily life that helps boost mental and emotional wellbeing. The advancements in the field of augmented reality and its ability to use various mediums to be a closer part of everyday human interaction has opened various avenues to bring back communities and increase their engagement. This paper presents a thesis project that aims to harness the potential of augmented reality to address the challenges of student disengagement and academic pressures in universities where they spend the majority of their time. The application aims to integrate seamlessly in everyday student lives. It hopes to foster a sense of community and boost their mental health by providing an avenue to manage stress, engage in physical and fun mental activities which in turn helps them perform better academically. This study focuses on designing interfaces and futuristic interface elements in an AR environment. It superimposes interactive elements in the real physical world to create a stimulating environment

PROBLEM STATEMENT:

Graduate Students are often lacking the motivation and resources to participate in the right events at the right time with their friends owing to academic responsibilities and pressures. In Spite of spending the majority of their time on campus they are busy in labs and other academic activities living isolated and stressful lives.

SECTION I: CONTEXT

Along with intensive course loads, Graduate students are juggling jobs on and off campus,

engaging in additional courses and graduate assistantships during their Graduate life. Competition, performance pressures and stress are an unsaid aspect of student life in Graduate College. Graduate student life in all aspects can be even more challenging for international students who have to struggle harder as they leave the comfort and familiarity of their home country to find themselves in a completely new environment culturally, socially and academically. Similarly, undergraduate students undergo considerable stress when they leave their homes at a younger age and have to make independent decisions and compete against new standards (Altmaier,1983). Many of them have often taken loans to help them pursue their education or are either working hard towards getting scholarships.

A number of stress factors envelop a graduate student's life. Graduate students not only have stress in college, but also within society. Graduate students must meet the demands of life outside of college as well (Pfeiffer, 2001). There are financial, academic, social, cultural and personal familial stress factors that they struggle with. Every attempt to socialize comes with a lot of effort to find the right events with the right friends and manage each other's schedules to make a plan work. Graduate students experience many sources of internal conflict. Internal conflicts may result from competing demands, the compromise of personal principles and standards, unrealized expectations, a sense of responsibility to "significant others", classmates, and employers, other concerns and commitments, incongruence of graduate experiences with past experiences or knowledge, a conflict between student's passion and (perceived) irrelevant degree requirements, and guilt (which is both a conflict and a result of internal conflict (Offstein et. al, 2024). All of this affects their mental and emotional wellbeing directly impacting their ability to perform academically which leads to more stress.

This vicious cycle of stress for students is never ending. Not to mention the lifestyles post the covid pandemic has instilled social behaviors where people are more comfortable staying isolated and interacting behind screens. Their physical health was also considerably affected giving rise to health issues arising due to physical inactivity. They could be encouraged to involve in physical activity. This thesis is an attempt to address bigger issues at hand and create a conducive environment for students using Digital Media Technologies and AR advancements to create a balance in student lives and help them be healthy to perform better academically.

SECTION II: METHODS

This section highlights and discusses all the processes undertaken and the applications used to design and implement the proposed solution. Following a design process of Empathize, Define, Ideate and Design, I began empathizing with the end user to get insights on their daily routines and challenges. Empathize began with Primary Research starting with an exploratory Qualitative Survey mainly composed of open-ended questions to help understand all the pain points and further investigate the depth of the situation. 6 key questions helped guide the direction of the research with 8 participants, all RIT Graduate Students. Following this I did an analysis to recognize Common Themes and Storylines that confirmed a few assumptions as well as threw light on new scenarios

Moving on to Define, I made a User Persona highlighting user goals and frustrations which

further helped me to define my problem statement. The How Might We method of arriving at actionable creative solutions helped to arrive at a solution statement.

The Ideation phase began with diving into the process of visual research recognizing design trends and color palettes, creating style boards to help define a uniform and unique visual style and pattern. Taking inspiration from the Apple Vision Pro's interface and gestural interactions helped guide the design direction of my Augmented Reality Application. Contextual inquiry included observing game interfaces and common gamification methods such as points, rewards, scores and leaderboards that help build a sense of responsibility towards team members that instills a fear of missing out among users helping them to join the activity.

Finally the Design phase Figma to Design User Stories, User flows and Scenario States. Several scenarios were sketched out and mocked in Adobe Photoshop using photographed images to develop a realistic story line. These scenarios were discussed and critiqued by my professors and peers to discover gaps and streamline on a single user track. Demo videos and scenarios were recorded and tested on Cinema 4D and Adobe After Effects to ensure optimal lighting and trackability of the video. This part of the design process was highly iterative to help explore solutions in a way to ensure usability of the designs. The field of instructional design (ID) has recently begun to shift its focus to more iterative design and user-driven development models, and a number of existing instructional design methods can be used or adapted to fit iterative approaches. Identifying learning needs has long been the focus of front-end analysis. Ideation and prototyping are frequently used methods from UX design and rapid prototyping (Earnshaw et.al, 2018).Simultaneously 3d elements were built in Cinema 4d to create a poster design and visual elements to be used in the AR scenario. Cognitive walkthroughs were conducted and cognitive load theory was studied to understand how much information the user can process at a time to proceed in his interactions. All these tools were used in conjunction to develop the proposed solution. The goal of the design was to provide a fun scenario he can understand quickly and take actions on to address the initial problem statement.

