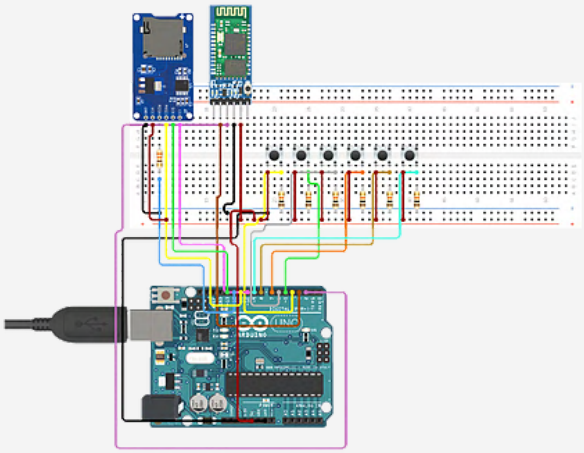
DEVICES

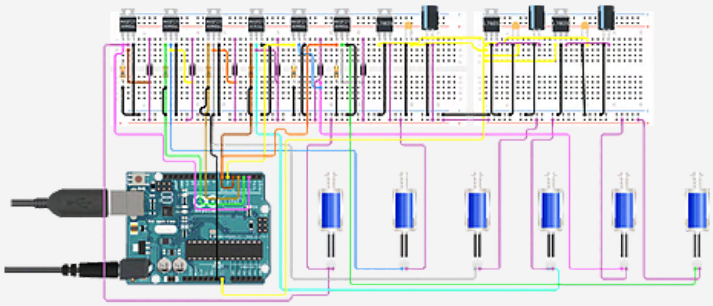
APPENDIX

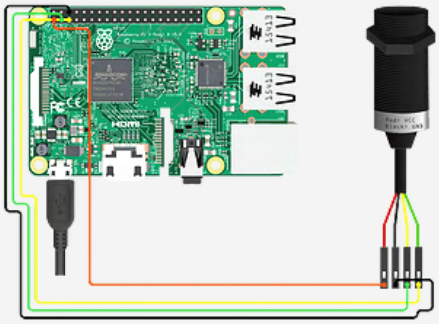
OUTLINED BLUEPRINTS



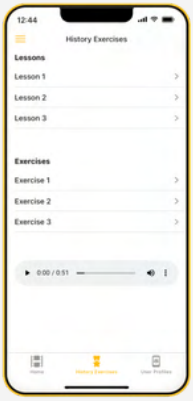
Braille Reading System

Braille Keyboard

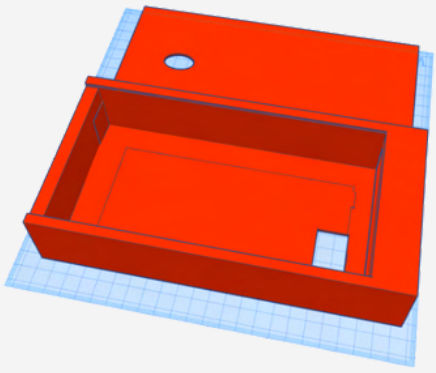




Web Camera and Microcomputer



Application



3D Printed Case

Code Snippets

```
  switch(incomingChar){
    case 'a' :
digitalWrite(solenoide1,HIGH);
digitalWrite(solenoide2,LOW);
digitalWrite(solenoide3,LOW);
digitalWrite(solenoide4,LOW);
digitalWrite(solenoide5,LOW);
digitalWrite(solenoide6,LOW);
delay(del);
digitalWrite(solenoide1,LOW);
break;
 case 'A' :
digitalWrite(solenoide1,HIGH);
digitalWrite(solenoide2,LOW);
digitalWrite(solenoide3,LOW);
digitalWrite(solenoide4,LOW);
digitalWrite(solenoide5,LOW);
digitalWrite(solenoide6,LOW);
delay(del);
digitalWrite(solenoide1,LOW);
 break;
  case 'b' :
digitalWrite(solenoide1,HIGH);
digitalWrite(solenoide2,HIGH);
digitalWrite(solenoide3,LOW);
digitalWrite(solenoide4,LOW);
digitalWrite(solenoide5,LOW);
digitalWrite(solenoide6,HIGH);
delay(del);
digitalWrite(solenoide1,LOW);
digitalWrite(solenoide2,LOW);
break;
```

```
 Serial.print("F");
 tmrpcm.setVolume(5);
 tmrpcm.play("F.wav");

 myString = myString + "F";
}
else
if(i==HIGH&&j==HIGH&&k==LOW&&l==HIGH&&m==HIGH&&n==LOW&&p==LOW)
{
  Serial.print("G");
 tmrpcm.setVolume(5);
 tmrpcm.play("G.wav");

 myString = myString + "G";
}
else
if(i==HIGH&&j==HIGH&&k==LOW&&l==LOW&&m==HIGH&&n==LOW&&p==LOW)
{
  Serial.print("H");
 tmrpcm.setVolume(5);
 tmrpcm.play("H.wav");

 myString = myString + "H";
}
else
if(i==LOW&&j==HIGH&&k==LOW&&l==HIGH&&m==LOW&&n==LOW&&p==LOW)
{
  Serial.print("I");
 tmrpcm.setVolume(5);
 tmrpcm.play("I.wav");

 myString = myString + "I";
}
else
if(i==LOW&&j==HIGH&&k==LOW&&l==HIGH&&m==HIGH&&n==LOW&&p==LOW)
{
  Serial.print("J");
 tmrpcm.setVolume(5);
 tmrpcm.play("J.wav");

 myString = myString + "J";
}
else
if(i==HIGH&&j==LOW&&k==HIGH&&l==LOW&&m==LOW&&n==LOW&&p==LOW)
{
  Serial.print("K");
 tmrpcm.setVolume(5);
 tmrpcm.play("K.wav");

 myString = myString + "K";
}
```

```python
import speech_recognition as sr

r = sr.Recognizer()


with sr.AudioFile('I-dont-know.wav') as source:

    audio_text = r.listen(source)

    try:


        text = r.recognize_google(audio_text)
        print('Converting audio transcripts into text ...')
        print(text)

    except:
         print('Sorry.. run again...')
```

APPENDIX

Business Model Canvas

8

Who do we collaborate with to create our value?

- 3D Hub for 3D printing
- Printing services
