

Keyword: VR games, immersive experience, communication and interaction



EmpathyEcho[®]

How to promote deeper emotional communication between college students and their parents?

Project Description :

This project is a VR game designed to improve communication between young adults and their traditionally authoritative parents in Chinese society.

The game aims to enhance empathy by visualizing and providing feedback on intangible emotions, using existing technology to help both parties understand the impact of emotions on communication and strengthen their connection.

08/2023-03/2024

Teamwork :

Xinyu Jiao: Team Leader, Inspiration, Code, Modeling, Interviews

Huang Ke: Typography, Code, Questionnaires, Research

BACKGROUND

WHAT I FOUND

Due to the rapid changes in society, the values and lifestyles of college students have changed. The concepts between college students and their parents are different, the **generation gap** is wider, and **communication has become more difficult**.



WHAT FACTORS CONTRIBUTE TO THE EMERGENCE OF GENERATION GAP WITHIN FAMILIES?

CONFUCIANISM

In Confucianism, the family is an organic unit with the father as its head.
"IDEOLOGICAL BONDAGE"



COMPULSORY EDUCATION

Higher education leads to more knowledge and cultural exposure for college students.
"SELF-AWARENESS"



INFORMATIONIZATION

The internet's popularity benefits college students with information and opportunities.
"INDIVIDUAL RIGHTS & FREEDOMS"



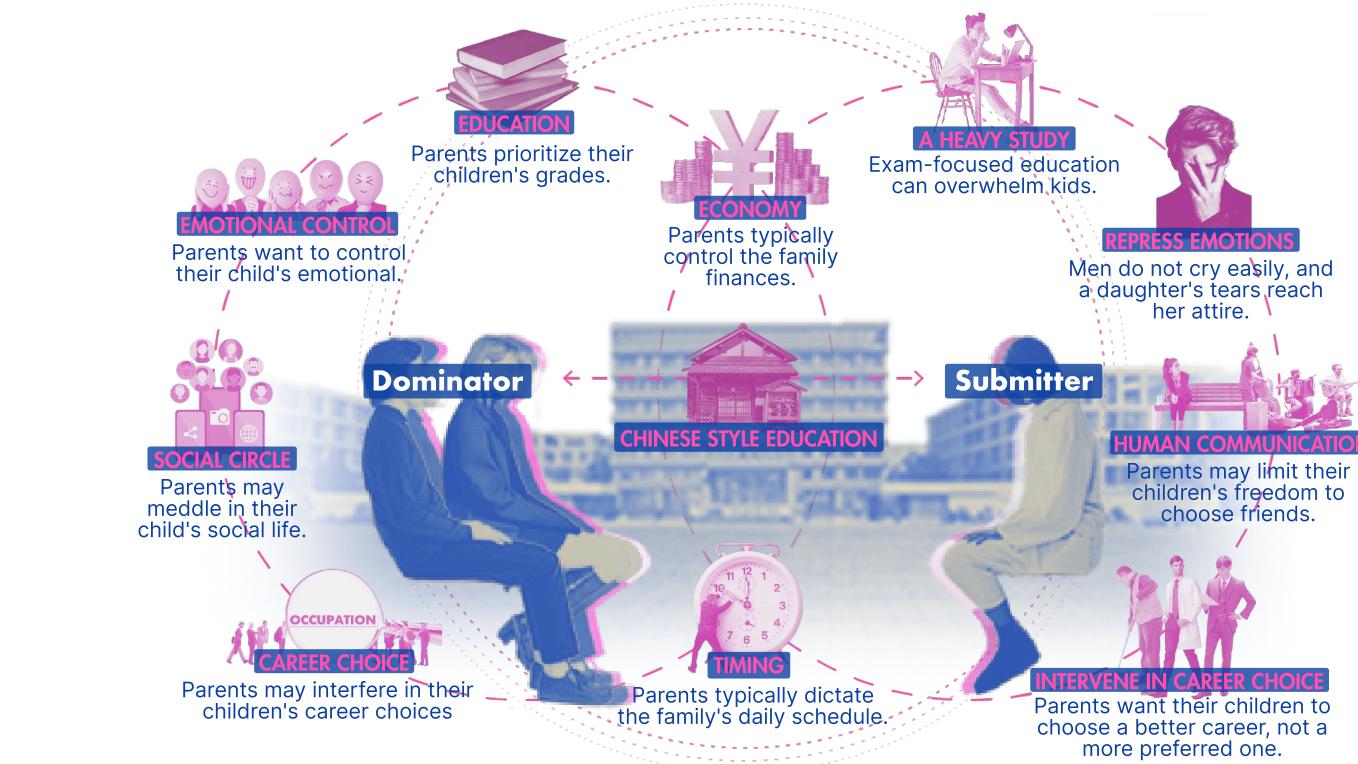
CULTURAL REVOLUTION

The Cultural Revolution influenced changes in family structure and values.

"FAMILY STRUCTURE CHANGE"

CHINESE FAMILY RELATIONSHIP

In traditional Confucian culture, the father is the dominator and the child is the submitter.



WHAT ARE THE POSSIBLE PROBLEMS?



CONSUMPTION

College students' consumer attitudes, shaped by unique ideas and needs, often differ from their parents, who may become upset with their preferred style of dress.