SECTION III: RESULTS

The final solution uses an Mp4 Video to demonstrate a scenario wherein a student on the campus university engages with interactive 3D AR elements such as donuts, candy, music, dancing man, merry go rounds in motion creating a fun environment mimicking the Fall Fest taking place at the university in real time and an interface design to show additional information regarding the event invitation for an activity challenge. The floating interface shows all the information needed for the student to make a prompt decision such as information about friends participating, personalized messages from the and their real-time activity related to the event.The challenge invitation to participate in the event along with rewards and score. Designing challenging activities is a key point in Gamification and a difficult task to accomplish. An activity is considered challenging when it tests the limits of our ability in subtle ways (Gallego-Durán et.al, 2019). Gamification focuses on shaping the user experience, which is similar to the game's emotional satisfaction (Ning, 2018). A similar gamification method is used here to help them take up challenges proactively. The AR environment and interface design aims to significantly increase the probability of a positive response from the student to participate in such activities with peers.

Features:

- Smart Application that integrates with a student's everyday class routine to present real time events and activities around campus.
- Manages friend schedules to match with one another
- Presents a timer within which a user must make a decision and take action
- Earn rewards as an impetus to participate
- Gamification elements such as scores, rewards leaderboards and teams for enhanced user experience
- Shows friends real-time activity related to the event
- Allows personalized messages from friends

Benefits:

- Saves time and effort to manage schedules and plan events
- Helps create a balanced lifestyle and avenue to manage stress
- Mental and physical activity promotes student wellbeing
- Opportunity to make more friends and strengthen bonds with existing friends
- Encash rewards and benefits to help reduce stress of daily expenses as a student
- Boosts a sense of community and belonging
- Better Academic performance

SECTION IV: EVALUATION AND DISCUSSION

This section discusses how the AR application addresses the initial problem statement. It evaluates a new innovative approach to address issues faced by college students. The interactive nature of the proposed solution using Augmented reality helps users immerse themselves in the environment and actively interact with the elements.The integration of AR to accentuate visual, interactive and auditory elements in the solution enhances the user experience. The problems seen around the student life such as stress, lack of motivation, cultural differences were further

studied in the qualitative research that helped understand the root causes of the pain points. It knitted a clear story of the deeper daily challenges of student life and its impact on physical, social and psychological health.In conducting the study, I gathered insights about their daily life and experiences. I designed an exploratory open ended survey with the following key questions:

- **What does your daily routine encompass?**
- **How do you spend their free time? How often do you get free time?**
- **How and often do you socialize or do something fun?**
- **Where do they spend the maximum of their time?**
- **Who were the set of people they usually hung out with**

The responses included spending the majority of their time on campus, being busy with assignments and going out only once in two weeks with friends and being isolated most times busy with their assignments.This probed me to further inquire about the underlying issues of associated decisions and behaviors of isolation and stress. Further questioning helped unravel a loop that indicated.In spite of wanting to socialize more they generally lack the motivation to plan and

manage schedules with friends owing to different schedules, part-time jobs and working hours, academic and performance pressures. Their routines being monotonous and predictable did not excite them to come to college. Their statements of " I wish we could see our friends in real time"- Naga Sai Sarvepalli and "I wish I could see what's happening at the event in real time" - Precious Onwubuche, helped incorporate those features in the proposed solution.

AR can provoke a great feeling of presence because the environments and tools with which the users interact are real therefore maximizing student involvement in the scenario. This mixed reality improves people's quality of lives as it opens new frontiers to help to solve most common mental health problems without having to take office appointments(Ventura et. al, 2018). Since the overall well being of the student is impacted here, the solution presented is an integration in their daily mundane lives to manage these issues. Peer group interaction and laughter sessions will greatly alleviate the feeling of social isolation. Good friends are good for health, friends prevent loneliness and increase your sense of belonging and purpose. Improving their self-confidence and self-worth and reducing stress levels (Sadasivan et. al, 2021). Exercise of any kind that encourages some physical activity has beneficial effects. Exercise and physical activity are associated with better quality of life and health outcomes. Medical evidence suggests that the human brain produces a variety of chemicals such as dopamine (reward), endorphins (pain relief)and serotonin (relaxation). Moderate exercise increases at- tention and academic performance Studies show that endorphins released may help in overcoming social anxiety
(Sadasivan, 2021).

The principle of gamification further optimizes people's motivation - "actionable gamification". In my opinion, the goal of a gamification system is consistent with user motivation, and its cornerstone is the core value and need of what we want to serve our users. When designing and building a gamified system for user services, our core principle is to fulfill the real requirements of the users and to create an unexpectedly emotional experience for the users (Ning, 2018). The mental health field recognizes the importance of individualization, wherein treatment approaches are ideally customized to align with each individual's specific requirements and preferences. Attaining such a degree of customization cost-efficiently poses difficulties within traditional healthcare environments (Singha & Singha, 2024). . Therefore, the solution has a strong and direct impact on the user's motivation and their overall wellbeing. It enables them to take quick actions in the given situation and quick desired results, holistically solving the problem.

CONCLUSION:

The thesis uses User Centered Design and MultiMedia Technology to address a number of significant issues faced by college students. Design has always proven to be a powerful tool, improving the quality of human life and continues to do so even in a complex scenario of student life difficulties. Through the demonstration of this concept, it shows how user centered design can tackle bigger challenges of student engagement and social interaction. The project's outcomes not only showcase the potential of AR but also paves the way for the application of design principles and technologies to solve greater issues at hand. The solution's application in this context creates a more supportive and connected campus environment. It throws light on the ability of interactive design to address issues of academic support, mental and emotional well being that goes on to

build a framework that can be applied to other such areas as well.