- Suppliers

Feedback from:
- 5 blind students
- 4 parents
- 9 teachers
- 7 relevant organisations

Indicatively: the Greek National Federation of the Blind, Black Light Athens, swim.me

Our Sponsors
- Friends, Family & Fools **:)**
- Epikentro
- BubbleVan

Future Partners:
- Product Designer for UX and Packaging
- Lawyer for Patent and Intellectual Property
- Accountant

We also use:
- Arduino, Raspberry Pi, Web-camera
- Canva, Python, Google Drive, Miro, Excelway, Instagram

What are we doing?

- Ideation & Testing
- User Research & Interviews
- Sourcing of materials
- Experimentation & Testing
- Design & Assembly
  - Coding
  - Electrical Designs
  - 3D design
- User Testing
- Communication and Marketing
- Fundraising & Sponsorships

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Our Resources

Team: Alice & Konstantinos
- Coach: Spyros
- Mentor: Jason

Knowhow, branding, equipment

Energy, Long nights and our time

Sponsorships

7

Future Steps and Resources
- New Languages
- Upgrade our software and App
- Improve UX and Packaging

The Problem

Students with visual impairments do not attend general school (although they are supposed to), due to:
- Lack of teachers that have been trained to teach blind students
- Inadequate adaptation towards the blind students' needs by their teachers
- Lack of technical means to adequately support blind students

One solution that is implemented in Greece, through a state program, is the system of "Parallel Support", i.e. an additional teacher within the classroom, who aims to support the blind student.

Lack of resources HAMPERS the education of students with visual disabilities

But families face the following problems:
- Insufficient resources to cover all students
- Lack of staff to meet the needs of specific areas such as islands
- Inadequately trained teachers.

Parents who experience this situation are led to two options:
- Privately providing "parallel support" to their children, a highly expensive choice (650 euros per month)
- keeping their children away from school as they are led to a dead-end

According to the relevant measures, the Greek Ministry of Education is trying to help every child with disabilities to have equal access to education, while a similar approach is applied abroad.

The Solution

1

2 portable devices

Main Device
- Braille Keyboard and Reading system
- Greek and English
- Direct communication with teachers

Camera with MicroComputer
- Image to Text
- Text to Speech
- Speech to Text

Notes, assignments, tests, books can all become part of the students school life.

