



The Abdus Salam
**International Centre
for Theoretical Physics**


Presenter: Prof. Markon Sandor, PhD

Benax,
inexpensive hand-made
robot for kids,
programmable in local
language

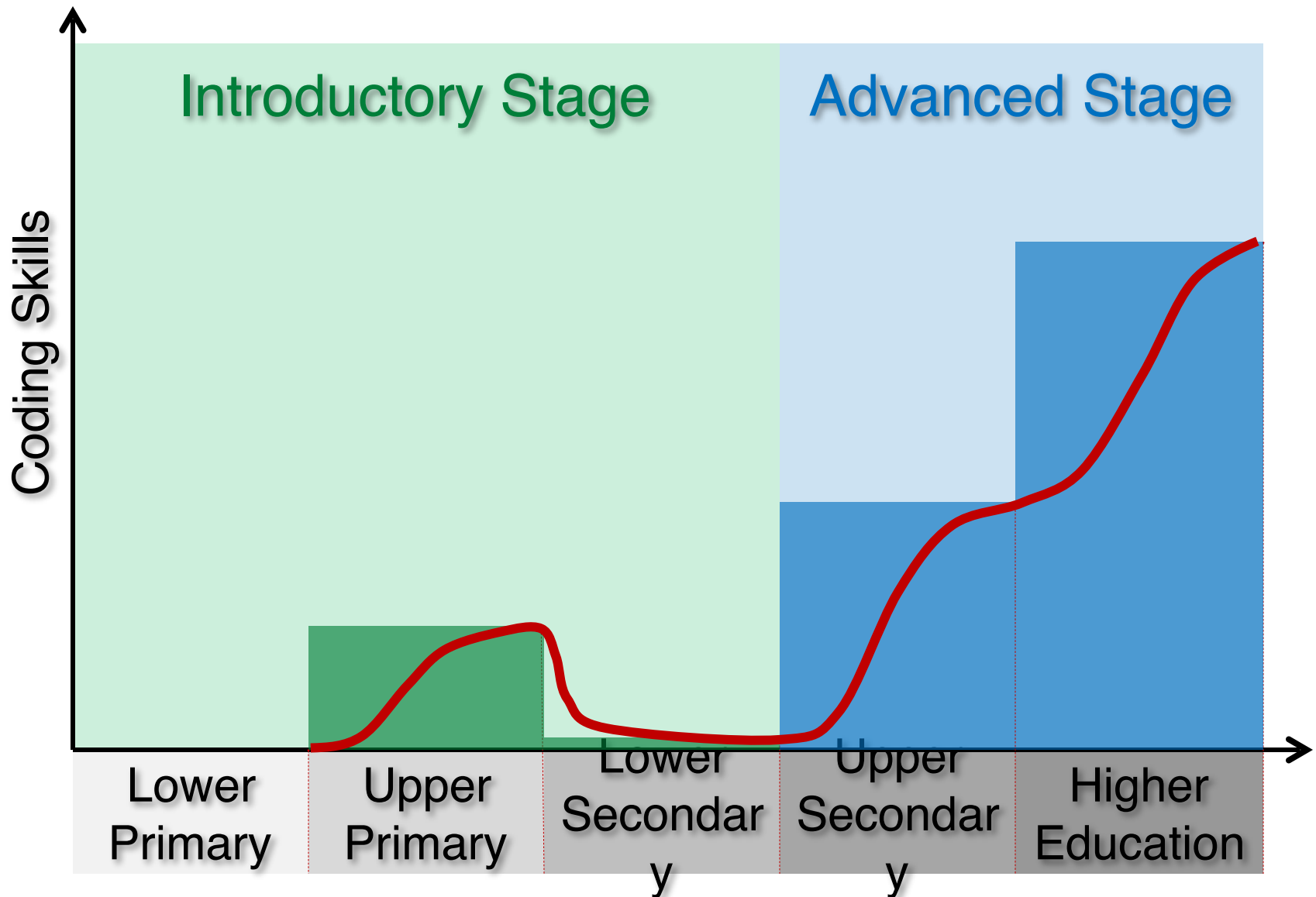


About the researcher

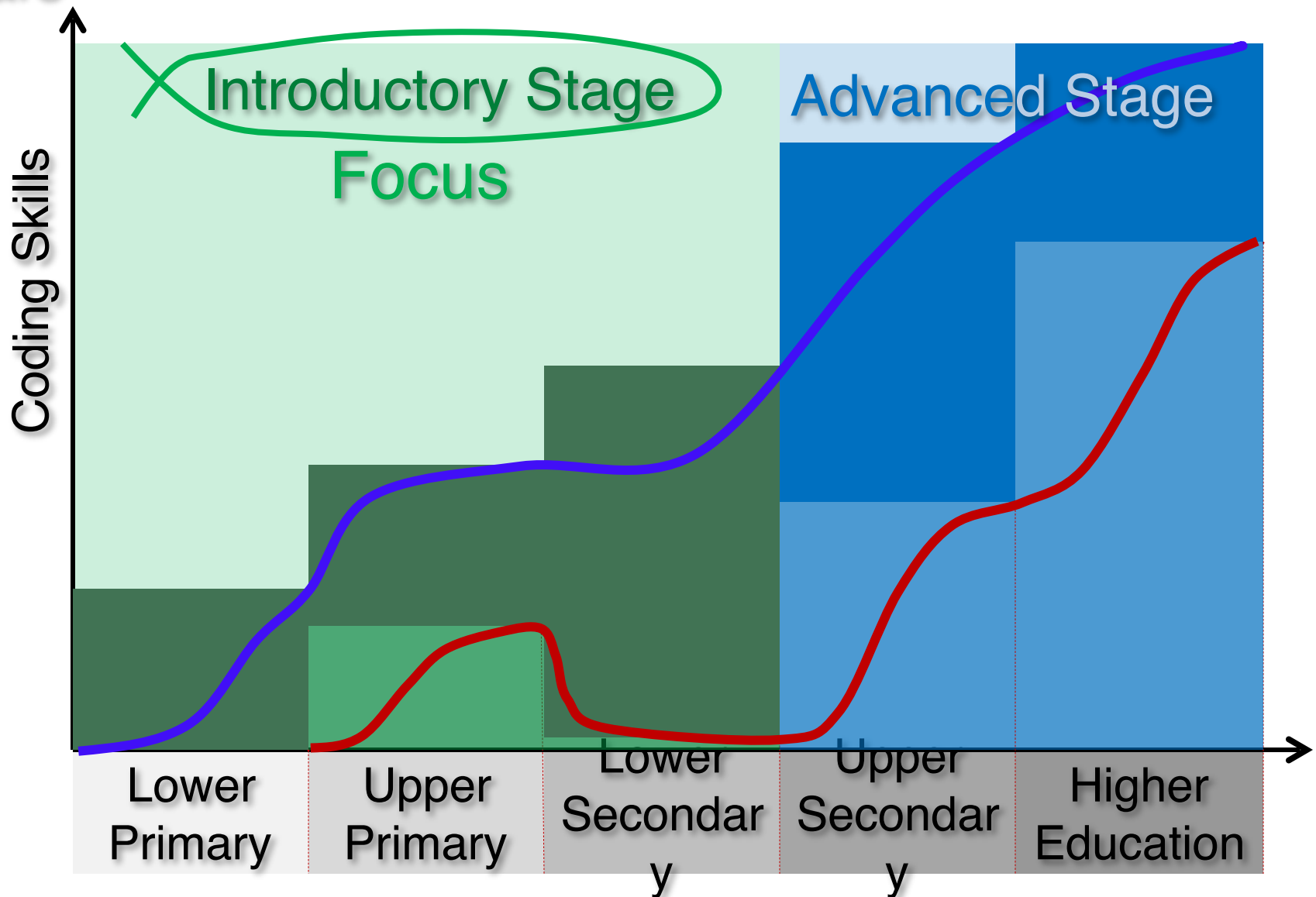
Gabriel Baziramwabo

- Rwanda 
- Graduated from Kobe Institute of Computing (KIC), 2018