This opens up possibilities of interactive media designs and technologies to bring across positive behavioral changes in children as well as adults. It can be applied to treat mental health issues such as depressive disorder, stress reduction, lack of motivation and other psychological issues. It demonstrates how it boosts not only psychological but also physical fitness by combating sedentary behavior found in students. It can further go on to make environments, information and activities more accessible for people with disabilities. It can provide visual and auditory cues for students with disabilities and improve their educational experience. Future research can explore areas of making these experiences fun for students with disabilities and its application for a wider range of age groups. Since these interactive experiences can be tailored to be more inclusive, it gives them an opportunity to indulge in fun experiences with their friends as well.

In conclusion, the thesis attempts to address a complex problem in an innovative way, not only solving the immediate issues but also providing long term benefits for their overall health and development.

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APPENDIX

Website: vcd-thesis-aditisingh.squarespace.com

VCDE THESIS IMPLEMENTATION

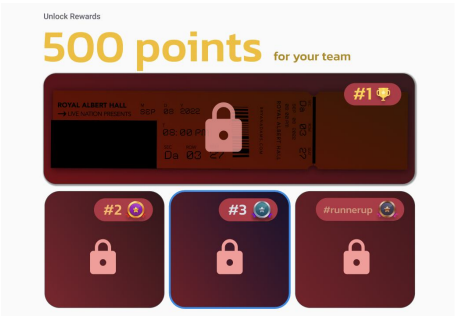
Leveraging AR for interactive student experiences, promoting overall well being

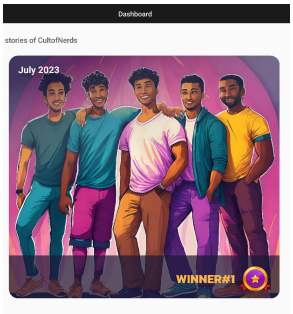
Augmenting Social Engagement for Students

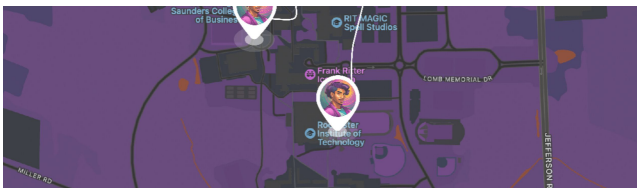
Augmented Reality enhances interactive student experiences and well-being.

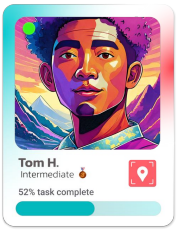
CONCEPT

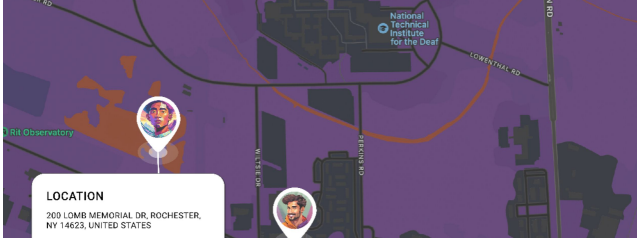
This thesis explores the concept of an Augmented Reality Application designed to enhance student's social engagement with their peers in campus activities at universities. It uses AR Technology and futuristic interface design to create a fun and interactive environment that motivates graduate students to socialize more often and maintain a balanced lifestyle. The problem addressed here is the lack of motivation and resources among students to engage in activities due to academic pressures which also adversely affects students mental and emotional wellbeing. The proposed solution involves integrating AR interfaces and 3D elements that immerse them in an enjoyable environment and encourage them to participate in activities between classes.