Features
- Read and write
- Convert
- Voice-record

Details
- Bluetooth, WiFi, SD Card
- 3D printed cases
- Locate the device through sound
- App for teachers/parents

Value Proposition

What do we achieve?
- Autonomy of students
- Inclusivity at general schools
- Interaction with teachers
- Usage at home and school (portability)
- Cost-effectiveness

Aligned with UN's SDGs 4, 7, 8 and 17

3

How do we interact with our audience?

Awareness (outreach):
- Organizations and doctors
- Events
- Stakeholders from the Educational System
- Present in the media

Acquisition & Activation (access & buy):
- Tests and Use cases
- Demos with users
- Communication with families and students (cold outreach) through e.g. Social Media & Forums

#blind, #blindness, #visuallyimpaired (1.7 mln posts)

- Public support for buying the product
- Training of students, parents, teachers

Retention & Referral:
- Customer Support and family/teacher support
- Frequent upgrades
- Continual user research

4

How do we communicate?

Direct Communication with Users and their communities

Secondary means:
- Events & Conferences, e.g. International Day - 3/12
- Social Media & Forums, e.g. Facebook & Instagram
- Social Impact and National Associations
- Influencers eg Sam Seavy (YouTube)
- Corporate Social Responsibility Programs

Our Users & Audience

Students
- that are blind or visually impaired
- in large or small cities and viallages
- from 6 till 25 years odl
- with our without parallel support
- Greek or English speakers (*3)
- Countries: UK, USA, Greece, Australia Canada

E.g Alice at Corfu

2

Parents and Families
- decision-makers
- cover the expenses
- aim to help their children integrate in the society

E.g. Alice's family

School
- All ages, from elementary till univeristy
- Private or Public
- General or Vocational
- In cities or in remote areas

E.g. Musical High School at Corfu

Organizations
- Communities for blind people
- Run activities, events etc
  - National Association of the Blind
  - Training Centers e.g. KEAT

State Education
- Directorates of Education where decisions are made
- Ministry of Education

Eg. Secondary Education Directorate at Corfu

Some Data
- We work for Greece, Europe and every blind student around the world
- 197,000 students with such problems in Europe
- 4,000 in Greece

What are our costs?

Development Phase
- Materials
- Transportation

Cost of Basic Materials: 300€

COST

Go To Market & Sales Phase

New Challenges
- Accounting & Legal
- External Partners (packaging, 3D printing, Designer)
- Cost of Promotion and Marketing
- Equipment

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Competition
- Braille writers ($$$ & noisy)
- Braille translators
- Smartphone Apps
  - Not used at school
  - Not supporting Braille as the blind communities want
  - Expensive
  - Limited countries/languages

Our Revenue

5

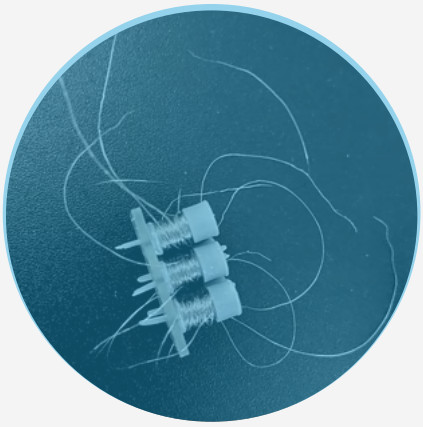
Social Business
- Sales of products
- Subscription services that include training, software and device upgrades
- Learning services for the braille language
- Access to EU or national programs