EDUCATOR

Parents may struggle to comprehend modern college students' learning methods, often expecting them to dedicate all their time to studies, resulting in conflicts.

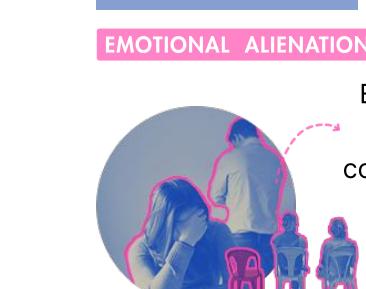
CAREER CHOICE

Parents typically prioritize stability in their children's career choices over their interests, often expecting them to choose a career aligned with the parents' preferences.

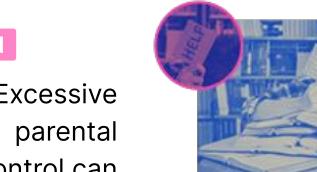
CONSEQUENCE

EMOTIONAL ALIENATION

Excessive parental control can alienate college students.



INFLUENCE ON STUDY AND LIFE
Without support and encouragement, college students may lose confidence and motivation.



MENTAL HEALTH ISSUES
Communication problems can lead to psychological problems such as irritability, anxiety, and depression.



RESEARCH PLAN

STEP 1

QUESTIONNAIRE

This questionnaire is mainly aimed at the topic of communication between college students and their parents. A total of 17 questions, a logical analysis of college students and parents communication status and barriers.

Collection Time

April 22, 2023 - May 1, 2023

Survey Methods

Questionnaire survey, the use of random sampling way to issue questionnaires.

Sample Capacity

125 valid questionnaires

STEP 2

FOCUS GROUPS

Aim

Find common problems in communication between university students and their parents.

Time

June 3, 2023 - June 7, 2023

Method Of Discussion

Considering the distance between both parties, we used online video for discussion.

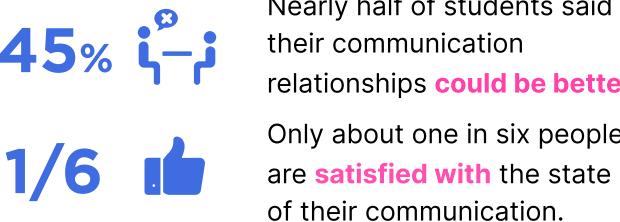
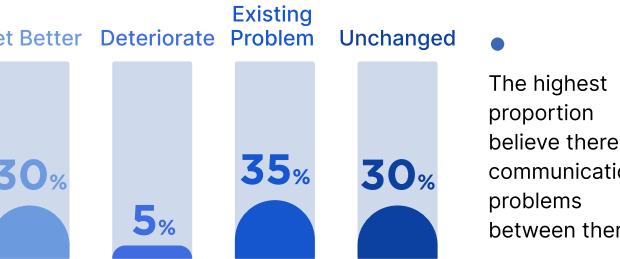
Number Of Participants

Three groups of families

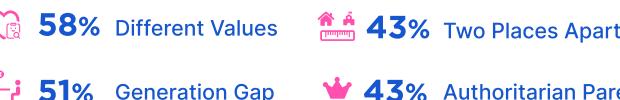
QUESTIONNAIRE

CURRENT SITUATION OF COMMUNICATION

- **46.4%** of college students and parents frequently engage in communication.
- **7.2%** of college students rarely or never communicate with their parents.

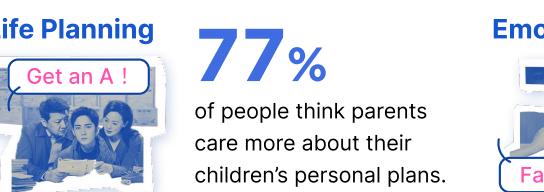


INFLUENCE FACTOR



- Many factors lead to **communication barriers** between parents and children.

CONTENT OF COMMUNICATION



65% of people think that their parents are **willing to communicate actively**, but they just can't find the right way to communicate.

They don't discuss it with their parents...



- Most college students discuss study and career planning with their parents, but there are many topics they **don't talk about**.

CONSEQUENCE



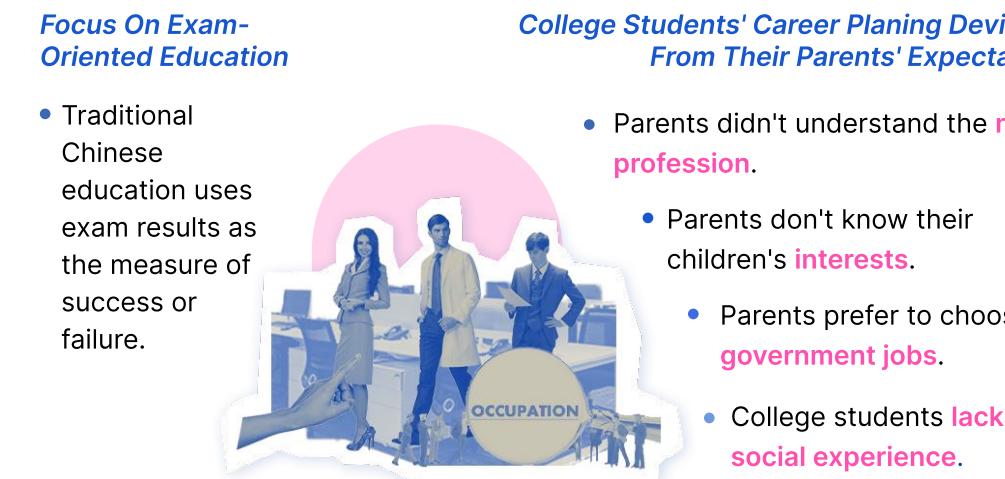
- This shows that both sides agree that by working together, the obstacles can be overcome.