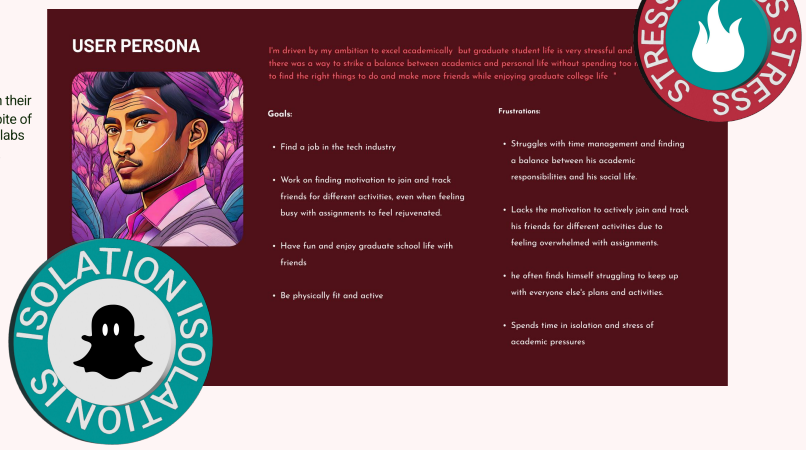




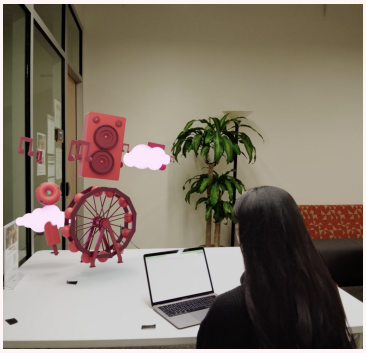


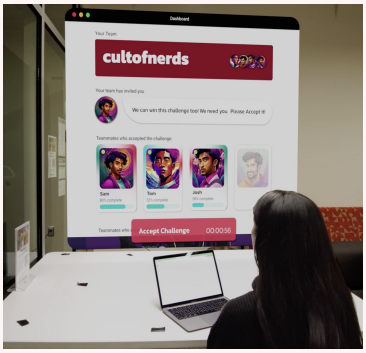


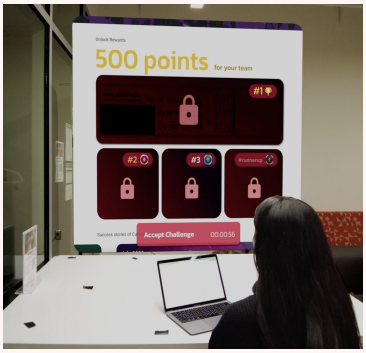
The user is a Graduate Students that lacks the motivation and resources to participate in the right events at the right time with their friends owing to academic responsibilities and pressures. In Spite of spending the majority of their time on campus they are busy in labs and other academic activities living isolated and stressful lives.



Features







Fun 3d elements in real environment

FUN IMMERSIVE ENVIRONMENT: INCREASED ENGAGEMENT

AR can provoke a great feeling of presence because the environments and tools with which the users interact are real therefore maximizing student involvement in the scenario. This mixed reality improves people's quality of lives as it opens new frontiers to help to solve most common mental health problems without having to take office appointments(

Futuristic Interface

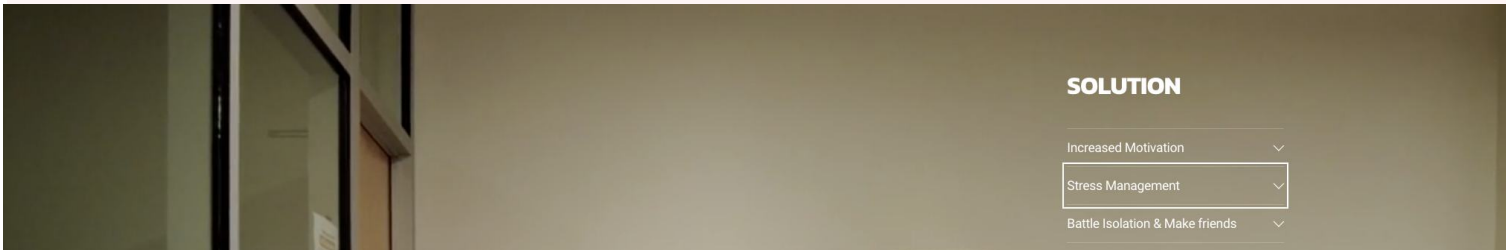
FUTURISTIC UI: AR DASHBOARD; REAL TIME UPDATES, FEAR OF MISSING OUT & TIMERS

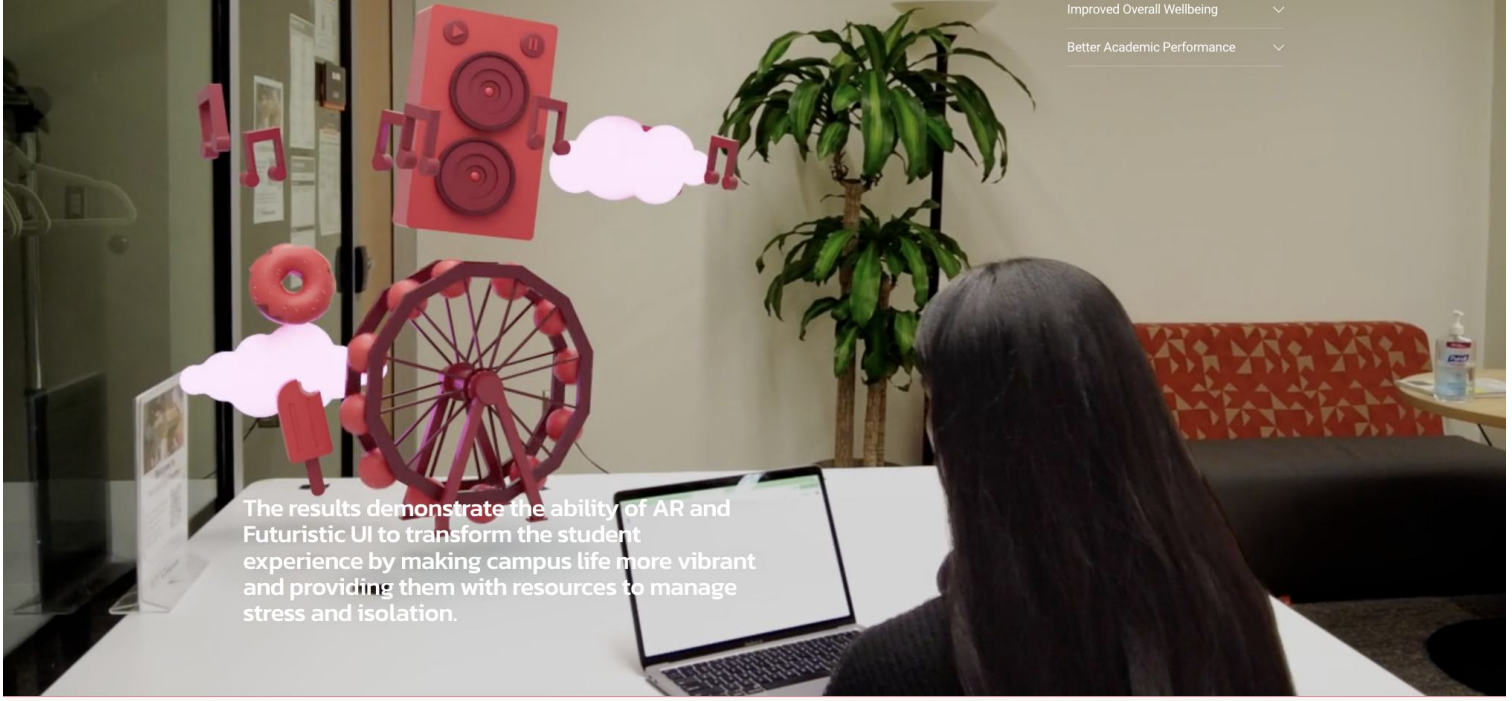
AR can provoke a great feeling of presence because the environments and tools with which the users interact are real therefore maximizing student involvement in the scenario. This mixed reality improves people's quality of lives as it opens new frontiers to help to solve most common mental health problems without having to take office appointments.

