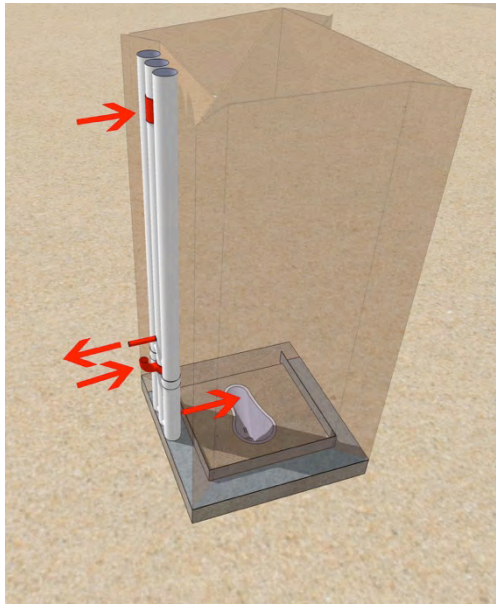
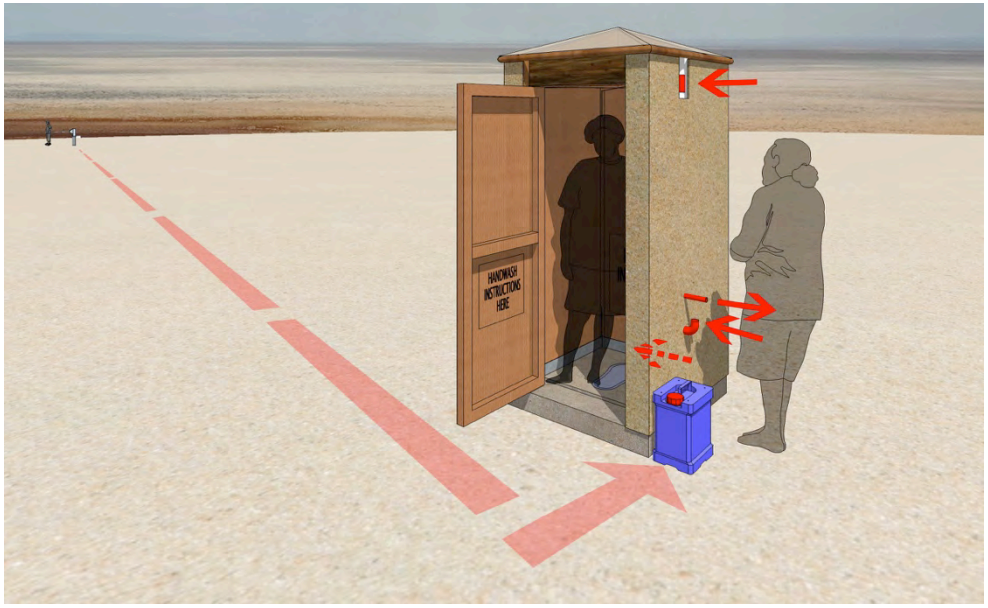
The University of Newcastle (Architecture)

2 x 2 x 2 Challenge (2 litres, 2 hands, 2 eyes) 31/10/15

Reducing trachoma in Ethiopia: an initiative of The Fred Hollows Foundation with help from Healthabitat and staff and students from the 2nd year design studio at the University of Newcastle (Architecture).

The challenge was set for teams comprised of architectural design students.
Research, think, develop and design ways to use minimal quantities of water to enable children (first priority) and adults to wash their hands and faces to remove the trachoma bug and any remnant food or dirt that has collected on the face that may attract flies.
Fabricate and assemble the solution.
Participate in the testing of the design solution and construction quality.

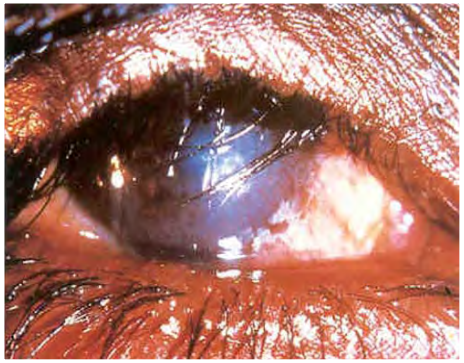




How to get water from the supply point to be stored near the toilet and then use very small amounts of from the local toilet reservoir to the faces and hands of all residents and finally, use the waste water for toilet floor cleaning, are all key parts of the problem.

'Thus, the continued provision of MDA (Antibiotic) cannot alone constitute an effective and sustainable approach to elimination of blinding trachoma."

