Rome, Italy 5.5-17.5.2013

# THEREMIN HERO

IP ROMA 2013

TECHNOLOGIES TO REDUCE THE ACCESS BARRIER IN HUMAN COMPUTER INTERACTION ERASMUS INTENSIVE PROGRAMME


**Monica Emerson** - University of Zaragoza
**Juan Muñoz** - Universitat Politecnica de Valencia
**Jouni Haasianlahti** - University of Applied Sciences of Lahti
**Debora Desideri** - Universita Roma TRE
**Virginia Gil** - University of Zaragoza


HTTP://TRABHCI.EU/

# TASK

Develop a project using several different techniques learnt throughout Erasmus IP

# The theremin

The theremin is an early electronic musical instrument controlled without discernible physical contact from the player.
The controlling section usually consists of two metal antennas which sense the position of the player's hands and control oscillators for frequency with one hand, and amplitude (volume) with the other, so it can be played without being touched.


# INITIAL IDEAS

Deploy a theremin simulator

Play musical scores with different instruments

# IDEAS CHOSEN

| FOCUS GROUP | PURPOSE AND MOTIVATION | FUNCTIONALITIES |
| --- | --- | --- |
| All aged people, whether they present or not any disabilities. | Improve movement precision of upper limbs and/or hearing. | Play theremin via moving hands horizontally and vertically in order to choose note and volume. |

# DIFFERENT OPTIONS

- Play musical scores in a guided way, without having to read scores.
  - Lines change colours whenever you have to play them.
  - Red indicates current note and grey the next one
- Play in a free manner or looking at your own scores.
- Ability to display position of the notes for begginers.
- Possibility to choose the speed of the song.