KEY FINDING

THE MAIN CAUSE OF COMMUNICATION BARRIERS



THE TOPIC FOCUSED ON THE REASONS FOR CAREER PLANNING



FOCUS GROUPS

OBJECTIVE

To explore and study the causes and effects of emotional communication problems between parents and college students, and promote their emotional connection and more effective communication.

SCOPE

Emotional Needs

Understand their different expectations and expressions of emotional needs.

Emotional Support

To understand whether the two parties will give each other positive emotional support.

Difference Of Generation

Discuss generation gaps due to age and experience.

Communication Barriers

Explore their common barriers and challenges in emotional communication.

ACTIVITY PROCESS

SCENARIO

Created a thematic setting for discussions between students and parents, focusing on emotional communication between students and parents.

STUDENT TASKS

- Try to discuss emotions that are often rarely mentioned.

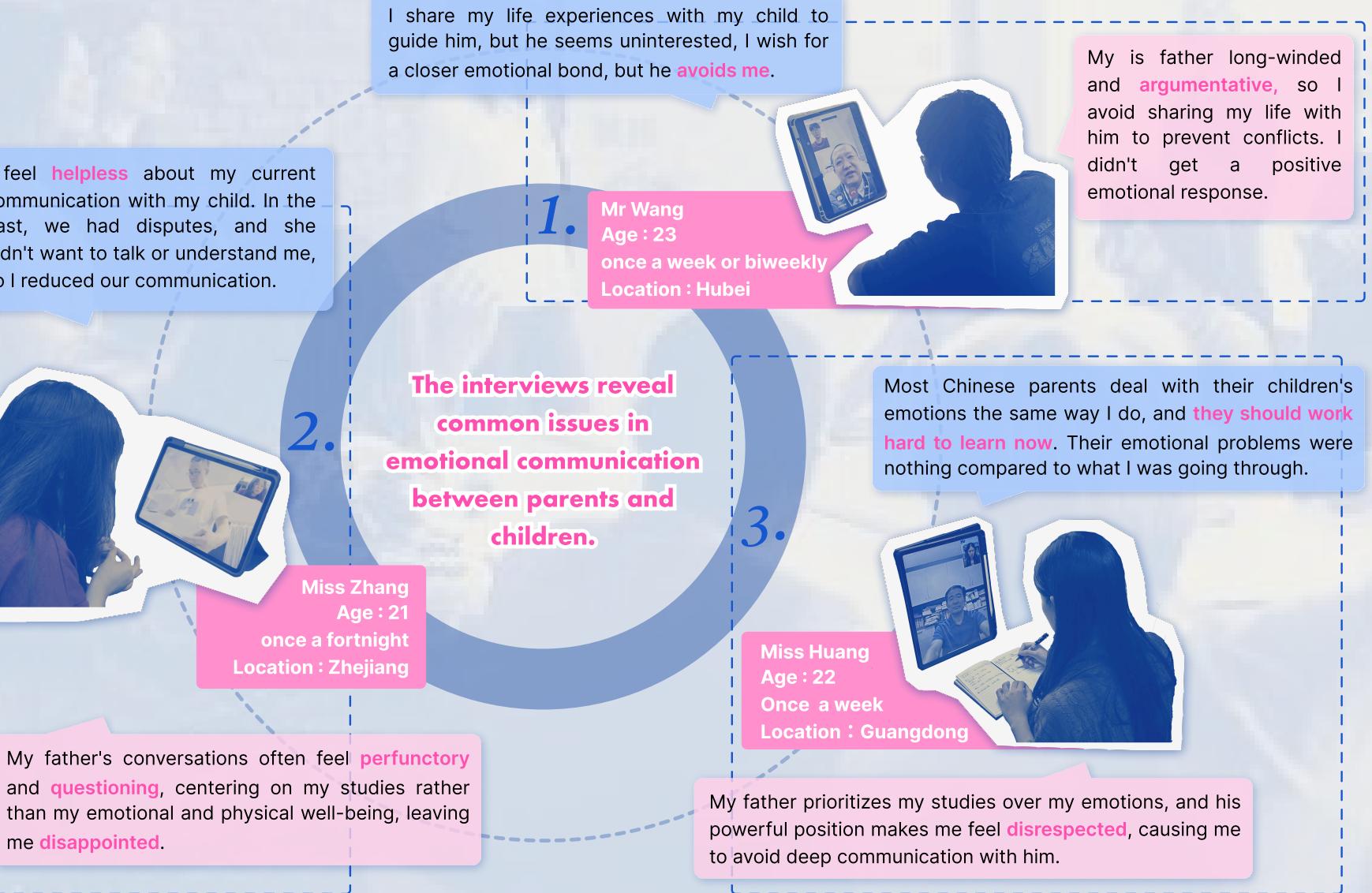
OR

- Share a recent emotional experience.

Express your emotions.

PROCESS

WHAT DID THEY SAY...