To quote WHO's GET 17 Report, "The Face Washing and Environment improvement components of the SAFE strategy must be integrated into the overall strategy in a coordinated way with the involvement of all partners. ***WASH interventions are often perceived as complex, costly and infrastructure-based*** *but that is not necessarily the case if the right partners are involved, as shown by the examples of the Gambia and Ghana."*



(S) Surgery and (A) **A**ntibiotics

+

(F) **F**ace cleanliness & (E) **E**nvironment improvement
(water for face washing & sanitation to reduce flies)

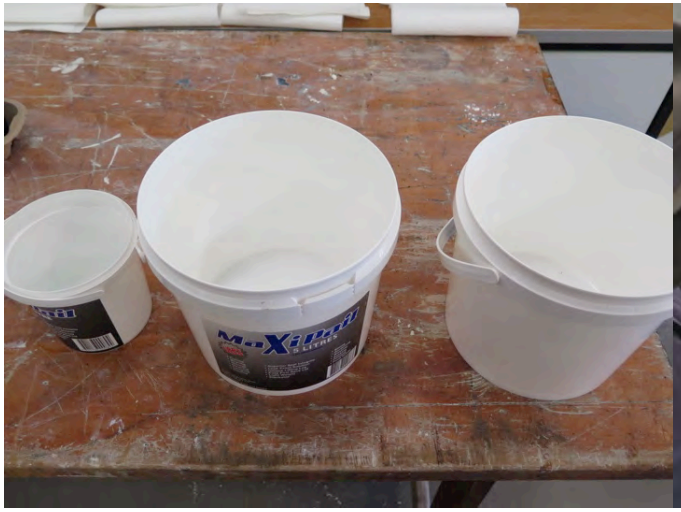
=

A cup of mud for the floor and cleaning brush

the face dirt kit and samples

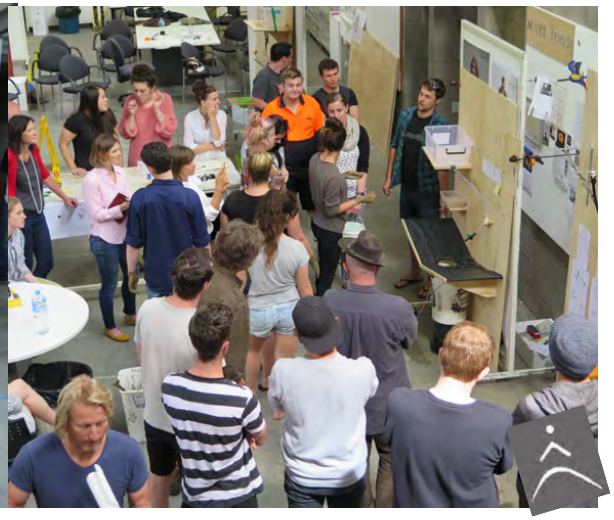
The setup for the Challenge

The water buckets (2 x 5 litre and 1 x 2 litre)



Mud for dirtying hands

Ply panels for each team and studio testing



Studio testing of the work of the 6 design teams

Pre – Challenge Preparation
Pre-painting 5 ‘dirty’ faces with a mix of food stuffs and putting mud on the hands of 5 team members

JUDGING CRITERIA

Face washing
All team members, a min. 5 of people, are to wash their 'standard' dirty faces. The 'dirt' will be applied to 5 members of the team. Sample 'dirt' was made available for team testing. After washing, faces were blotted/wiped dry on a paper towel, provided by HH. The towels were later assessed. The dirt on the towel was a measure of how much dirt was left on the face *after washing*. **The cleaner the towel the more points gained.**

Hand washing
All as above with 'standard' dirty hands from bucket of mud.

Toilet floor washing
Water was used to wash 'standard' dirtied concrete floor area provided. A blot test with paper towel assessed cleanliness after washing.

Water security
Total volume of clean water left over after all the above was measured. Points were awarded for remaining water from the 10 litre allowance.

Other criteria for the judges.
Cost efficient?

Robust technology for the task?

Will it be used?

Will kids be able to use it and want to use it?

TEAM 6 — 6th place

Face washing – OK
Hand washing – OK
Floor washing – with dirty remnant water via basin
Water remaining – 8 litres
Cost – within budget ($4.20)
Technology – foot operated, generous basin, flow of water poor and slow to wash
Usable – simple to fill and use, waste water captured
For kids – height OK, foot mechanism OK

TEAM 2 — 5th place

Face washing – good steady stream recharged when needed
Hand washing – as above
Floor washing - simple sink collected water, drain blocked and little water collected
Water remaining - + 8.5 litres
Cost – slightly over budget ($29)
Technology – simple using common containers, foot operation hard to control for stirrup foot grip
Usable – OK, simple stream
For kids – sink small and drain clogged

TEAM 4 — 1st place

Face washing – good stream, cleanest
Hand washing – as above
Floor washing – good with remnant water collected, cleanest
Water remaining - + 7.0 litres,
Cost – below budget ($8.80)
Technology – common parts and very simple construction
Usable – simple … to fill and use, waste water captured
For kids – height OK, easy to use