Technologies and arquitecture applied: kinect and C# for gesture recognition


Camera up

Camera down

Right hand (X): 374.00000000000006

Left hand (Y): 397.06875

Frequency: 261.63

Amplitude: 0.25

- (•) Black notes
- ( ) Coloured notes

- (•) Color
- ( ) Depth
- ( ) None

Play

Load score

Play score

[ ] Hide lines

Rythm: 1,5


Camera up

Camera down

Right hand (X): 364.43749999999994

Left hand (Y): 406.11875

Frequency: 261.63

Amplitude: 0.25

- Black notes
- Coloured notes

- Color
- Depth
- None

Play

Load score

Play score

Hide lines

Rythm: 1.5

Camera up

Camera down

Right hand (X): 395.25000000000006

Left hand (Y): 414.0375

Frequency: 261.63

Amplitude: 0.25

- Black notes
- Coloured notes

- Color
- Depth
- None

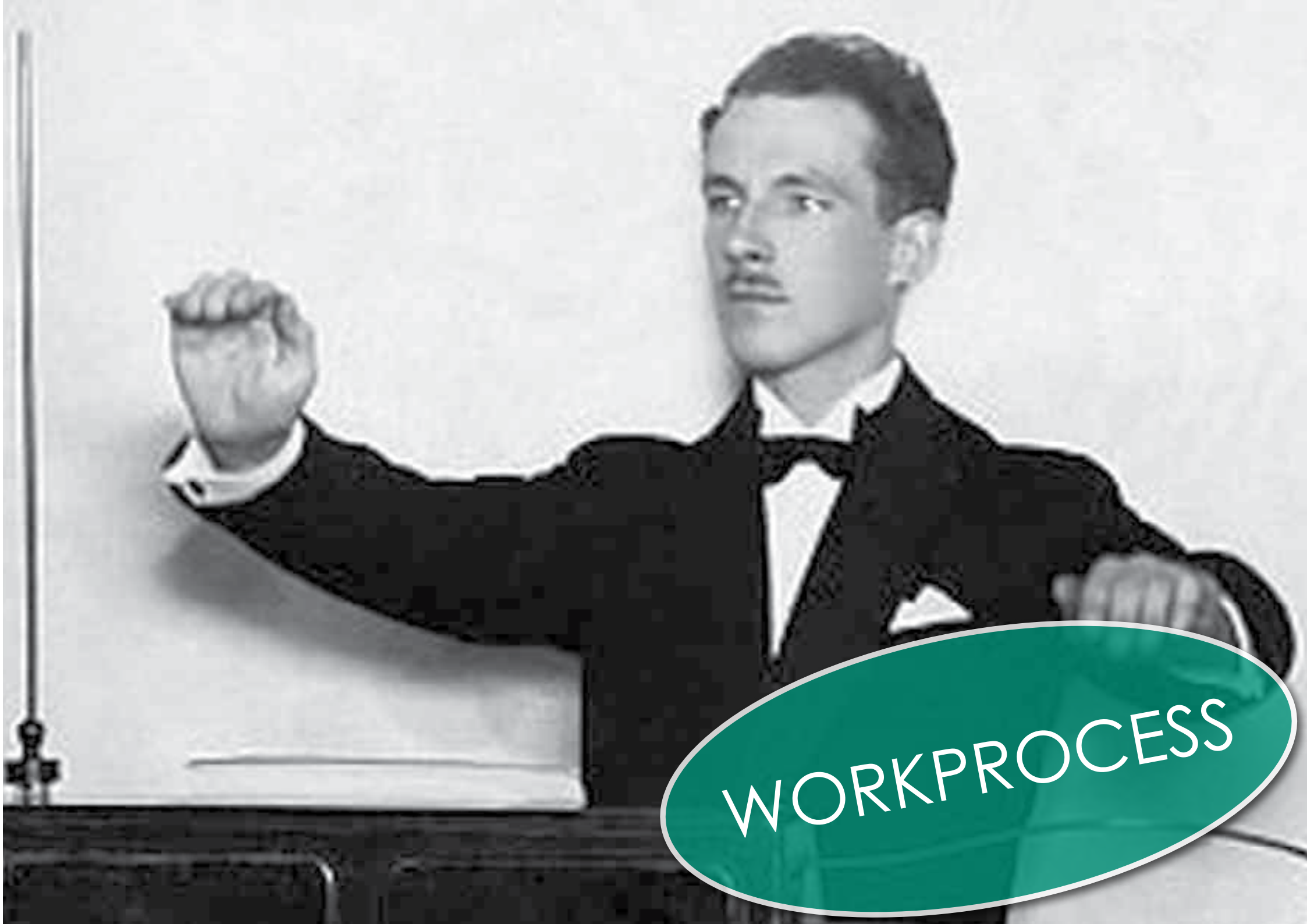
Play

Load score

Play score

Hide lines

Rythm: 1,5


WORKPROCESS

# SUBTASKS

> Interface (graphics, buttons, lines...)
> Sound: simple sinusoide
    - Frequency (notes) depending on the x position of the right hand
    - Amplitude (volume) depending on the y position of the left hand
> Creating text file from music score
> Reading text file (note and length)
> Hand tracking

The work was evenly split between the members of the group. We worked individually or in pairs and helped other members when difficulties were encountered.

# Difficulties met during the work and how they were solved:

- Radio buttons stopped working. **Solved doing nothing.**
- Scaling between line coordinates (window) and canvas coordinates. **Solved**
- Changing from camera coordinates to canvas coordinates. **Solved**
- Using dynamic timers to read partitures. **Solved by hard working.**
- Crashing of the program when the partiture finished. **Solved with an if.**

