

First session: education / Arduino not so accessible...

Poster: "open science school.org" - Paris / do water quality monitoring

2nd session: developing world (majority world)

- various backgrounds - education (ej. webian microscope) @ school age
- public health, open access
- bio hack: PCR diagnosis??

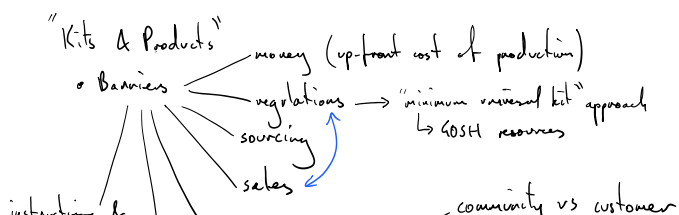
② How do we establish credibility of OSH? Business Model retr3d
 ↳ let someone sell it as a product
 ↳ Government? ← case studies matter a lot
 ↳ Sci. Research
 ↑ More: examples? (tech for trade)

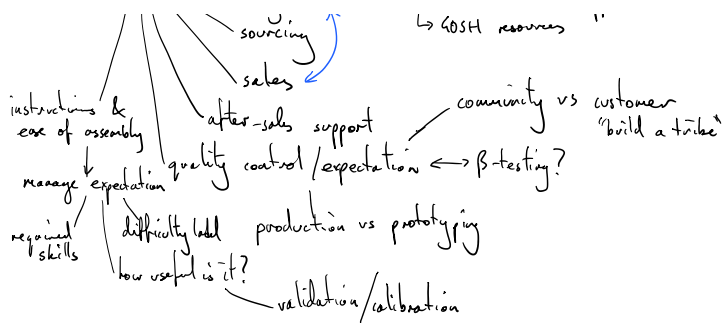
Denial (University Andes of Chile) - established maker space - funded with a business development remit also school age sessions

③ How can we encourage the majority world to contribute not just adapt?
 ↳ see this happening @ STICLab: how to document & share?
 • "Ancestral Knowledge"

Afternoon #1: Upscaling

- Tactics:
- Workshops
 - Sell a product (backyard braais)
 - Co-design
 - Word of mouth
 - Key people - influencers/enthusiasts
 - Find organisational partners w/ shared goals
 - Road map & milestones
 - Mass media / social media
 - Online community building
 - Funding
 - Modularity (split into smaller/easier/independently useful) products
 - UX for new users
 - Explicitly welcoming → "onboarding"
 - Target specific groups (why is this interesting?)





• Acceptance / advertising — distinction between "science grade" and "hobbyist" valuable
how about "calibrated" vs "uncalibrated"

• Production / manufacturing — often not very open process
(just pay a company)
what is the cost involved

how do you manage tooling / set-up — does the kit diverge from the development version?
do you want to make it yourself or give design to someone else?

sales & distn logistics

CNC as an alternative

can we make a roadmap with examples of success

let's do this!

↳ Onboarding (group report back) — the process of welcoming people in

ask people to help — with "bite size" problems

showing stories

using social media
first-timers only projects

sets role models

to set up, need to know

your target audience

you're not just "giving" — how do you communicate your mission
set expectations of what you get out

We must actively bring people in — or we will grow slowly & have poor diversity

↳ Communities through workshops — gets repeated by attendees (low kit rate)

co-creation & ownership — just tell them "please replicate"

include people in organisation

divergent designs can give ownership
does branding discourage ownership
how do you stop it only belonging to the creator

inject into existing community — eg teachers — can be v. challenging institutional hurdles

PM #2: Standards

"universal play & play"

- Standards for interfaces to encourage re-use & avoid re-invention
- Equipment that can take publishable data → is it calibrated? is it quantitative?
- Design constraints
- Standards are important to interact w/ others (electrical engineering background)
- I like a design — make it consistent?

- How do you standardise a design - make it consistent?
- Different standards for different regions
- Are standards needed for bio stuff
- Do standards have the same problem as a kit - lock in / ownership
- Do standards break equity

or legal
Formal standards for manufacturing,
sale, certification - and how
we deal with that

Legal

(expensive) certification often expensive & slow

Standardising hardware performance
and interfaces

Voluntary

do we want our own
standards

how could we
get this adopted?

interoperability
& reverse

Quality control, safety, ethics

interoperability & reverse

Equity & accessibility

standard for centrifuge force
communications protocols
EMI standards

safety
accuracy
What do standards do
best practice compatibility

c.f. roadmap for the
idea-to-product process: could
we have a flowchart for which
standards you need to hit, with helpful
hints/examples/contacts?