Gamification

ENHACING USER EXPERIENCE , PERSONALISATION AND REWARDS

Designing challenging activities is a key point in Gamification and a difficult task to accomplish. An activity is considered challenging when it tests the limits of our ability in subtle ways. Gamification focuses on shaping the user experience, which is similar to the game's emotional satisfaction. The AR environment and interface design aims to significantly increase the probability of a positive response from the student to participate in such activities with peers.





Event Poster: 3d elements brought to life

The static elements from the poster come to life to create a more realistic and immersive environment of that event giving the user a fun sneak peak of the festivity happening making it more enjoyable for the user and giving them a comprehensive picture to take quick action of whether it interests them.

THE PROCESS

Empathize.

USER PERSONA

I'm driven by my ambition to excel academically but graduate student life is very stressful and I wish there was a way to strike a balance between academics and personal life without spending too much time to find the right things to do and make more friends while enjoying graduate college life *

BOB

Age: 22

Occupation: Mater's Student at RIT

Major: VCD

Location: Rochester, NY

Housing: Lives with roommates in a shared apartment

Education: Bachelor's degree in Design

Goals:

- Find a job in the tech industry
- Work on finding motivation to join and track friends for different activities, even when feeling busy with assignments to feel rejuvenated.
- Have fun and enjoy graduate school life with friends
- Be physically fit and active

Frustrations:

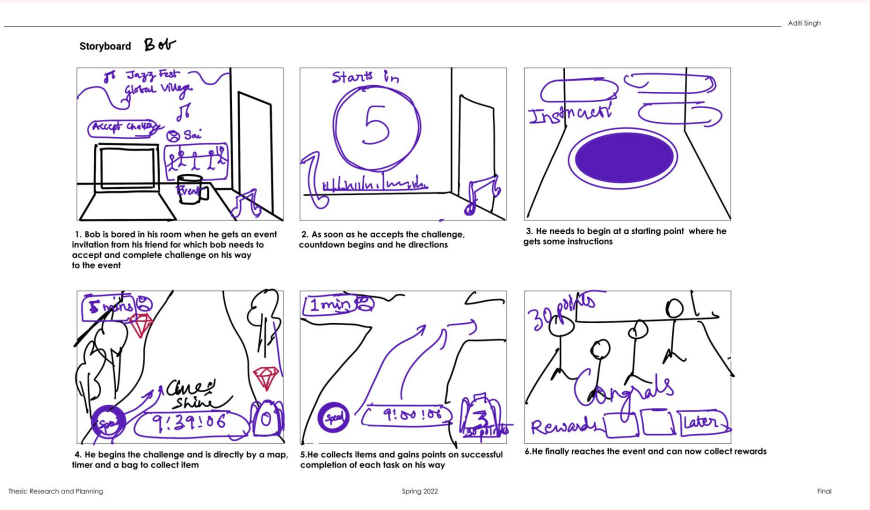
- Struggles with time management and finding a balance between his academic responsibilities and his social life.
- Lacks the motivation to actively join and track his friends for different activities due to feeling overwhelmed with assignments.
- he often finds himself struggling to keep up with everyone else's plans and activities.
- Spends time in isolation and stress of academic pressures

Ideate.

User Stories

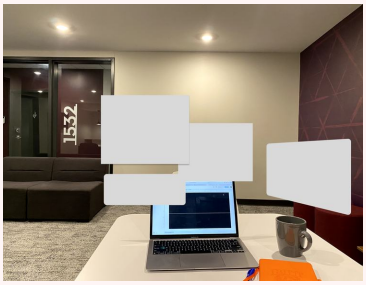
As a _____ , I want to _____ so that _____ .