SUMMARY



Parents

Major issues identified during the interviews



Undergraduate

 They focus on practical problems in study and career.	 Cognitive & communication mismatches	 They crave attention and support on an emotional level.
 Family role stereotypes that they ignore emotional expression.	 Emotional expression disorder	 They don't get positive emotional support from their parents.
 They control their children's lives out of their care and responsibility.	 Conflict between control & independence	 They yearn for more freedom, independence, respect, and recognition.
 They are more traditional and conservative, valuing authority.	 Conflict of views & values	 They are more influenced by modernization and personal freedom values.

IDEATION

DESIGN THINKING

- Emotional Needs Don't Match
- Emotional Expression Disorder

Key Findings

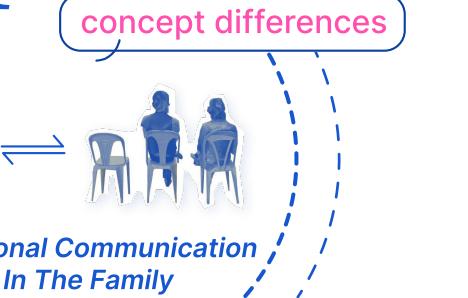
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- Cognitive Divergence
- Communication Barriers

Conversion

1

Research



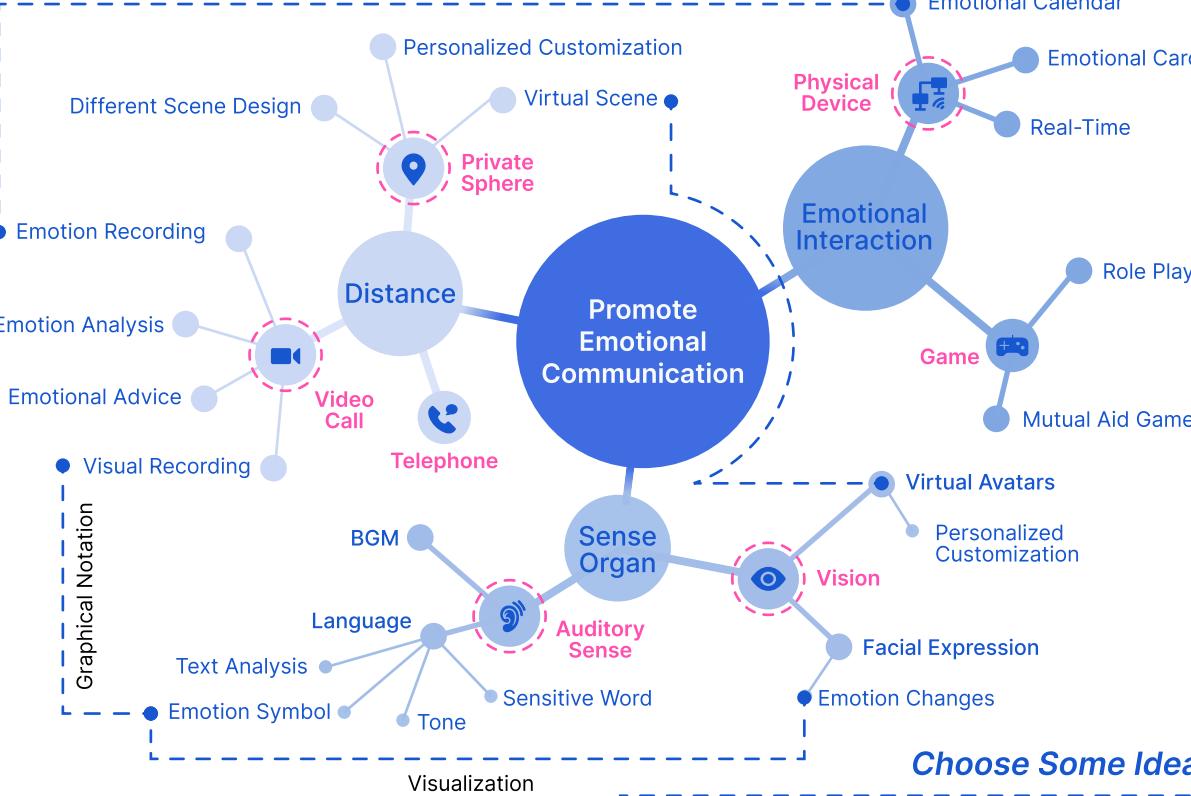
Project Thinking

- Emotional Satisfaction & Support
- Cultivating Empathy
- Collaboratively Solving Problems

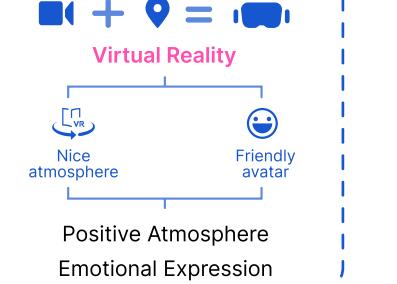
How Might We...

Create an engaging experience to encourage students and parents to collaboratively address existing conflicts, promoting mutual resonance and a deeper connection between both parties, and reducing the generation gap.

