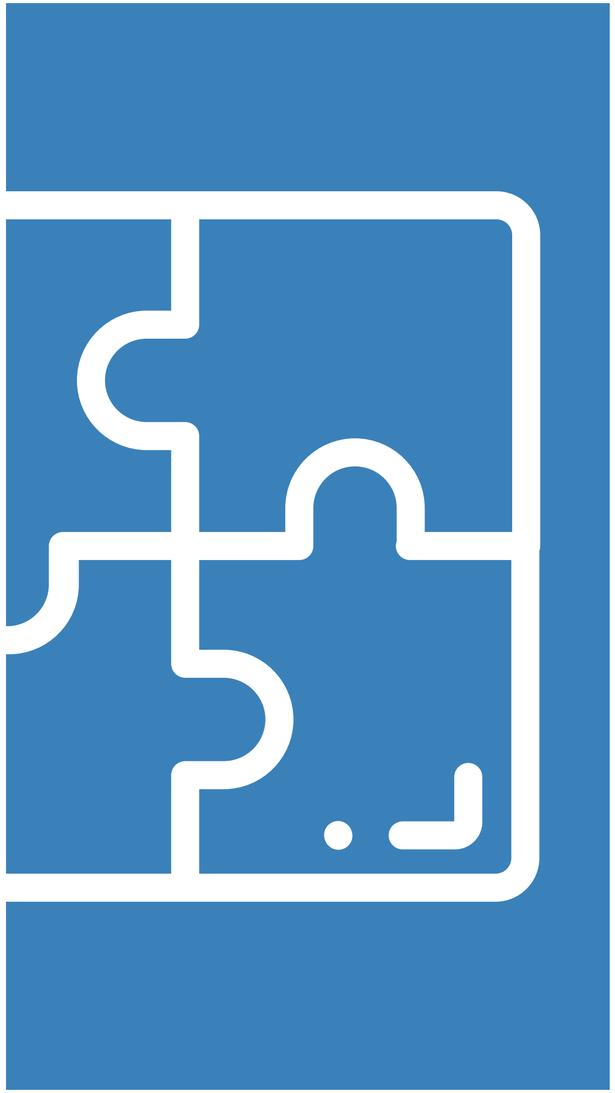
AR Game for improving Emotion Recognition in Children on the AS

通过AR游戏提升自闭症儿童的情绪识别能力

设计学院
SCHOOL OF DESIGN
ARCHITECTURE 建筑 / DESIGN 设计
LANDSCAPE ARCHITECTURE 风景园林

上海交通大學
SHANGHAI JIAO TONG UNIVERSITY

Daniel Vicente Lopez Trompo
May 2020



Autism

IT AFFECTS 40/10000

CHILDREN UNDER 2 YEARS
OLD IN CHINA

CONDITION FOR LIFE

THERE'S NO CURE,
ONLY ADAPTION TO THE WORLD

TOYS AS LEARNING TOOLS

THE INFLUENCE OF TOYS ON
CHILDREN'S DEVELOPMENT IS
PROVEN

AS · AR · Emotion · Game

Augmented Reality game to increase interaction, and
both physical and mental engagement

Hands-free setup to direct the focus to the game
Emotion recognition through evolving tasks

How would the children respond?
How would the game affect their skills?

LITERATURE REVIEW

PLAY TO DEVELOP

The importance of proper and quality toys and their potential to develop skills

LITERATURE REVIEW

PLAY TO DEVELOP

The importance of proper and quality toys and their potential to develop skills

AUGMENTED REALITY

Several studies have proven how AR can add a magic feeling to the experience with children increasing engagement

LITERATURE REVIEW

PLAY TO DEVELOP

The importance of proper and quality toys and their potential to develop skills

AUGMENTED REALITY

Several studies have proven how AR can add a magic feeling to the experience with children increasing engagement