- Worker of Rwanda Education Board (REB)

Problem: Very narrow introductory coding



Expected Impact: Boosted coding skills over years



How to bring kids on board?



Kids already like RC Cars!

Beside fun, kids develop:

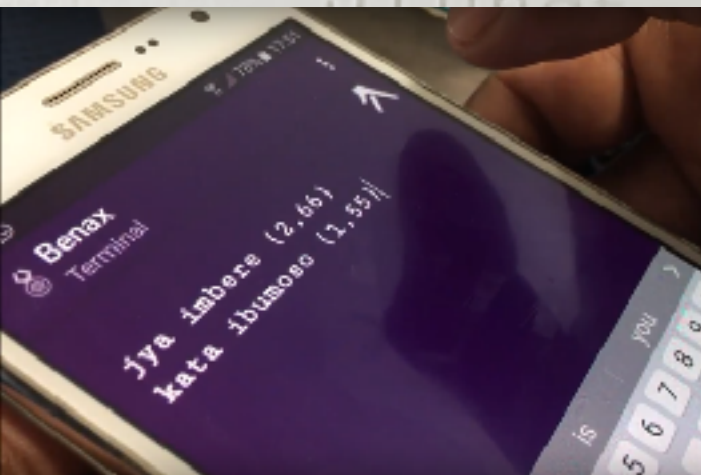
- Responsibility
- Hand-eye coordination
- Understanding of motors & gears
- Spatial Awareness
- Outdoor playing
- **No coding though**