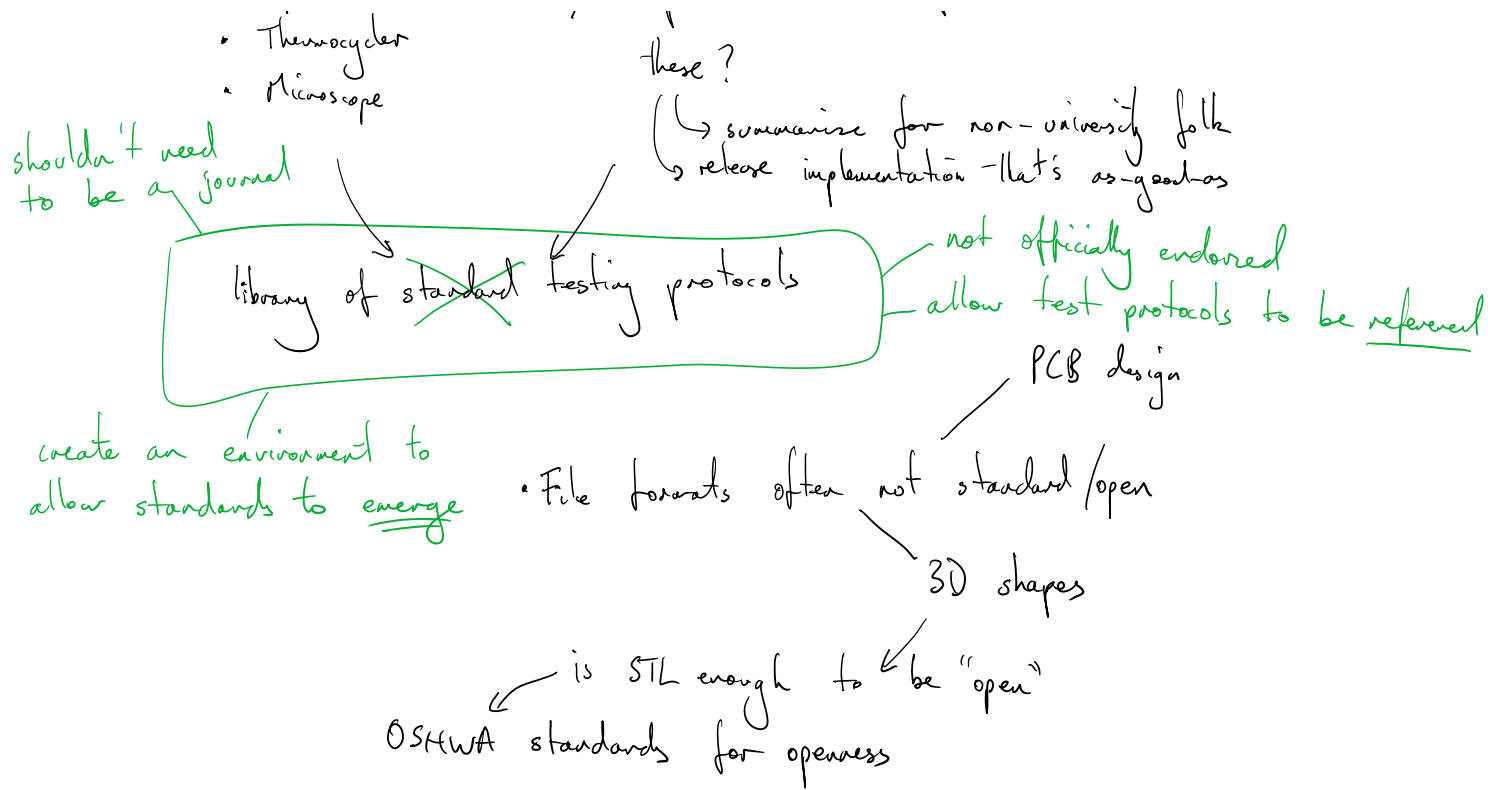
Action

Does GOSH need a
standards group?
what standards should we
create?

Here are some standard bits of kit

- Centrifuge
- Pipette
- Thermocycler
- Microscope

map out standards for
these?



- Recommendations vs Standards - often more appropriate for us?
- Example of open standards: Open Geospatial Consortium vs GeoJSON
 - took off because of good libraries
 - ↳ grassroots - not from ESC
- where do standards live — GitHub?
 - own server?
- how do you "peer review" hardware
- Political standards (e.g. public lab/health/environment monitoring)
- Sloan report on open hardware standards

⑦ How do you define interfaces (e.g. HW control or data sharing) without being too prescriptive (e.g. defining the top-level SW environment)

↳ go for higher level description

↳ standardise data formats

⑦ What will we do? ↗ review these

↳ Make lists of bio lab standards (Jenny)

↳ Standards are created by the community

we should think about standards & protocols for testing

1. have us up to 100 standards (very)
- ↳ Standards are created by the community — we should think about standards & protocols for testing
 - ↳ Public Lab working on performance standards
 - ↳ Make protocols for our equipment
 - ↳ Look at some HW & analyse what needs standardised
 - ↳ Establish basic/local working practices → E.g. Drop Bot
 - ↳ Point: if I design something, include tests/protocols
 - ↳ choose the design that has a test
 - ↳ Richard: document my tests explicitly