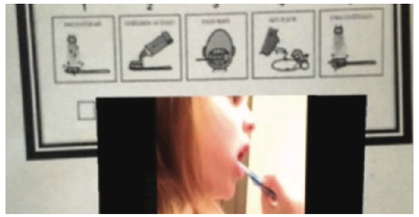
EMOTION RECOGNITION

Improvement of skills in identifying emotions can also lead to better regulation of personal emotions

LITERATURE REVIEW

Previous Works

ATTENTION



Cihak et al., 2016

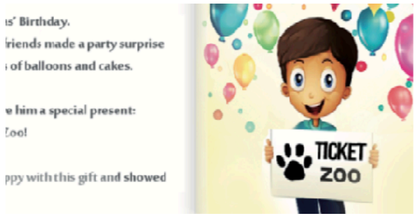
SOCIALISATION

Malinverni et al., 2017

WHOLE PICTURE

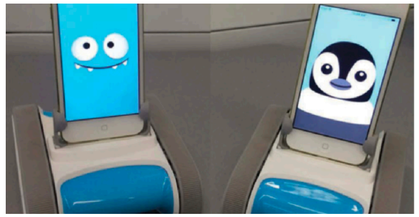
Lee et al., 2018

ADAPTATION



Cunha et al., 2016

FOCUS



Javed & Hyuk, 2019

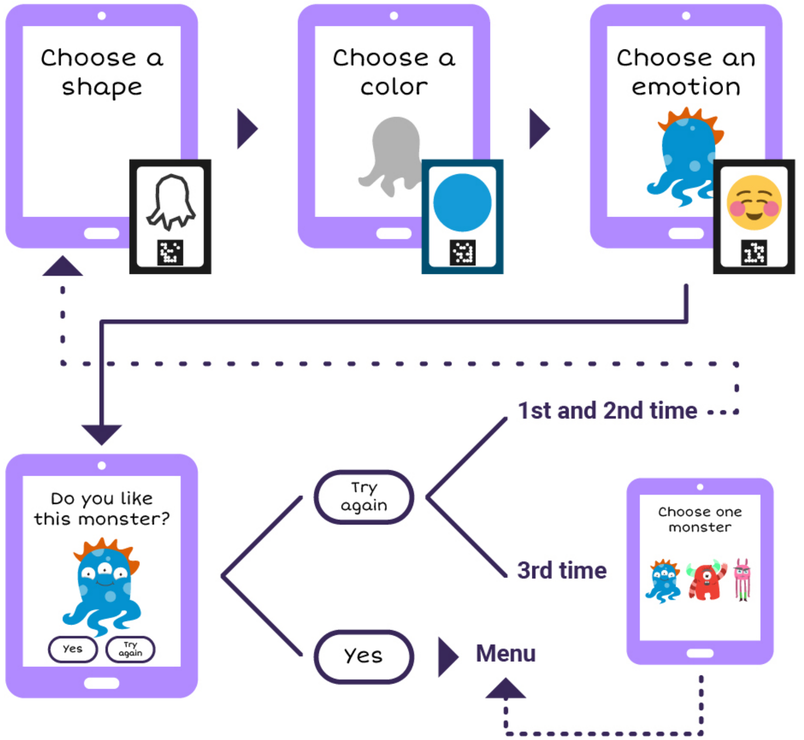
PROGRESS

Miskam et al., 2014

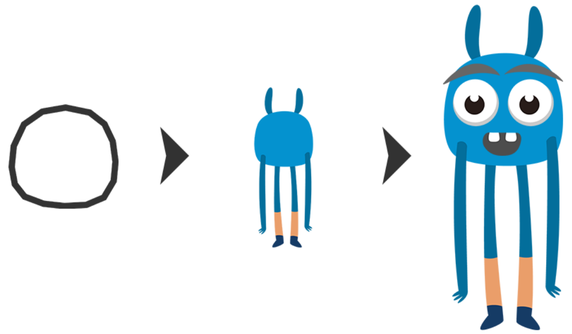
The Game

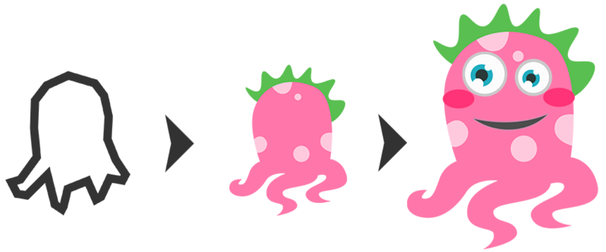
An adapted AR videogame developed in Unity for children on the spectrum that attends to the specific needs of these users, such as predictability and a curated design.