Benax, a programmable RC car



Replacing the console with the terminal, a kid get

- Responsibility
- Hand-eye coordination
- Understanding of motors & gears
- Spatial Awareness
- Outdoor playing
- **Coding**



RC car vs. Benax



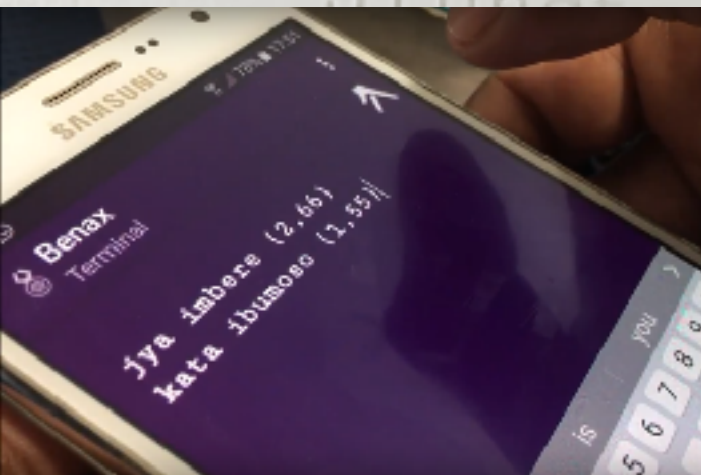
RC Car	Benax
<ul style="list-style-type: none">■ Switch on■ Use	<ul style="list-style-type: none">■ Switch on■ Connect■ Use
Control console	Terminal on PC, Mobile device
Reading and writing not required	Reading and writing required
Playing with buttons	Typing the commands



What motivates kids on Benax?



- Kids can create a program and run it multiple times.
- Instead of a single command via button pushing, kids type a sequence of commands



Autonomous: Benax keeps on running while the kid is relaxing

Package component 1: Bot



Constructed in cheap materials!

