Offline Knowledge Hotspots

Creating low-cost WiFi-enabled solar-powered
Digital libraries in schools

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About me

- Open Source Technologist, Ex-Mozilla Firefox L10N community Manager
- Focus on **equitable access** to digital technology
- Driving grass-roots innovation
- Resource driven design appoarch
- Use technology for social impact projects in India, Cambodia and Kenya

Purpose

- Bridging the digital divide, to bring high quality education to the disconnected world
- Openly licensed and open-source software, open hardware for offline distribution into low-resource contexts
- By providing adaptive self-paced learning for students,‘just in time’ pedagogic assistance for teachers, and learning experiences that bridge real world and digital instruction.

Hole in the Wall (India)

Minimally Invasive Education (MIE) ... learning environment to generate an adequate level of motivation to induce learning in groups of children, with minimal, or no, intervention by a teacher.

http://www.hole-in-the-wall.com/

Rural Internet Kiosk (East Africa)

http://www.ruralinternetkiosks.com/

What changed since $100 laptop?

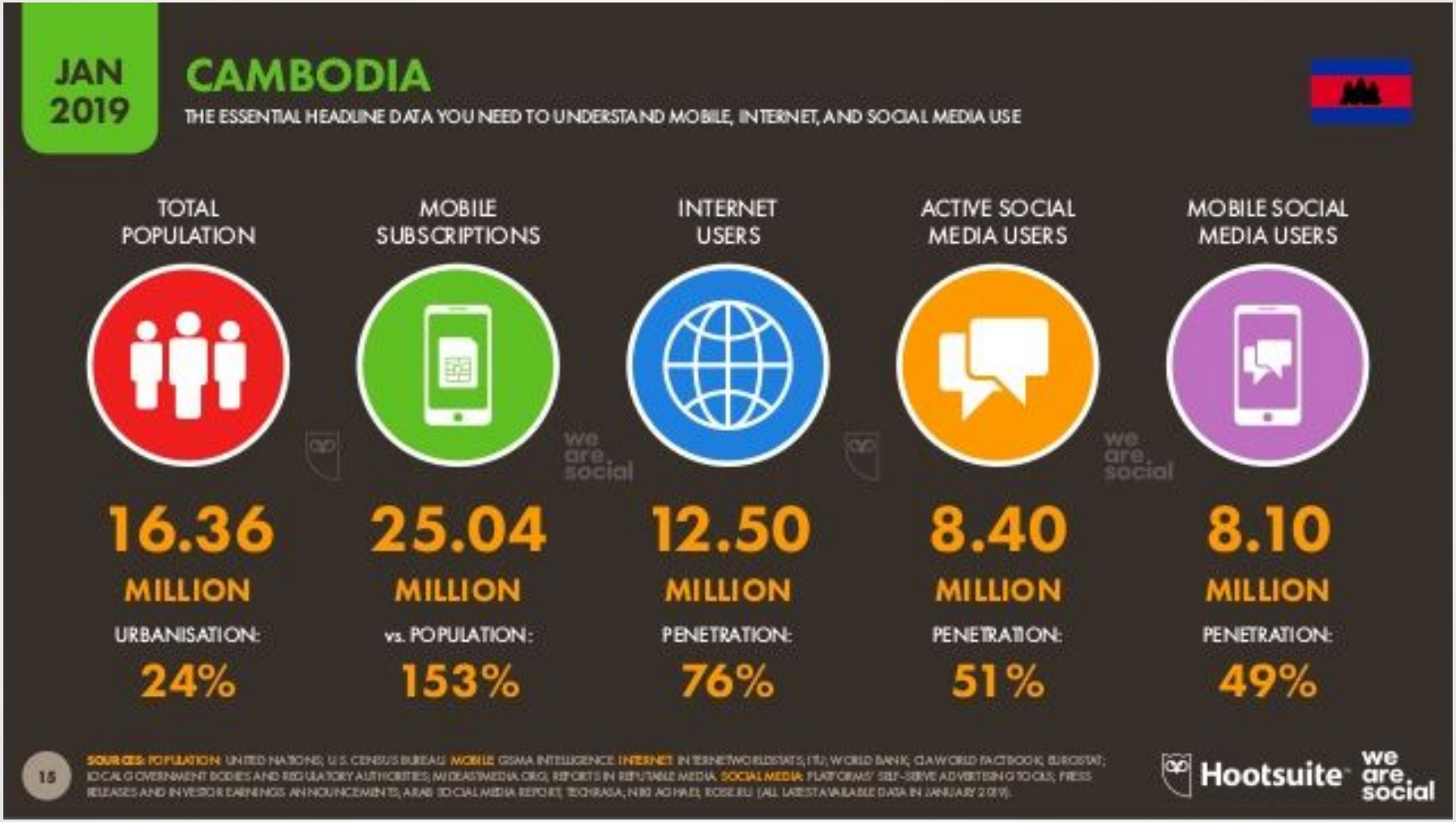
- **One Laptop Per Child (OLPC)**

  January 28, 2005; 15 years ago

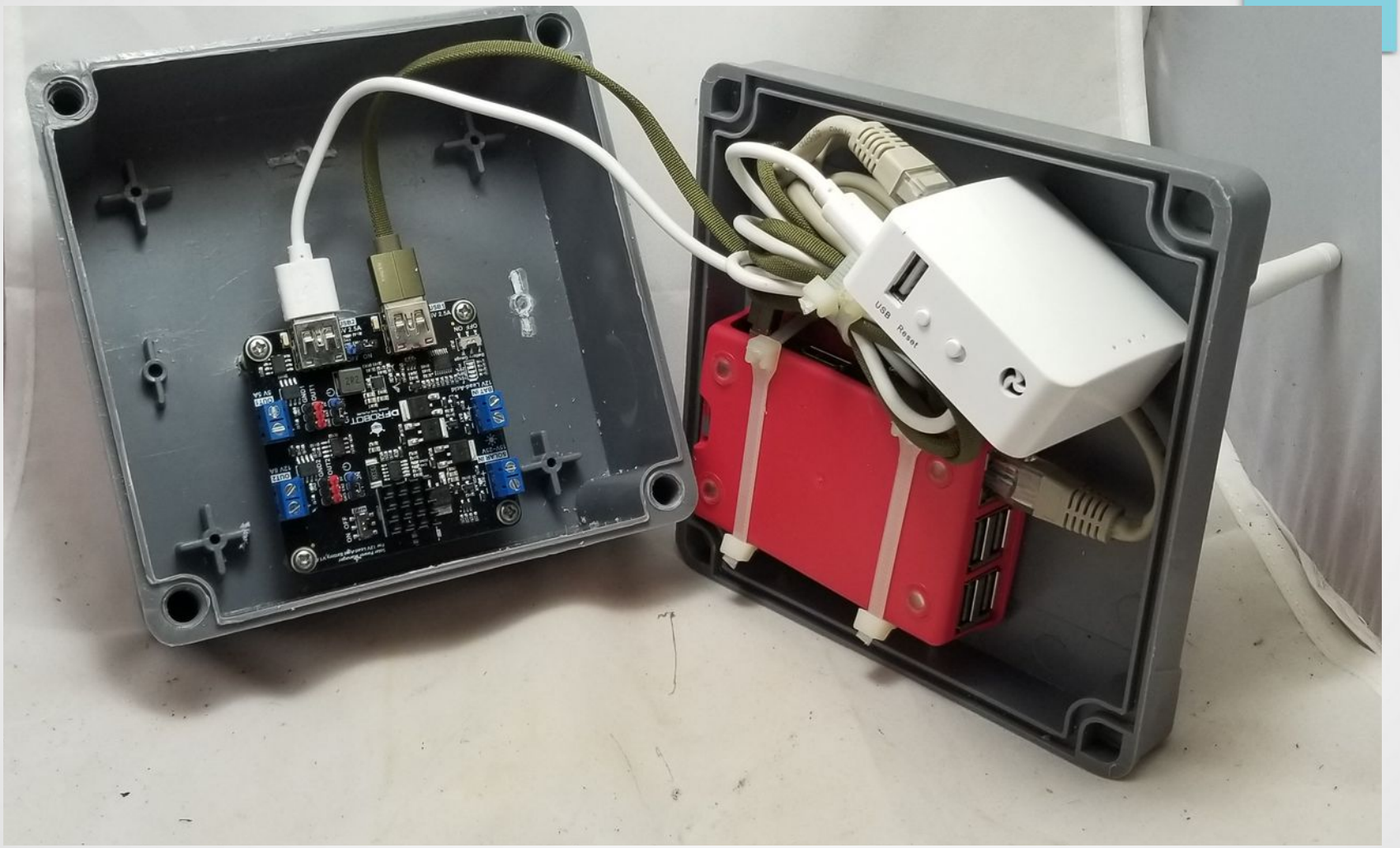
$30 Raspberry Pi SoC

May 21, 2020

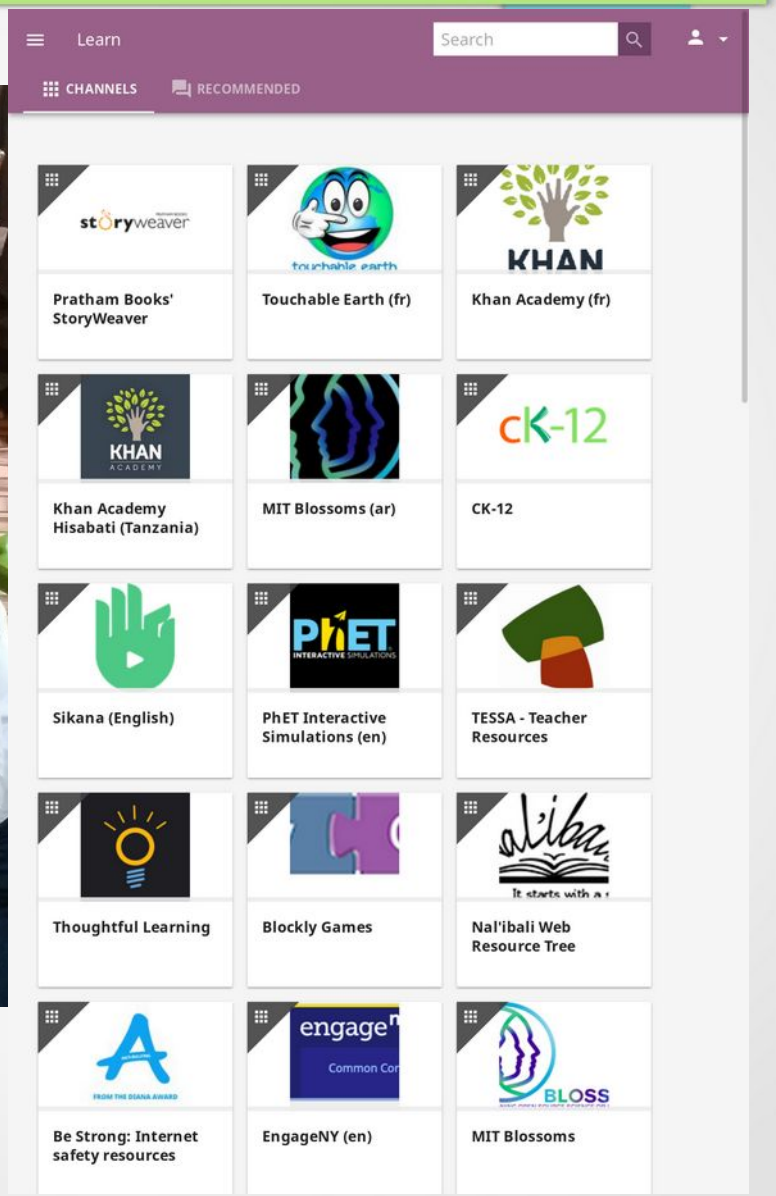
Mobile Phone Penetration



Digital Library



Mobile Phone Access



https://learningequality.org/kolibri

Offline Knowledge Hotspots?

- The digital library act as a local server, accessible by browsers on nearby smartphones, tablets and computers via a WiFi hotspot connection.
- The digital library is designed for standalone, offline usage. There is no need for Internet as everything is stored and run locally; even usable in areas without reliable electrical grid using solar panels and battery.
- Deployed in schools and aboard Tuk Tuk mobile library equipped with 25 tablets to be used in classroom activities on visits to ensure access for everyone.
- The goal of such offline digital libraries is to overcome infrastructural barriers preventing equitable access and effective learning outcomes.

TUKTUK

https://tuktukcharity.org/

Challenges

- WiFi chips are power hogs
- Captive Portal Detection
  - Requires DNS (dnsmasq hack)
  - Internet Connection Checks (iptables/HTTP responses)
  - Captive portal web browser handoff
- You still need internet to download learning material
- Current deployments needs skilled people to maintain
- Solar power is expensive and unrealiable

Future

- Get Involved:
  - Help us scale and make more impact deployments
  - Next steps: Product designing and manufacturing
  - Seeking to develop more localized content and innovative teaching material
- Cambodia Deployments:
  - Schools are closed until Nov, 2020
  - Expanding to 4+ schools and more learning material.
  - Design low-cost sub $50 digital libraries

Thank you!

Q & A