INTERACTION

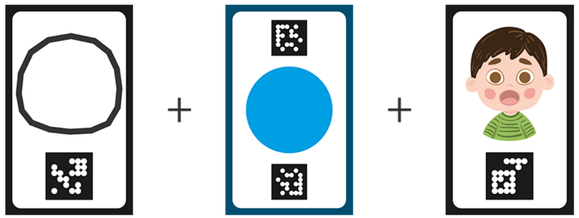


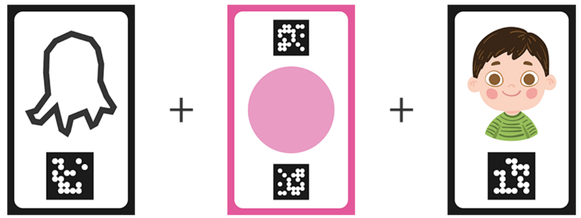
Monster creation sequence

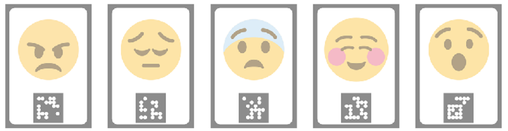




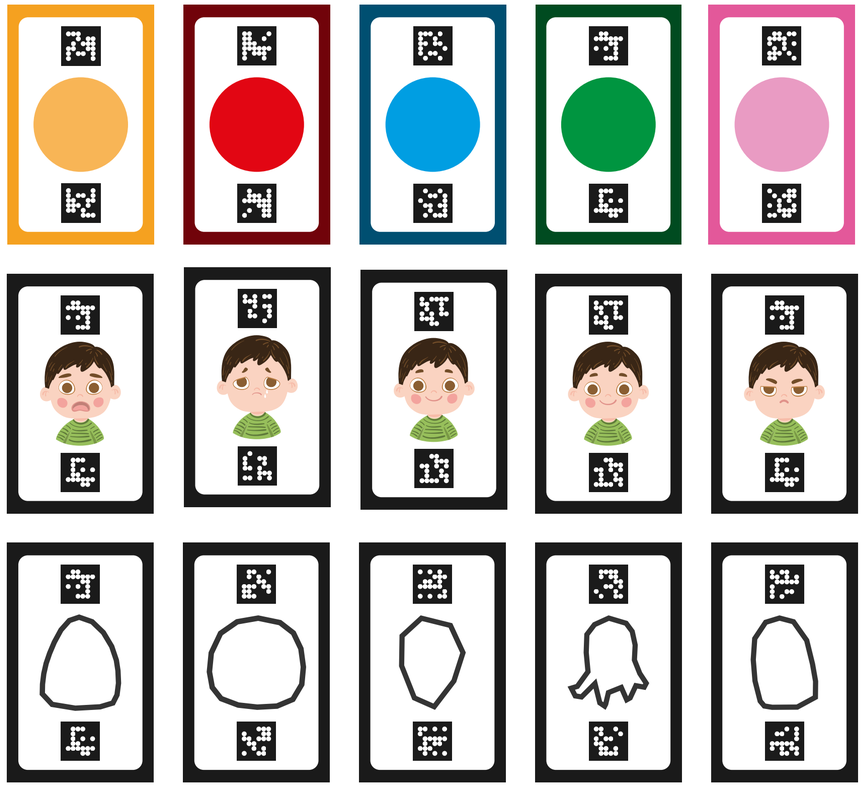