Package component 2: Android App



Available on Play Store

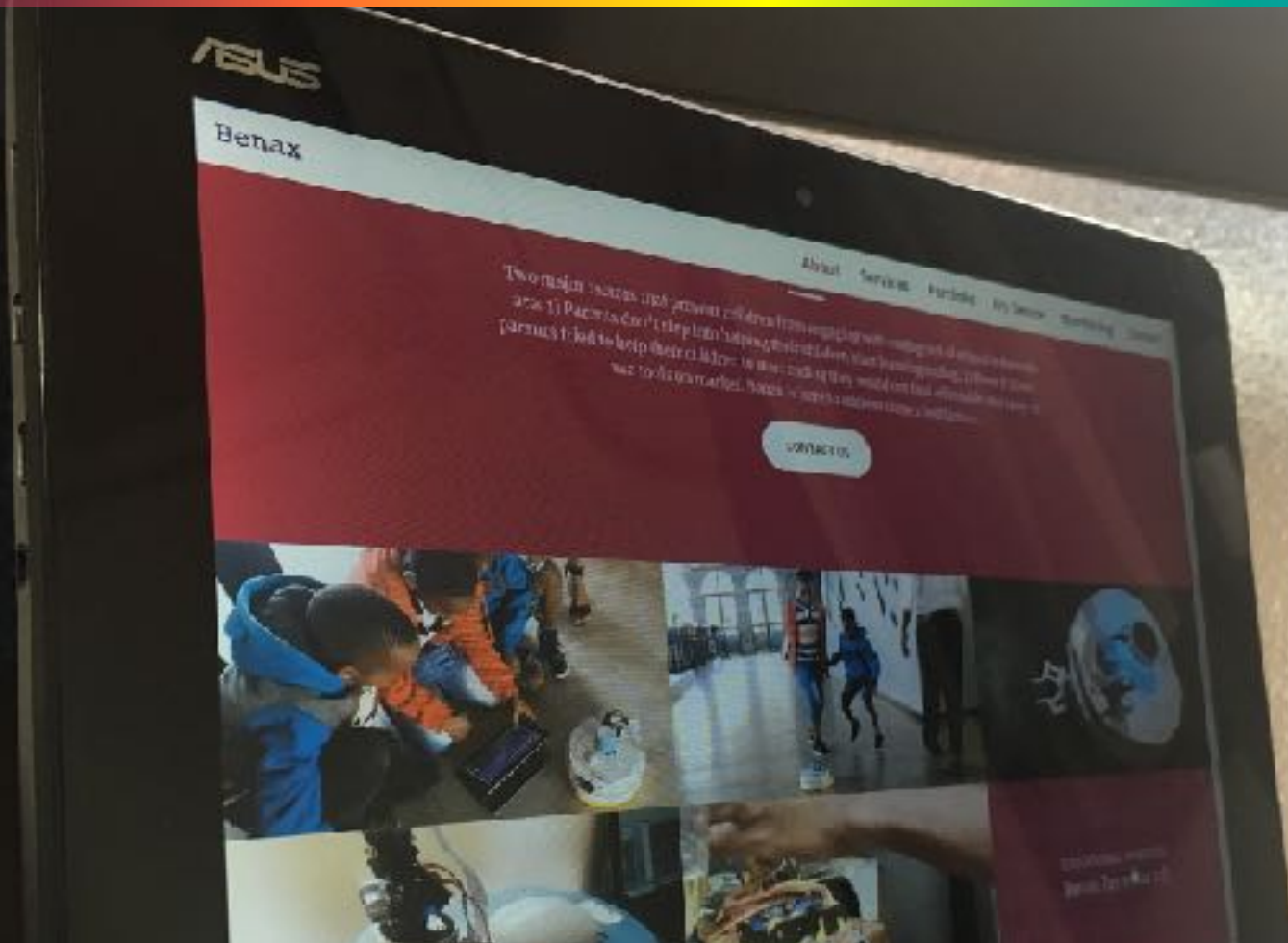
Package component 3: Browser Interface



Research Project: Benax, inexpensive hand-made robot for kids, programmable