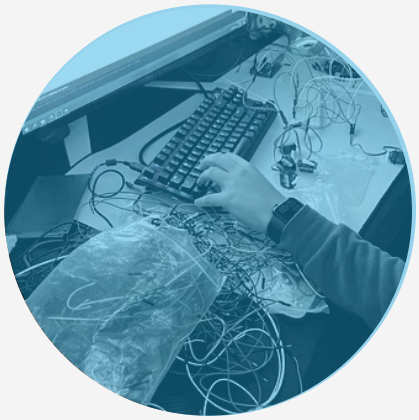
Notes and Sources

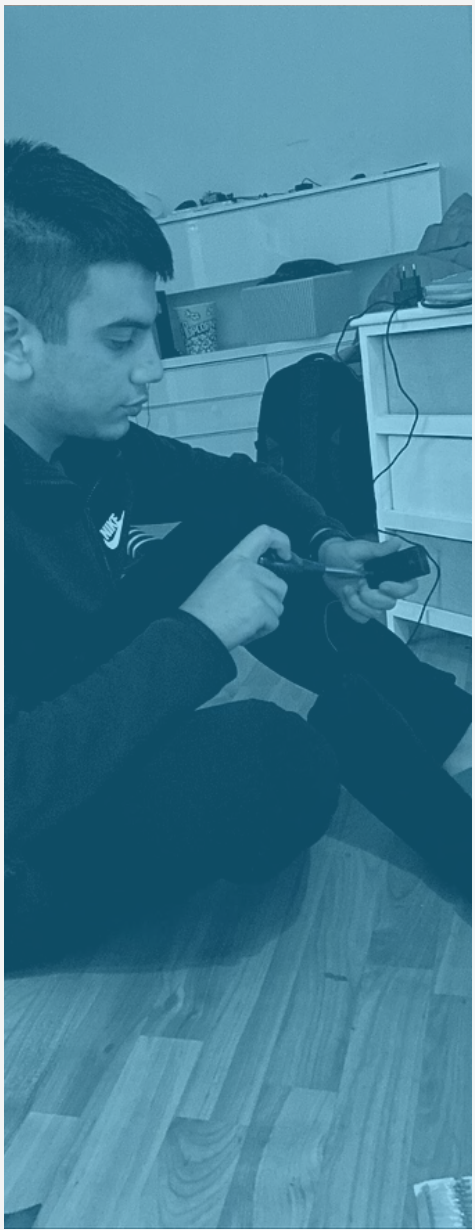
*1 - one extra teacher within the classroom
*2 - interviews with "parallel" support teachers
*3 - English was our pilot language