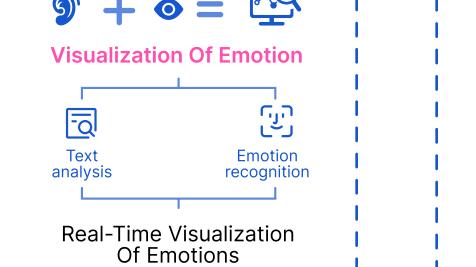
BRAINSTORMING



1



2



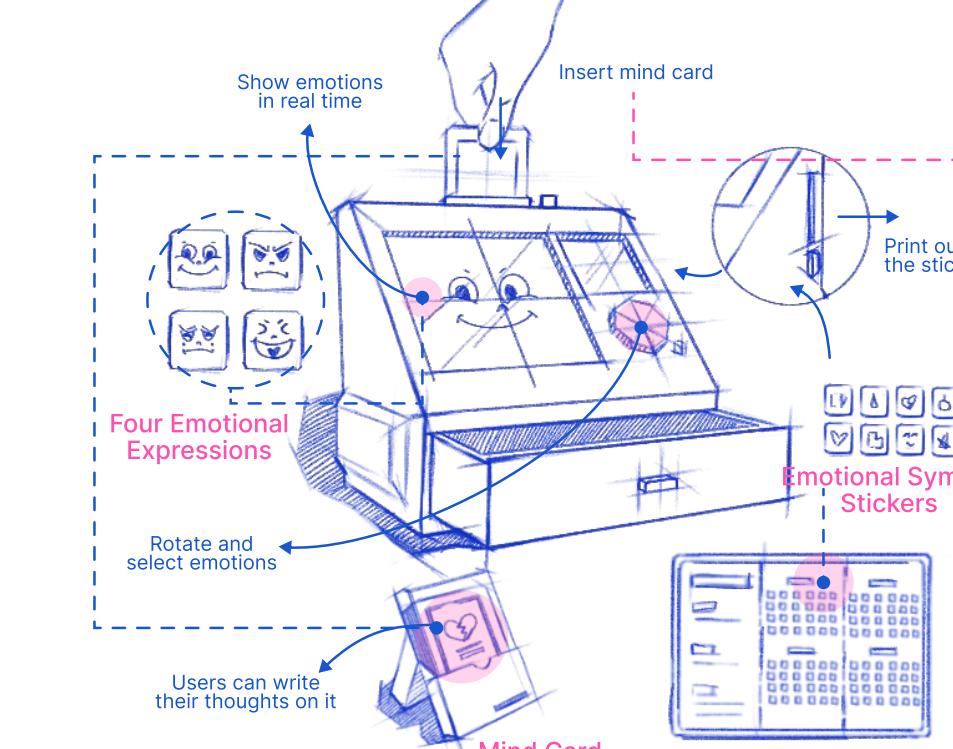
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CONCEPT DEVELOPMENT

EMOTIONAL BANK VR DEVICE

PHYSICAL PRODUCTS



Emotional Bank

The system creates emotional accounts, assigns tasks, and integrates online VR with offline devices, enabling users to instantly switch visible emotional states.

Emotional Stickers

Emotional symbols from the chat can be printed and added to the emotional calendar via the device.

Mind Card

Write down dilemmas or problems, and insert the device, the system will automatically create an online virtual card.

Instruction Manual & Emotional Calendar

The device instruction book and attached emotional calendar facilitate users in recording and affixing emotional symbol stickers.

VR DEVICE

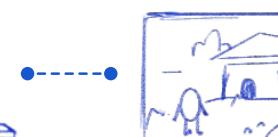
1.



Virtual Avatars

Promote emotional expression and relieve tension in communication.

2.



Virtual Scene

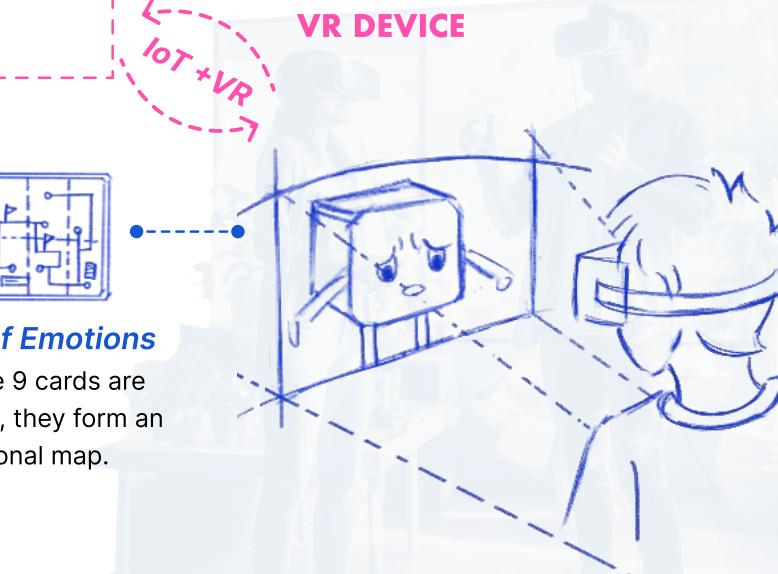
Customize scenes to create the right scene for your mood.

3.



Map Of Emotions

When the 9 cards are completed, they form an emotional map.



CONCEPT SCENE

OVERALL EFFECT

Each map is divided into 9 blocks, and players need to solve the cards step by step to unlock new map blocks.