in local language: A case study in Rwanda

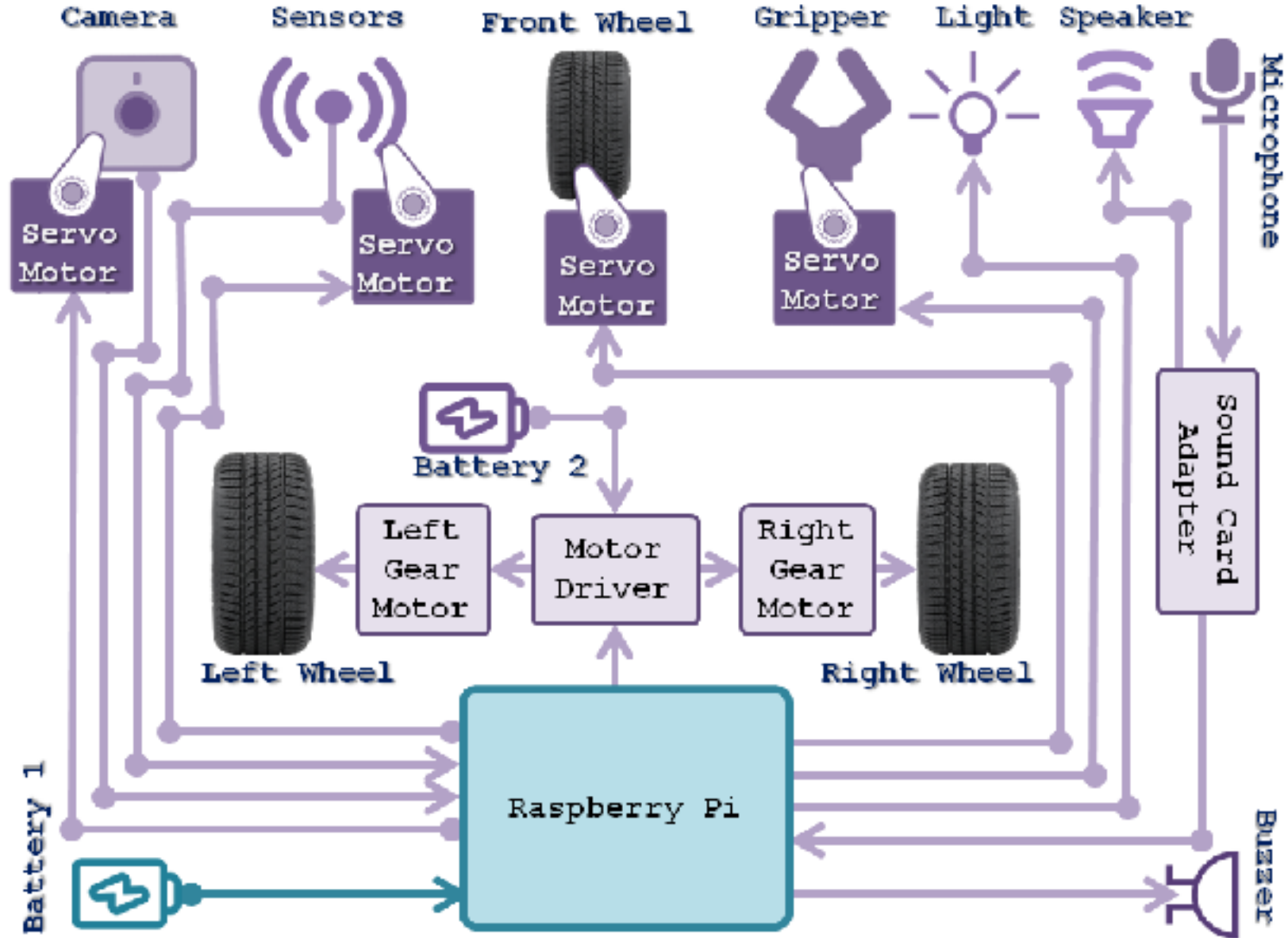
Research Project: Benax, inexpensive hand-made robot for kids, programmable in local language: A case study in Rwanda