## WHAT WAS LEARNT:

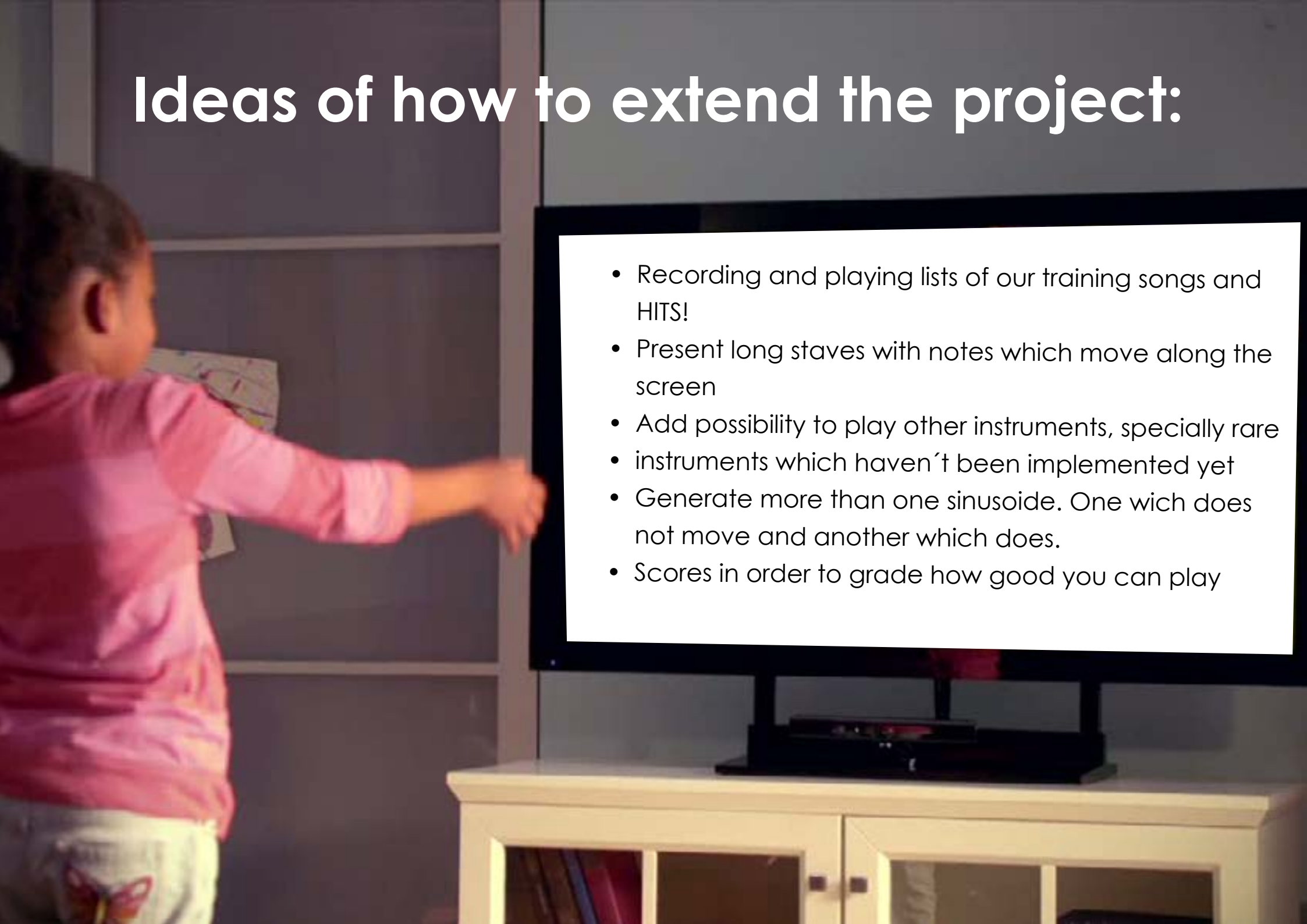
- Reading text files (created from musical scores) and converting information read on to coloured lines.
- Team work and collaboration
- Musical theory
- English vocabulary such as music scores.

and...PLAYING THE THEREMIN!!!!

## WHAT WAS LEFT NOT DONE:

- Recording songs
- Present short musical scores on the screen
- Buttons activation via gestures

# Ideas of how to extend the project:



- Recording and playing lists of our training songs and HITS!
- Present long staves with notes which move along the screen
- Add possibility to play other instruments, specially rare
- instruments which haven´t been implemented yet
- Generate more than one sinusoide. One wich does not move and another which does.
- Scores in order to grade how good you can play

## WHERE WAS SUCCED AND WHY:

- We got everyhing working like we wanted

## WHERE WE FAIL AND WHY:

- We did not have enough time to learn to play the theremin, so we are not very good at playing it

JUST A BIT BETTER THAN THIS GAY...


Thank YOU FOR
YOUR attention