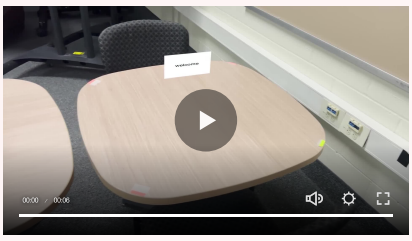
As a graduate student, I want to participate in events so that I experience co curricular activities and get a break from studies Aditi Singh	As a graduate student, I want to do fun activities with friends so that I can make memories with them Aditi Singh	As a graduate student, I want to be motivated to do fun activities so that I can strike a balance between academics and fun. Aditi Singh	As a graduate student, I want to get real time updates of fun events around so that I do not have to keep track of things. Aditi Singh	As a graduate student, I want to be motivated to attend campus events with friends so that I can make the most of my college experience Aditi Singh
As a graduate student, I want college to be more exciting so that I am motivated to spend more time on campus Aditi Singh	As a graduate student, I want to be able to make more friends so that I increase my social network and feel a sense of belonging Aditi Singh	As a graduate student, I want to know real time updates of my friends on campus so that we do not spend time in planning to meet. Aditi Singh	As a graduate student, I want to know of the fun events outside of classrooms so that I am not distracted during classes. Aditi Singh	As a graduate student, I want to be able to engage in stimulating activities outside of classes and assignments Aditi Singh

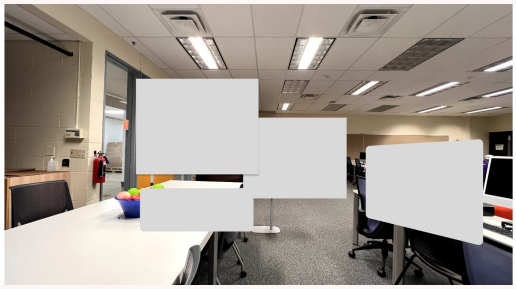


Design.

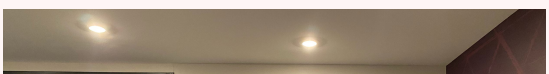
Testing scenarios and environment.



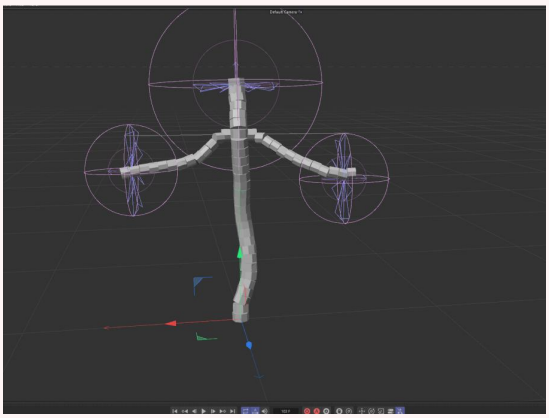


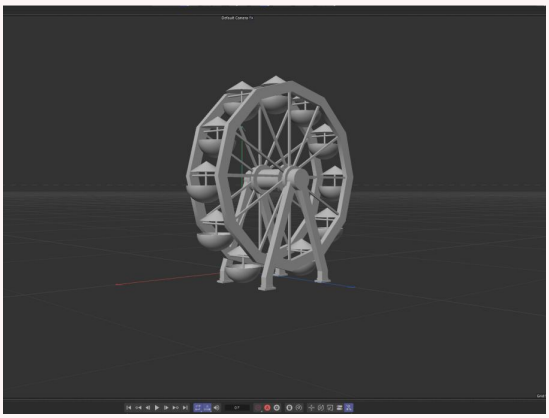


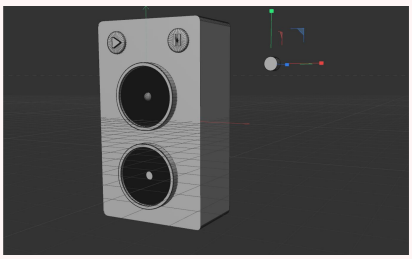
Concept Design

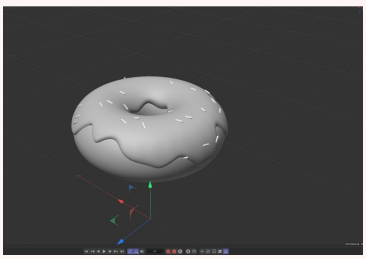


3D Assets









Defining states; User path

User Flow: Path 2

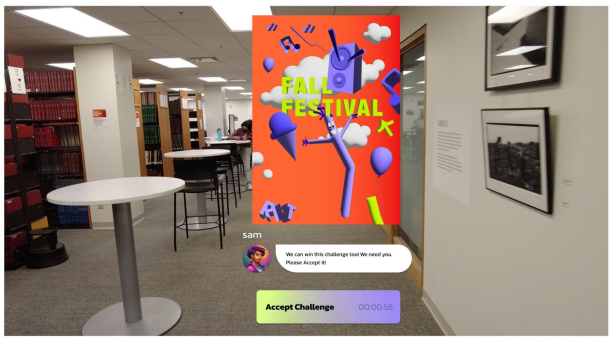
One of many possible paths

State
STATE 01:

Scenario: Student steps out of the classroom and sees a poster pop in front of him with an invitation from his friend

Content/what he sees:
-picture of sam
-his msg/voice invitation
-Event poster
-challenge #22
-timer to accept challenge