Package component 4: Website

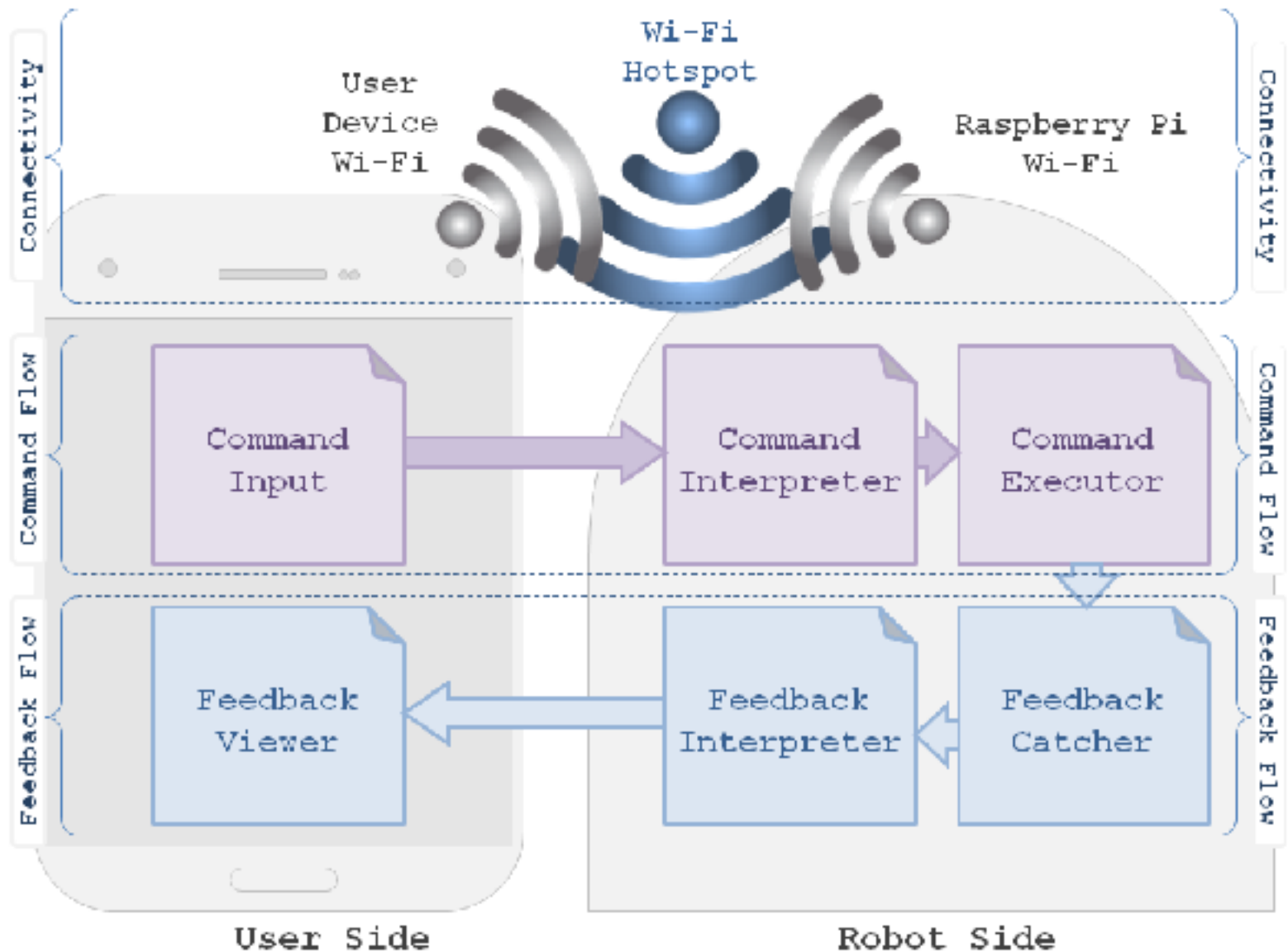


benax.yellowpages.rw

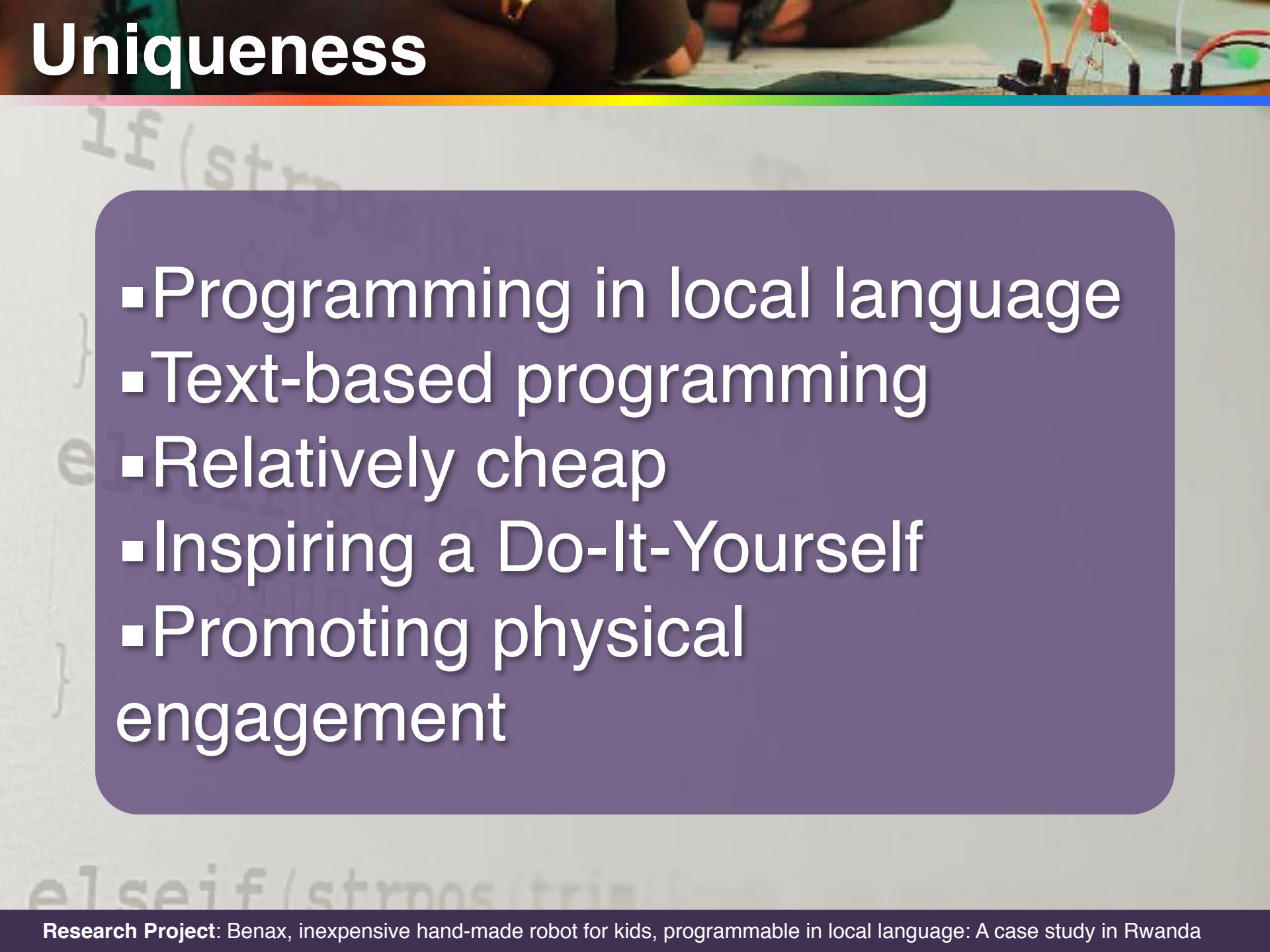
System Design: Hardware



System Design: Software



Uniqueness



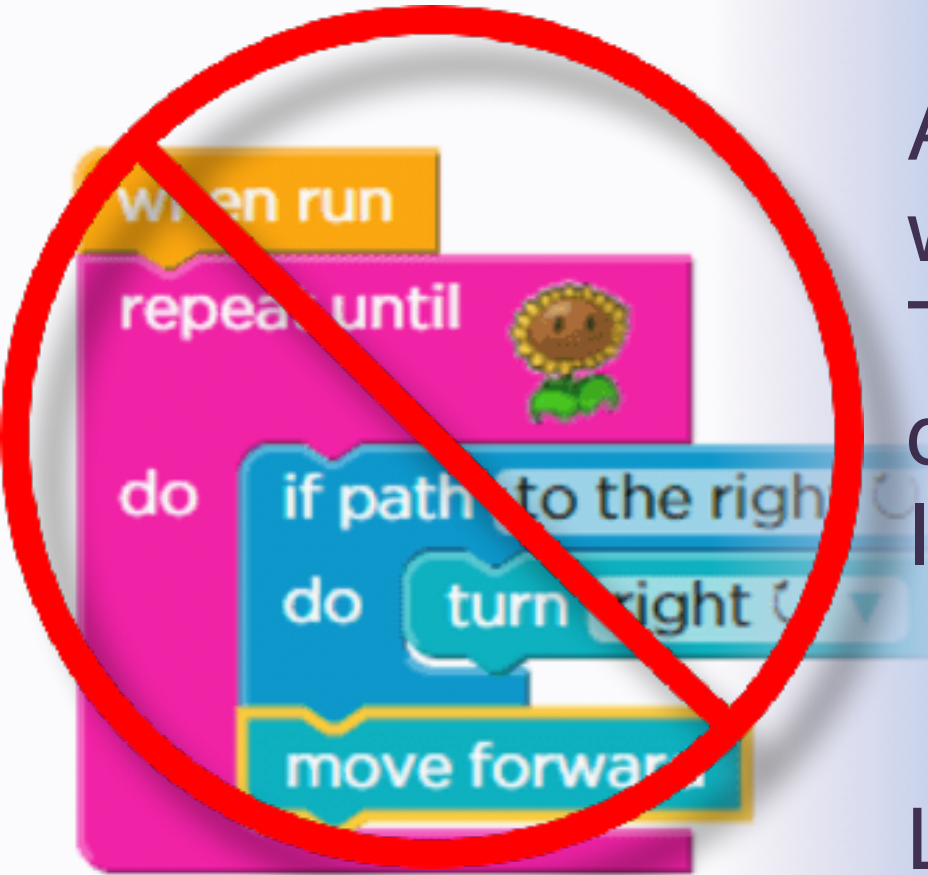
- Programming in local language
- Text-based programming
- Relatively cheap
- Inspiring a Do-It-Yourself
- Promoting physical engagement

Why Coding in Local Language?



By removing the language barrier, creativity can boost up

Why **not** Block Based Coding?



A block contains codes written by another person. The kid only drags & drops. It seems lazy!

Let's kids write codes themselves!