Markers used







MARKER CARDS

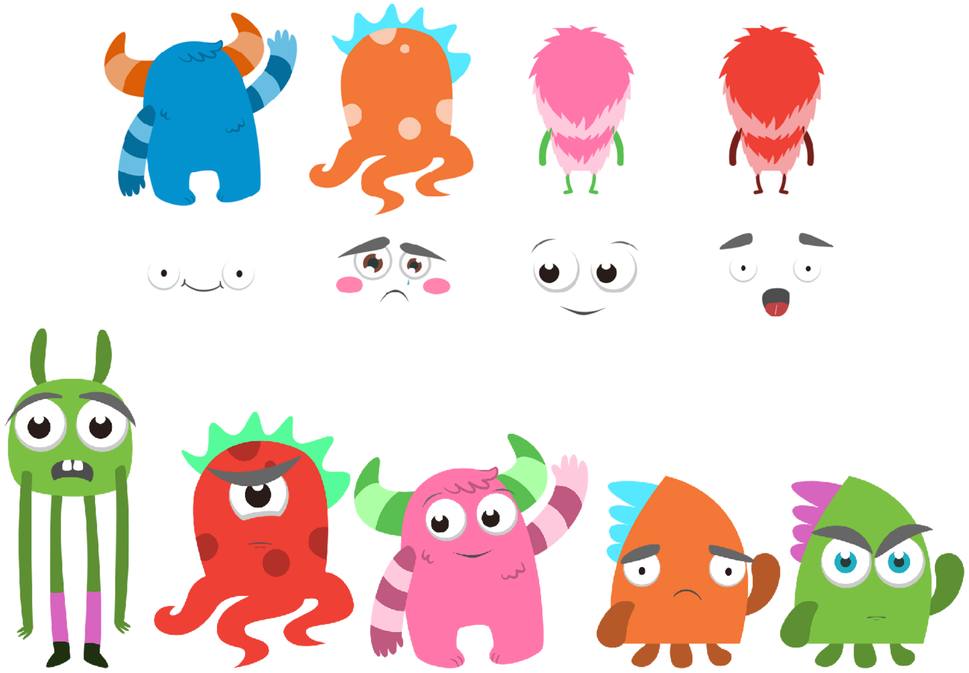


5 shapes

5 colors

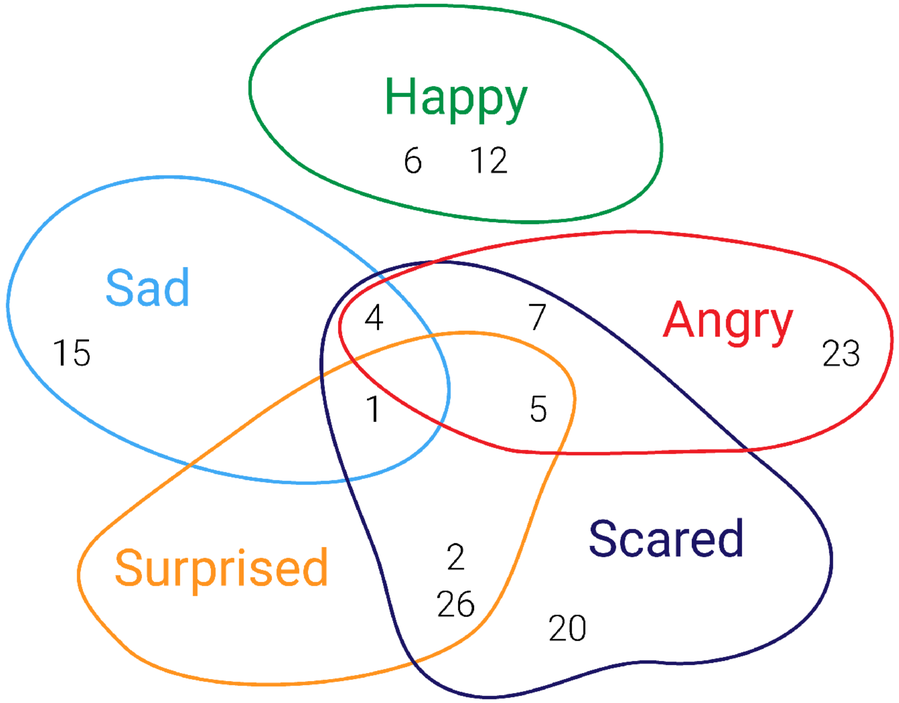
5 emotions x 3 face styles

MONSTERS



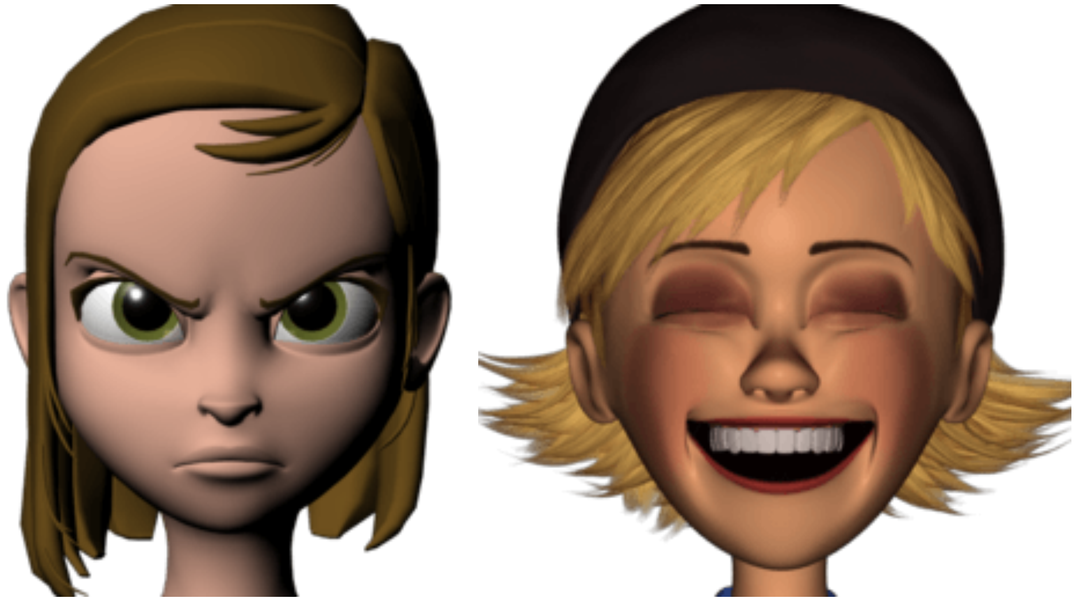
EMFACS

Action Unit	FACS Name
1	Inner brow raiser
2	Outer brow raiser
4	Brow lowerer
5	Upper lid raiser
6	Cheek raiser
7	Lid tightener
12	Lip corner puller
15	Lip corner depressor
20	Lip stretcher
23	Lip tightener
26	Jaw drop