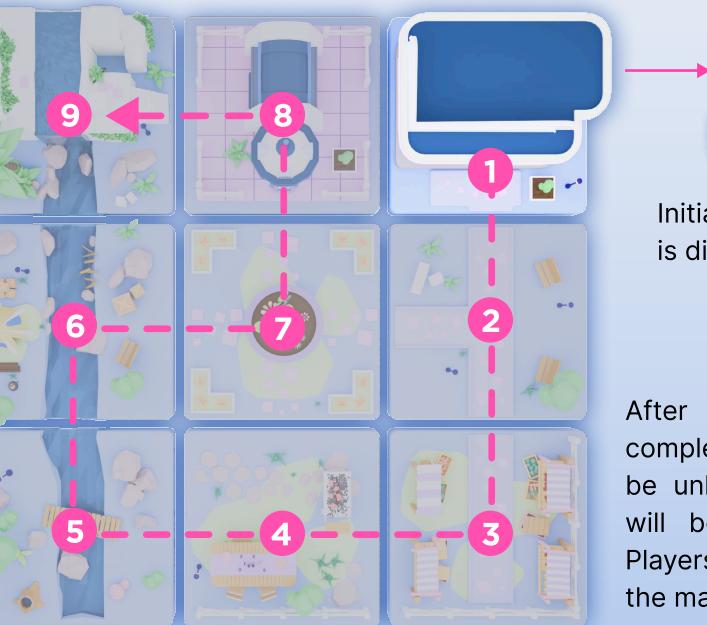
VISUALIZATION DETAIL

1. INDOOR INTERACTION



The two parties interact indoors to solve the initial mind cards. Elements of the indoor scene can be interacted with by the player.

2. MAP TILES

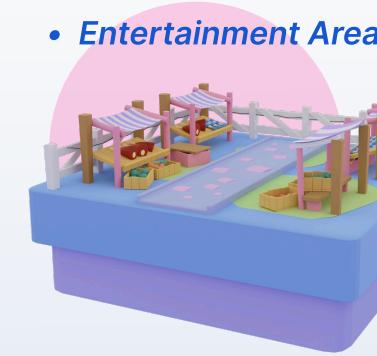


Initial map, a complete map is divided into nine pieces.

After the outdoor mind card is completed, the outdoor scene will be unlocked and the map section will be expanded step by step. Players need to find the next card in the map and interact in new scenes.

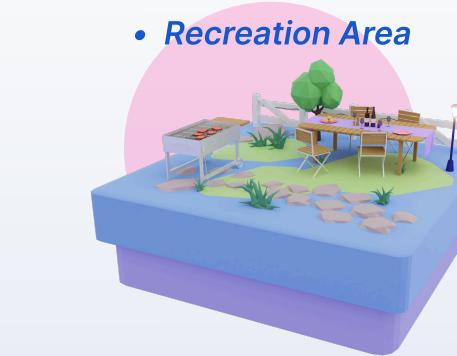
3. PARTIAL THE SCENE DESIGN DETAILS

• Entertainment Area



Players can play games here, and each stall has a corresponding game.

• Recreation Area



Both players can have friendly conversations in this area.

• Home Banking Area

Players can browse past conversation records and scores in this area, which is equivalent to an emotional bank.



• Wishing Area

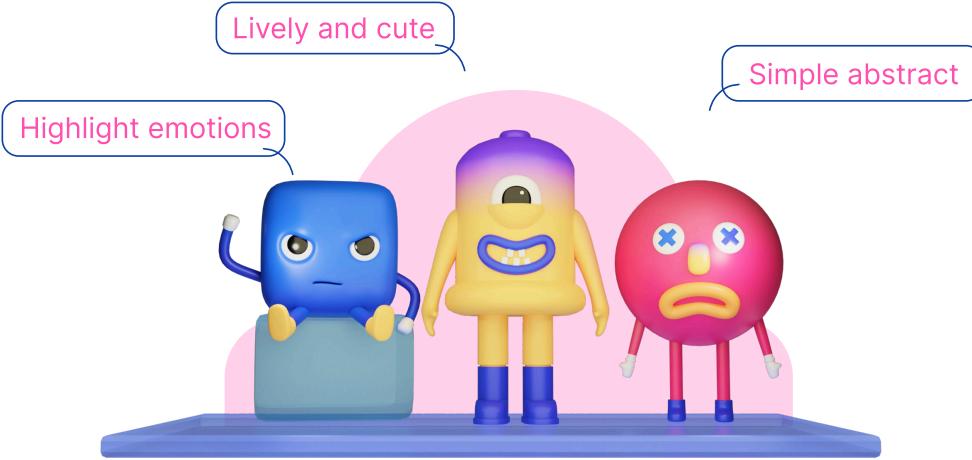
The last map is where players can make wishes for improvements to the other party.