APPENDIX

Experiments

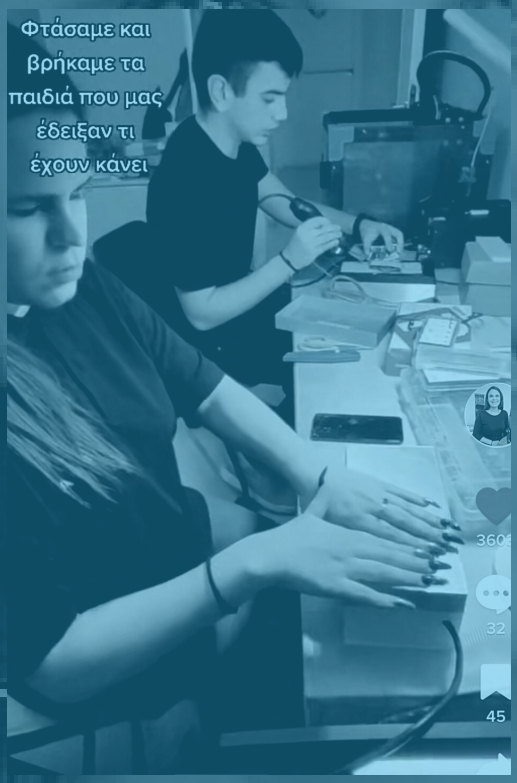






Abassador


Project Ρομποτικής
"RoboCores"
TikTok
@anna__balan


Φτάσαμε και
βρήκαμε τα
παιδιά που μας
έδειξαν τι
έχουν κάνει
32
45


Φτάσαμε και
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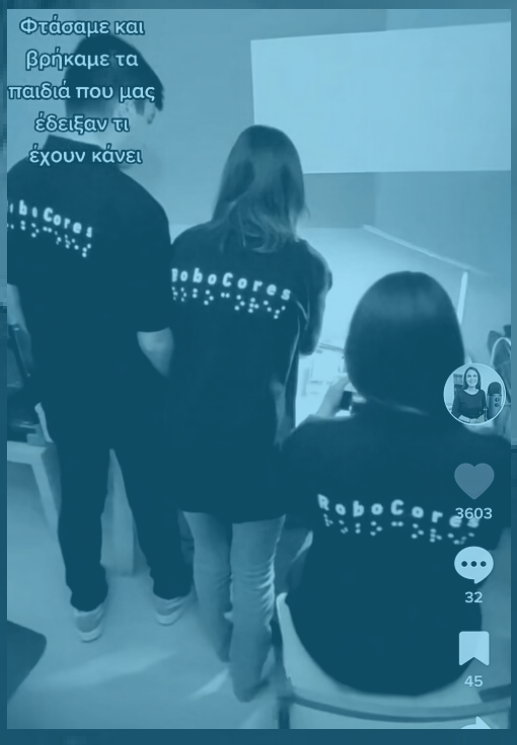
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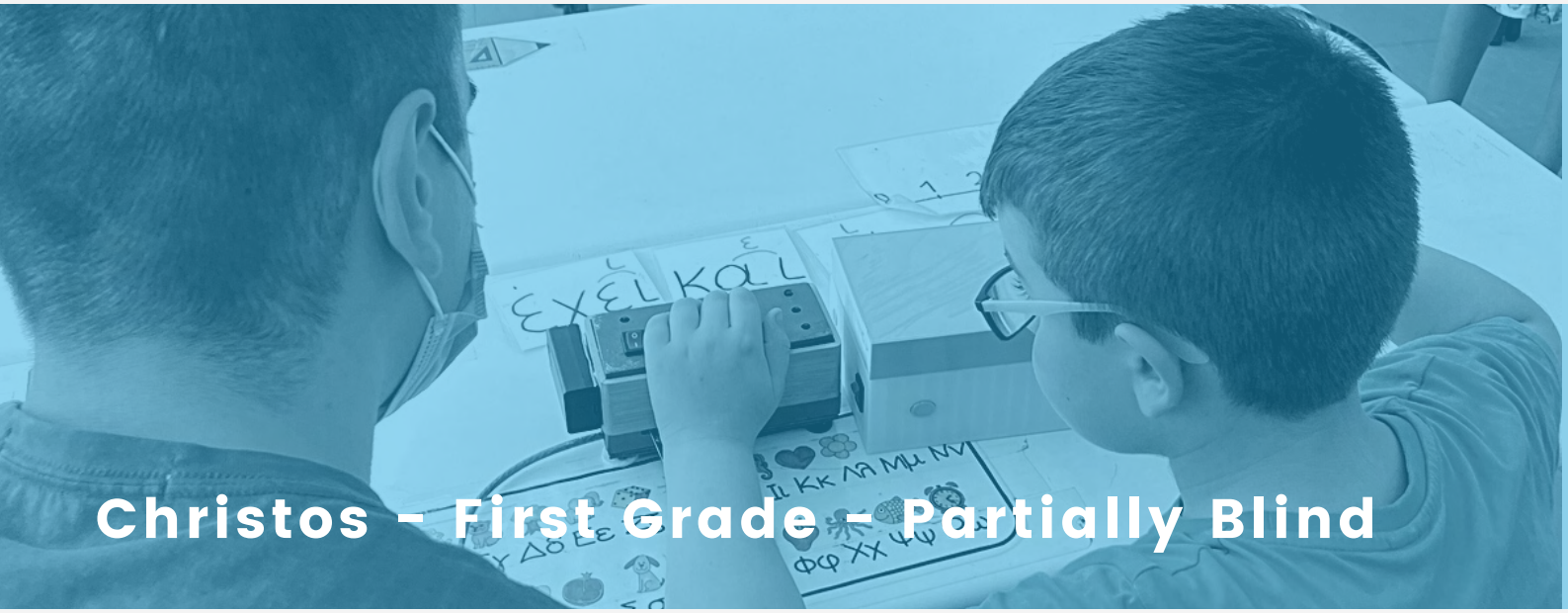
Real Cases



Christos - First Grade - Partially Blind

Marina - University Student - Blind

Anna - University Drop-out - Blind

APPENDIX

Competition Comparison

We Collaborate

	Braille Writer 	iPhone 	Parallel Support 	Pop2See
Cost in €	✗ €800	✗ €700+	✗ €500+ /month	✓ <€500
Noise in Class	✗	✗	✓	✓
Portability	✗	✓	✗	✓
Communication of Teacher <> Student	✗	✓	✓	✓

IN ALIGNMENT WITH SUSTAINABLE DEVELOPMENT GOALS 4, 7, 8, 17

JOIN OUR EFFORTS TO CREATE AN INCLUSIVE WORLD FOR ALL CHILDREN.

THANK YOU

Project: Pop2See - Smart Class

Team: RoboCores

Aliki - Konstantinos

Country: Greece

EU Contest for Young Scientists Leiden2022

June 2022