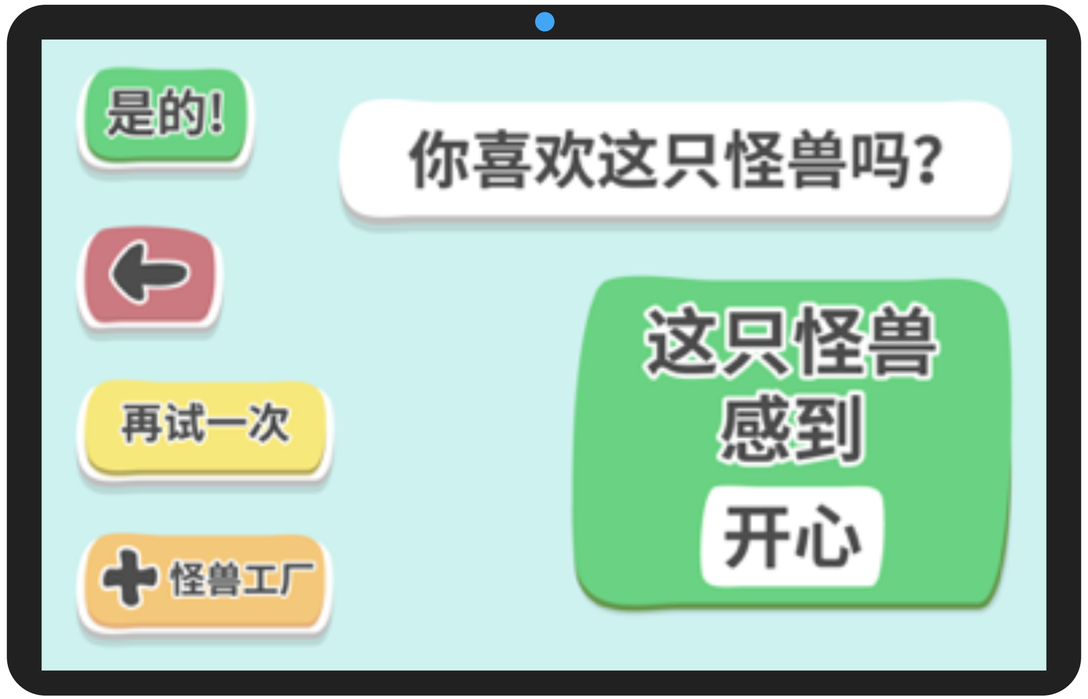
FERG database

VIRTUAL HUMANS



DRAW ATTENTION

CLEAN DESIGN

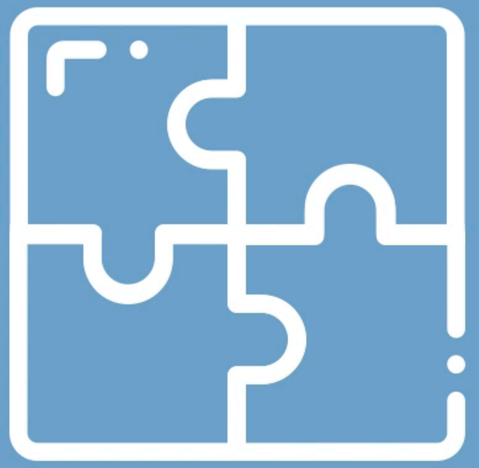


SCAFFOLDING

In this game the children can experiment with the cards and learn their meanings on their own by showing different cards to the AR camera and seeing and hearing the results.

3 GAME MODES

Tutorial

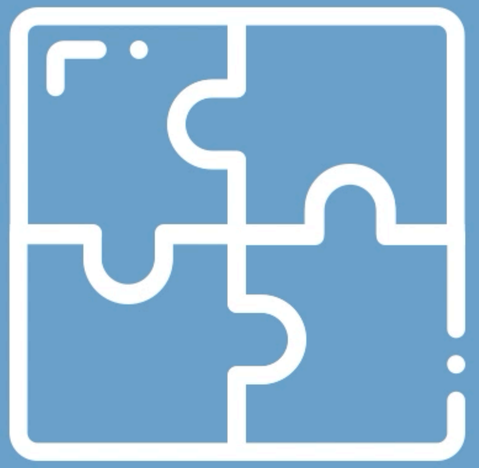


Tutorial Game

This games provides the children the chance to get familiar with the characters and personalize the game experience. The child can pick one card of each type and generate a monster based on their choice.