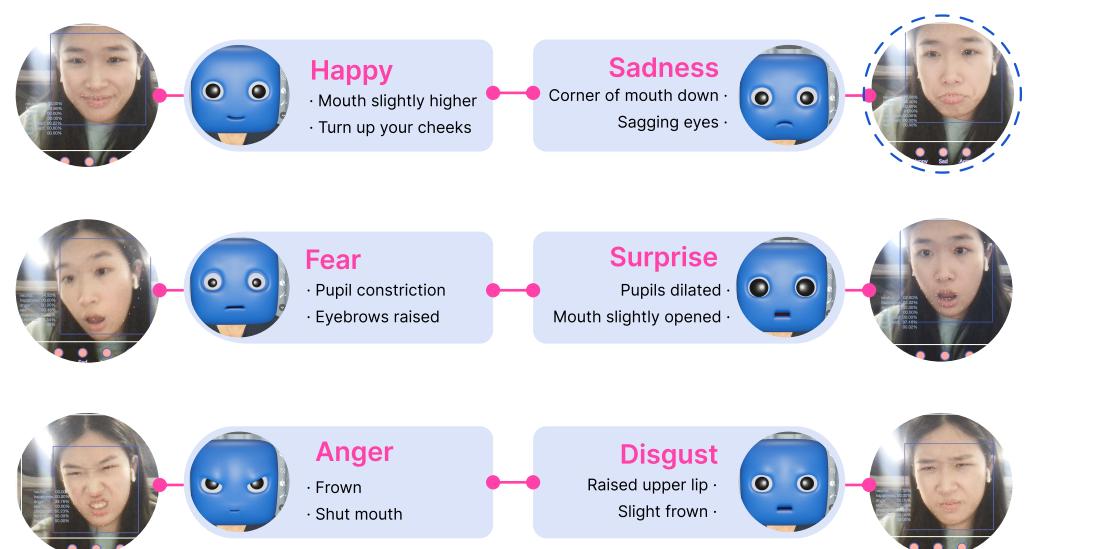
VIRTUAL AVATARS

IMAGE DESIGN

Facial expression detection dynamically adjusts the avatar's emotions. Cute designs ease tension, while simple, **abstract visuals** reduce confusion, helping users focus on the game's plot and tasks.



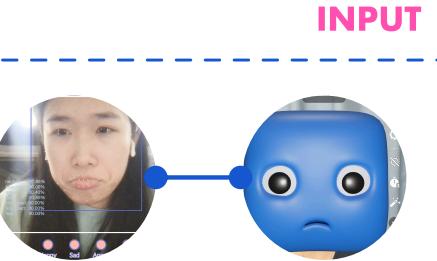
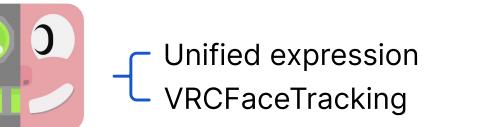
CHARACTER MAPPING



EMOTION RECOGNITION

• Facial Expression Capture

VRCFaceTracking can be used to capture the user's facial movements in real time within a VR device, providing detailed data about their expressions.

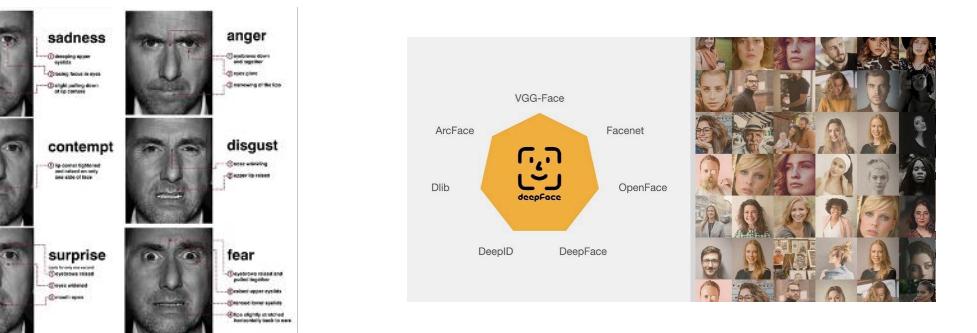


Using a facial tracking camera, Avatar can map the user's facial expressions in real time

• Specific methods for quantifying facial expressions COMPUTING ②

Ekman's model of six basic emotions is based on facial expressions. It shows that emotions are the same across cultures and conditions.

Process facial expression data using **DeepFace** to recognize specific emotions based on models such as **VGG-Face** and **Google FaceNet**.



INPUT ① ③ OUTPUT

• visual and auditory feedback

The theory of embodied cognition says that elements in a virtual environment, including scenes and characters, should make users feel different emotions.

Emotion	Scenes	Scene elements	Character emotional	Sound effect
Happy	The sun shines through the window, casting a warm light	Blooming flowers, dancing balloons	Characters exude a warm glow	Birds and cheerful ambient sounds
Sadness	Raindrops slide down the window	Withered flowers, fallen leaves outside the window	The character is surrounded by a dark blue halo	The sound of rain and melancholy piano music
Anger	The rain beat violently against the windows	Cracked wall/ suddenly broken glass	The figure exudes a fiery red aura	Low frequency drum sound
Fear	Dark, foggy, heavy rain intensifies	Flickering candles, flickering lights	The character is surrounded by an eerie purple color	Rhythmic thunder
Surprise	Lights suddenly become very bright/lightning flashes suddenly	Balloon burst	White halo	Rhythmic heartbeat
Disgust	The room is filled with turbid gas and smog	Flies fly in and surround the withered flowers	Characters are shrouded in a disgusting green haze	Vomiting sound

VR GAME MECHANICS & GAMEPLAY

MIND CARD SECTION

1. Physical Device



Write a card of concern and insert it into your device, and the system will generate a virtual card.



2. Extraction Of Mind Cards



When starting a chat, both parties will randomly draw a worry card and chat around their worries.