Controls/ what he does: says show notification/
swipes to see more info



01

User Flow/Highlighted Path

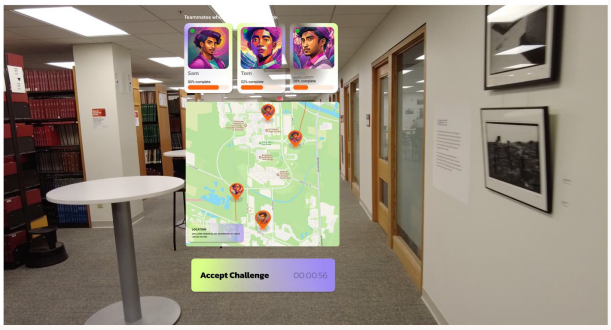
One of many possible paths

State
STATE 02

Scenario: Sees an urgent invitation for a challenge from his friend

Content/what he sees:
-his friends who have accepted the challenge
-competitors
-map showing friends journey
-Rewards and Leaderboard
-Live event
-timer

Controls/ what he does: clicks on accept invite

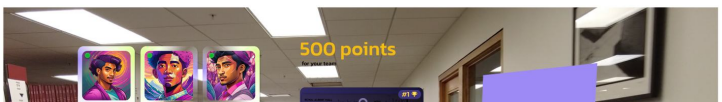


02

User Flow/Highlighted Path

One of many possible paths

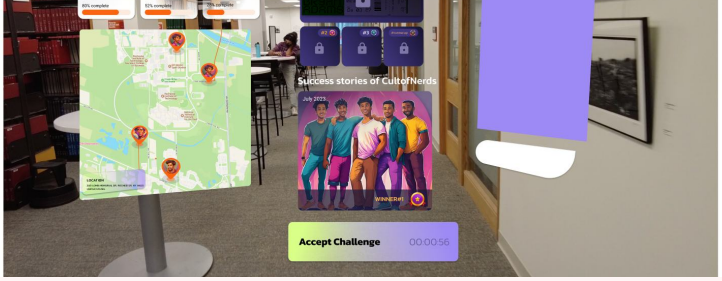
State
STATE 03



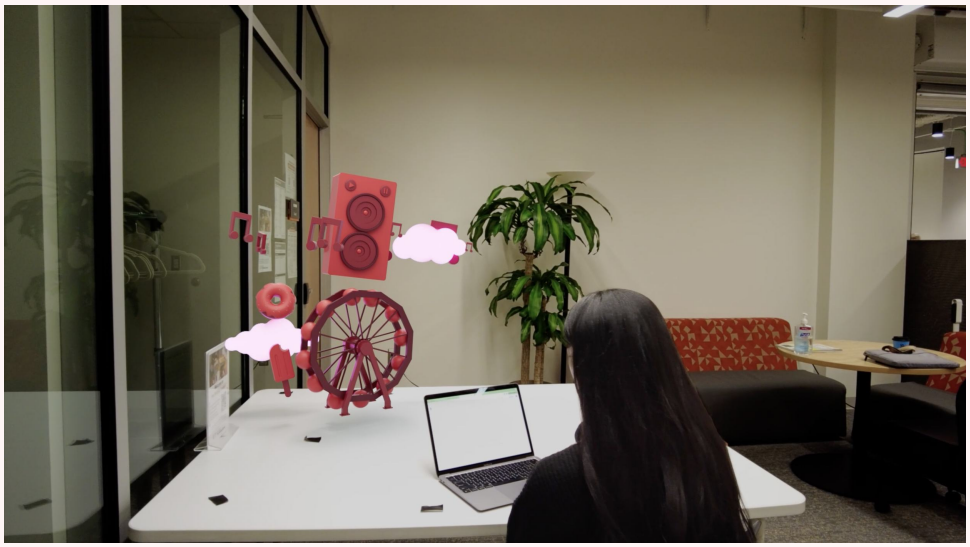
options

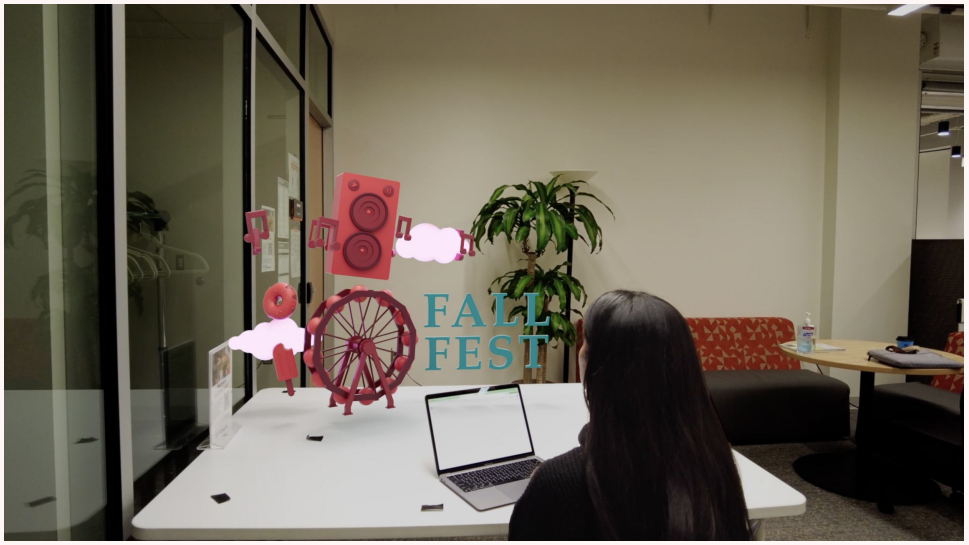
Content/what he sees:
-his friends who have accepted the challenge
-competitors
-map showing friends journey
-Rewards and Leaderboard
-Live event
-timer