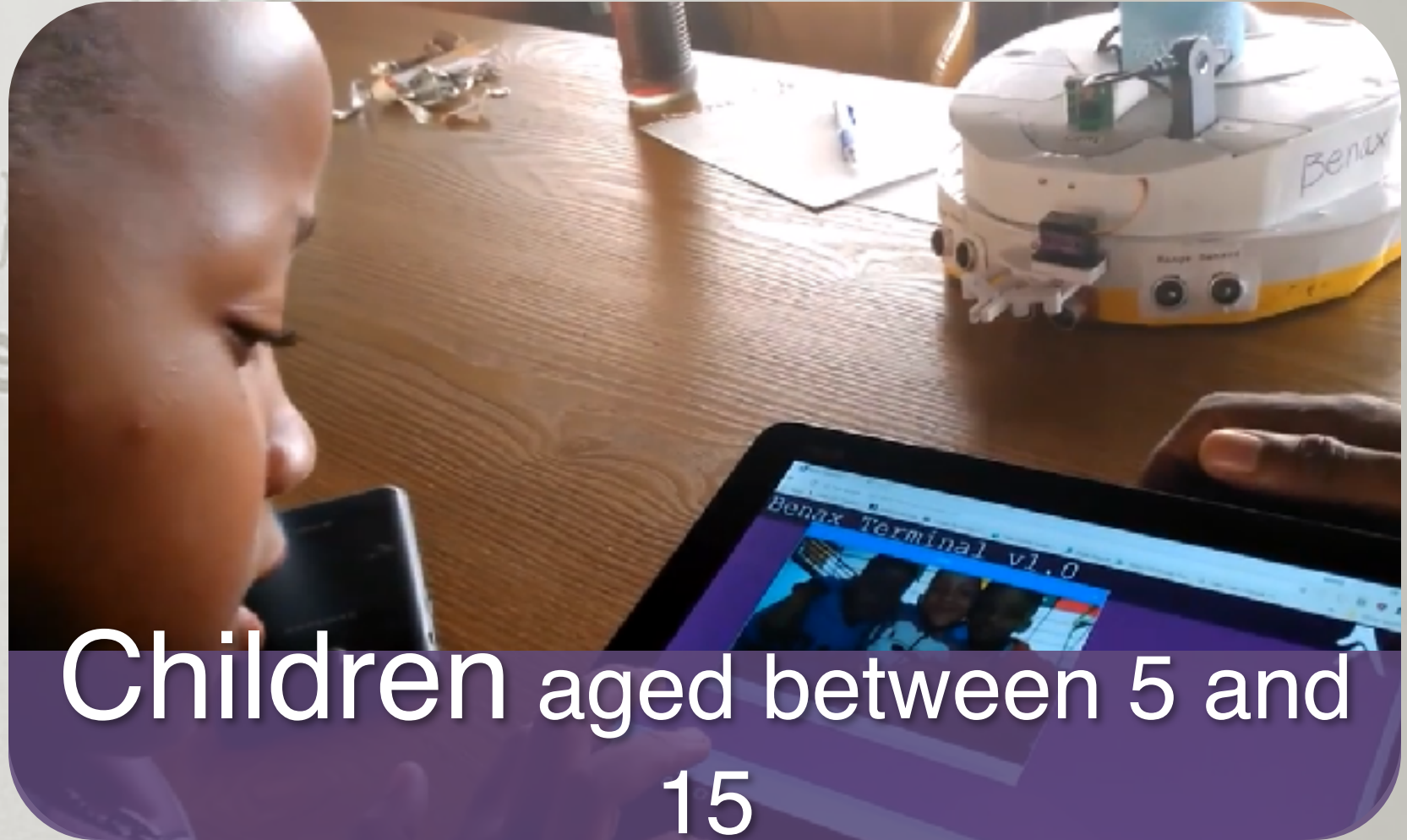
Cheaper solution

So far, existing solutions to promote programming through robotics require:

- Experts
- Mass training
- Long time

The new solution is exempt from all that!

Targeted Users



Children aged between 5 and
15

Targeted Customers

- Parents
- Private schools
- Organizations teaching coding in boot camps

Project Testing: Rwanda, 2018- Jan&Feb



photo 1/8

Project Testing: Rwanda, 2018-

Jan&Feb



photo 2/8

Project Testing: Rwanda, 2018-

Jan&Feb



photo 3/8

Project Testing: Rwanda, 2018- Jan&Feb



photo 4/8

Project Testing: Rwanda, 2018-

Jan&Feb



photo 5/8

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Project Testing: Rwanda, 2018- Jan&Feb



photo 6/8

Presentation to Indian Investors



photo 7/8

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Presentation to Indian Investors



photo 8/8

Research Project: Benax, inexpensive hand-made robot for kids, programmable in local language: A case study in Rwanda

Video: Project testing

<https://www.youtube.com/watch?v=xdEeQtQIMHA>



Conclusion

- So far so good ... but
- Challenges
 - Cost of Operating Energy
 - So far tested with a small sample
 - Not yet cheap for a poor family

Sample code

```
igihe=60
```

```
burundu:
```

```
@genzura hagati
@niba(intera hagati<50):
@@genda kinyumanyuma(0.1,igihe)
@@kata ibumoso(0.2,igihe)
@bitari ibyo:
@@jya imbere(0.1,igihe)
```

```
@genzura ibumoso
@niba(intera ibumoso<igihe):
@@kata iburyo(0.2,igihe)
@bitari ibyo:
@@jya imbere(0.1,igihe)
```

```
@genzura iburyo
@niba(intera iburyo<igihe):
@@kata ibumoso(0.2,igihe)
@bitari ibyo:
@@jya imbere(0.1,igihe)
```


A photograph of two young boys in a brightly lit hallway. The boy on the left is wearing a striped shirt and a backpack, looking down at a small white robot on the floor. The boy on the right is wearing a dark hoodie and is running or jumping towards the robot. In the background, there are large arched windows and a person's legs are visible on the right side. The entire image has a purple tint.

Thank you

Any Questions?