4. Chat Ends

1 When a map is completed, the system will rate both users, and the one with the highest score will randomly receive a family privilege card.



2 Players can review previous conversations through emotional records, and the system will generate suggestions.

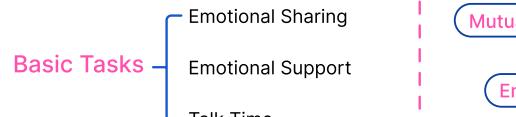


3 The final emotional symbol can be printed and affixed to a physical calendar via the sentiment banking device.



3. Chat Mechanism

1 During the chat process, points will be added or subtracted based on the completion of **basic tasks** and the chat status.



2 After resolving a mind card, a **new map** tile unlocks, allowing you to search for additional cards. Once you complete nine pieces, a full map is created.



At the same time, **emotional symbols** are generated to record emotions.

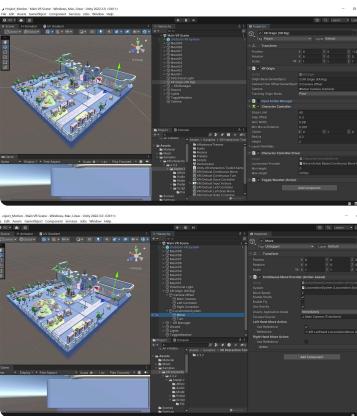
Emotional records will generate an online emotional calendar.

Emotion symbols will also be displayed on the map, allowing users to observe the status of each communication.

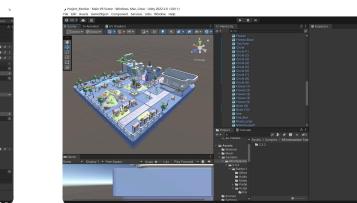
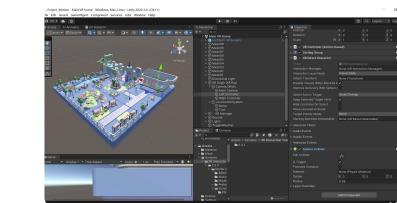
VR TECHNICAL SUPPORT

MAIN TECHNIQUE

LENS AND MOVEMENT SETTINGS INSTRUCTIONS



- Use Unity's official XR toolkit XR -- Interaction Toolkit
- Lens SettingsXR -- Origin MainCamera
- Lens Collider Settings -- Character Controller
- Driving the collision body to move -- Character Controller Driver
- Set the left controller to move continuously -- Continuous Move Provider(Action-based)
- Set the right-hand controller camera rotation -- Snap Turn Provider (Action-based)



- Set up left and right hand Controller control XR --Controller (Action-based)
- Set up left and right hand interactive control XR --Direct Interactor
- Set up left and right hand collision bodies -- Sphere Collider



SWITCH GESTURES, GRAB, TRIGGER CODE

```
using System.Collections;
using System.Collections.Generic;
using UnityEngine;
using UnityEngine.InputSystem;

[RequireComponent(typeof(Animator))]

public class AnimateHandControllers : MonoBehaviour
{
    //引用库
    public InputActionReference gripInputActionReference;
    public InputActionReference triggerInputActionReference;

    private Animator _handAnimator;
    private float _gripValue;
    private float _triggerValue;

    //获得手势姿势
    private void Start()
    {
        _handAnimator = GetComponent<Animator>();
    }

    //手势抓取、触发姿势函数
    private void Update()
    {
        AnimateGrip();
        AnimateTrigger();
    }

    //调用抓取手势姿势函数
    private void AnimateGrip()
    {
        _gripValue =
            gripInputActionReference.action.ReadValue<float>();
        _handAnimator.SetFloat("Grip", _gripValue);
    }

    //调用触发手势姿势函数
    private void AnimateTrigger()
    {
        _triggerValue =
            triggerInputActionReference.action.ReadValue<float>();
        _handAnimator.SetFloat("Trigger", _triggerValue);
    }
}
```

```
using System.Collections;
using System.Collections.Generic;
using UniStorm;
using Unity.VisualScripting;
using UnityEngine;
using UnityEngine.InputSystem;

public class ToggleWeather : MonoBehaviour
{
    //设置控制按钮变量
    [SerializeField] private InputAction toggleButton1;
    [SerializeField] private InputAction toggleButton2;
    [SerializeField] private InputAction toggleButton3;

    //设置按钮控制天气系统的切换
    private void Update()
    {
        if (toggleButton1.action.WasPressedThisFrame())
        {
            T_Weather(15);
        }
        if (toggleButton2.action.WasPressedThisFrame())
        {
            T_Weather(4);
        }
        if (toggleButton3.action.WasPressedThisFrame())
        {
            T_Weather(16);
        }
    }

    void T_Weather(int weatherNumber)
    {
        UniStormSystem.Instance.ChangeWeather(UniStormSystem.Instance.AllWeatherTypes[weatherNumber]);
    }
}
```

```
if (toggleButton2.action.WasPressedThisFrame())
{
    T_Weather(15);
}

if (toggleButton3.action.WasPressedThisFrame())
{
    T_Weather(4);
}

void T_Weather(int weatherNumber)
{
    UniStormSystem.Instance.ChangeWeather(UniStormSystem.Instance.AllWeatherTypes[weatherNumber]);
}
```