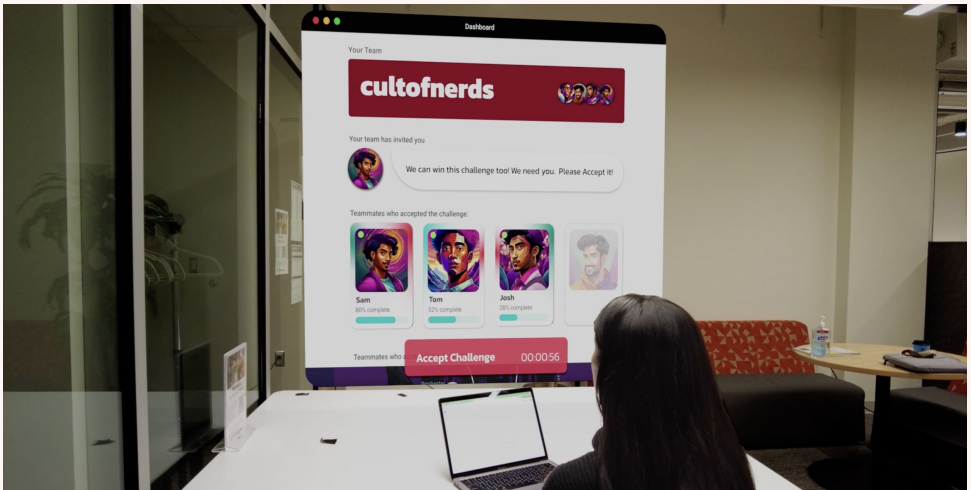
Controls/ what he does:
-he checks in with voice assistant before accepting invite
-clicks on accept invite

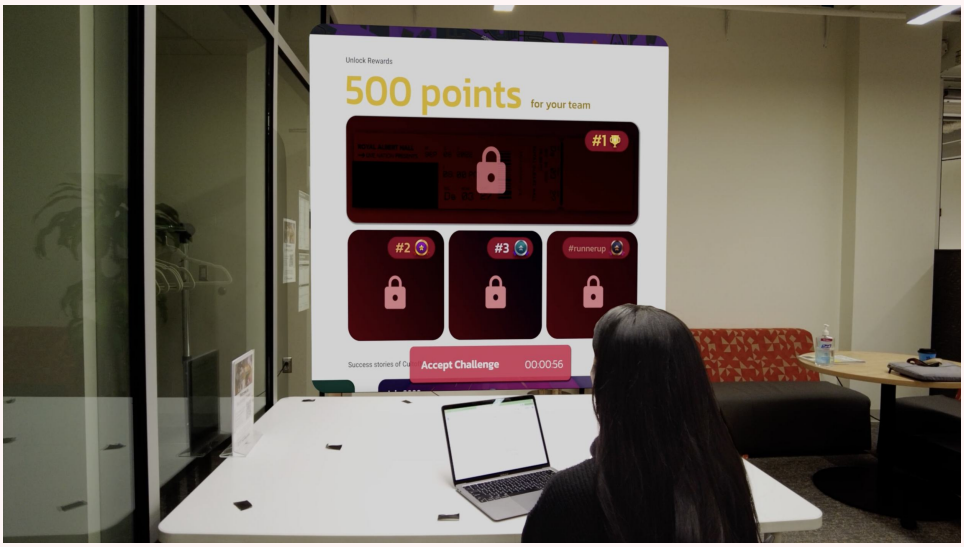


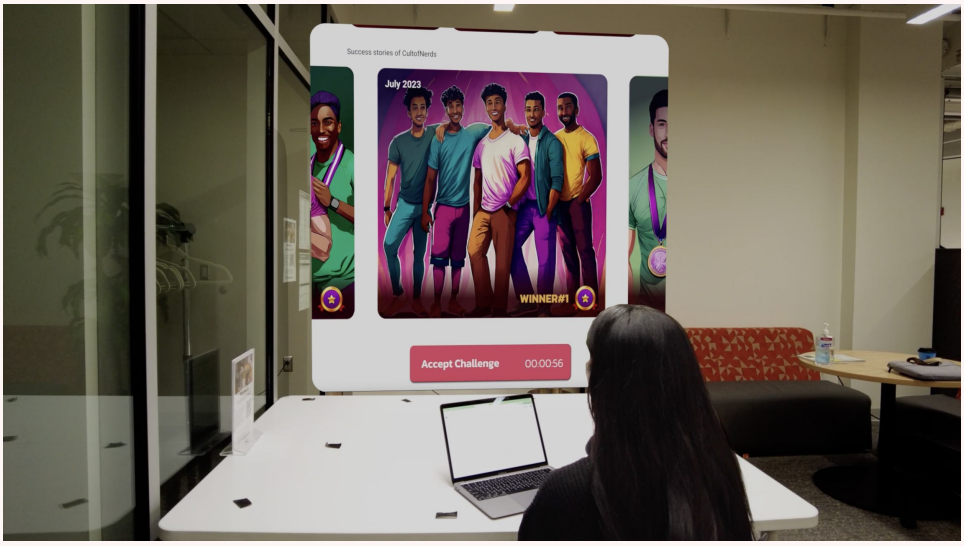
03











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Batch 2021-24