3 GAME MODES

Create a Monster

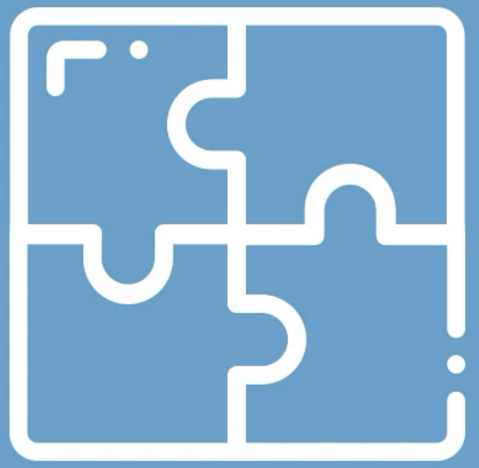


Create a Monster

In this game the children are shown a character and must identify their expressed emotion, presenting their guess as one of the five cards for facial expressions.

3 GAME MODES

Guess the Emotion



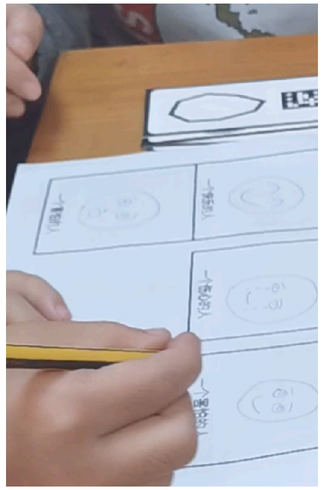
Guess the Emotion

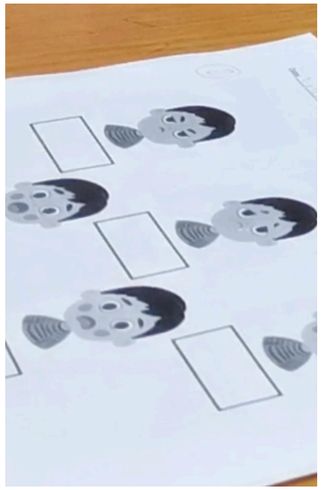
Field Study

Usability Pre-test (Osaka, July 2019)
Emotions Review Survey (Online, September 2019)

School usability test + Teachers interviews

(2 sessions, Shanghai, November 2019)





CONTROL TEST

ASSISTED PLAYING

GUIDED SURVEY

Teachers' Insight

Interview + Survey

Game is **adapted** to the children

Improvements suggested:

- **Sound** Feedback
- Cartoon Faces
- Refine the **levels**

Children’s Insight

Adapted survey + Observation

Difficulties in the procedure

Fun & Easy

Drawings follow EMFAC

Observations

The children showed **interest** in playing.
During the second session this interest increased.

The pre and post tests were difficult to perform,
children got **distracted or tired**.

Analisys

GOOD RESPONSE TO THE GAME
FUN AND WILLING TO PLAY AGAIN

SLIGHT IMPROVEMENT ON EMOTION RECOGNITION
ACCORDING TO DRAWINGS

ALLOWS FOR INDEPENDENT PLAYING
THE GAME IS ALSO OPEN TO COLLABORATION

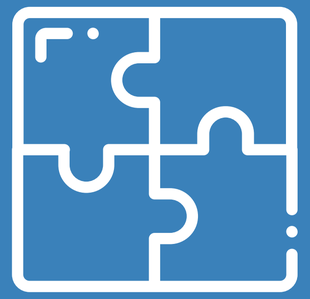
FURTHER DEVELOPMENT
FURTHER TESTING CAN ENHANCE THE IDEA

FUTURE RESEARCH

SIMPLE TEST
LESS TASKS, INCORPORATED ON THE GAME

EXTENDED PERIOD OF TIME
SEE THE RESULTS OF CONTINUOUS USE

Thanks!



AR Game for improving Emotion Recognition in Children on the AS

通过AR游戏提升自闭症儿童的情绪识别能力

设计学院
SCHOOL OF DESIGN
ARCHITECTURE 建筑 / DESIGN 设计
LANDSCAPE ARCHITECTURE 风景园林

上海交通大學
SHANGHAI JIAO TONG UNIVERSITY

Daniel Vicente Lopez Trompo
May 2020