TEAM 1 — 4th place

Face washing –very slow
Hand washing – as above
Floor washing – very little water used
Water remaining - 9.3 litres
Cost – over budget ($34)
Technology – simple available irrigation fittings, spray and drip wash parts separated
Usable – OK water collection did not work very well
For kids – easily adjusted, heights OK

TEAM 5 3rd place

Face washing – good – slow consistent stream
Hand washing – as above
Floor washing – good with remnant water via basin
Water remaining – 9.3litres
Cost – below budget ($12)
Technology – common parts simple construction, basin would need to be rethought BUT large and generous good for young children/mothers. Sand to help cleaning provided.
Usable – simple to fill and use, waste water captured
For kids – height OK, basin OK

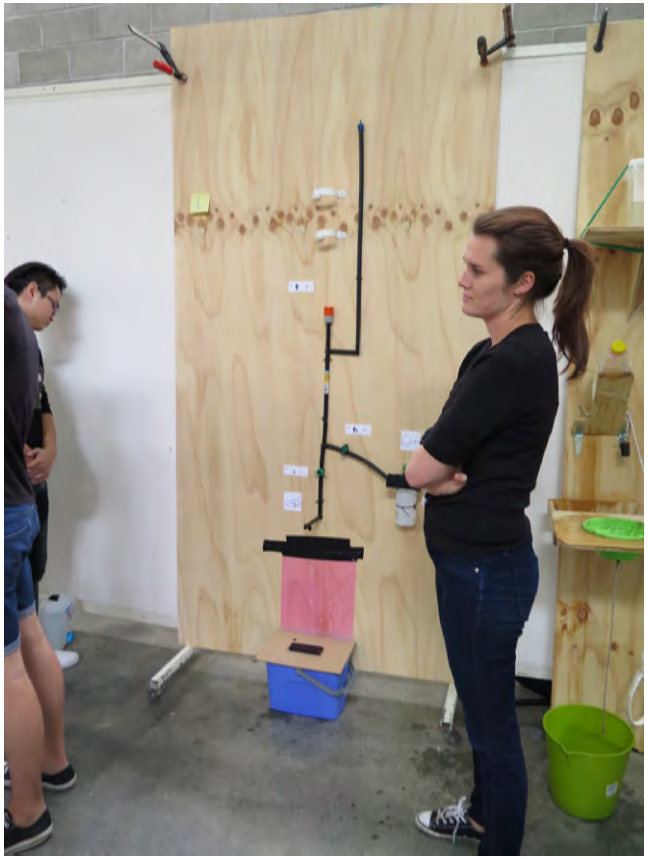
TEAM 3 2nd place

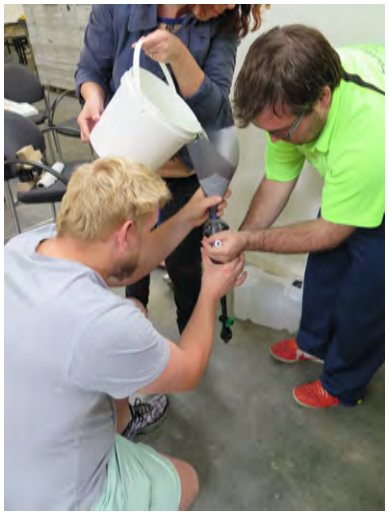
Face washing – good – slow consistent stream 2 jets
Hand washing – as above
Floor washing – water used from collected water in watering can
Water remaining - + 8 litres,
Cost – over budget ($41)
Technology – two valves and secondary reservoir good for water use, but complex to operate
Usable – easy to wash but hard to control water supply
For kids – basin OK, hard for kids to recharge secondary reservoir

Some pictures of elements of each design and how they performed on the day




TEAM #1

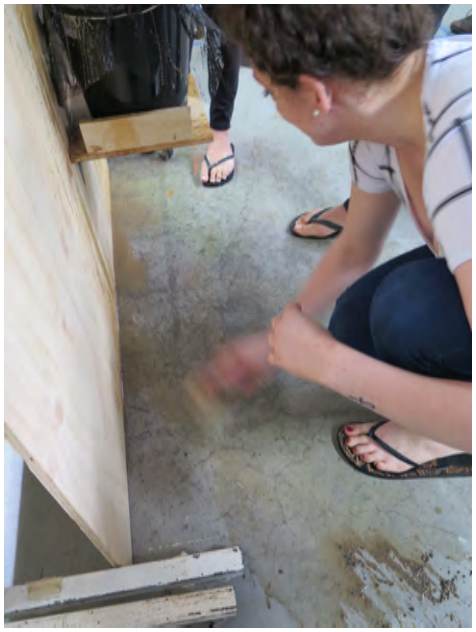




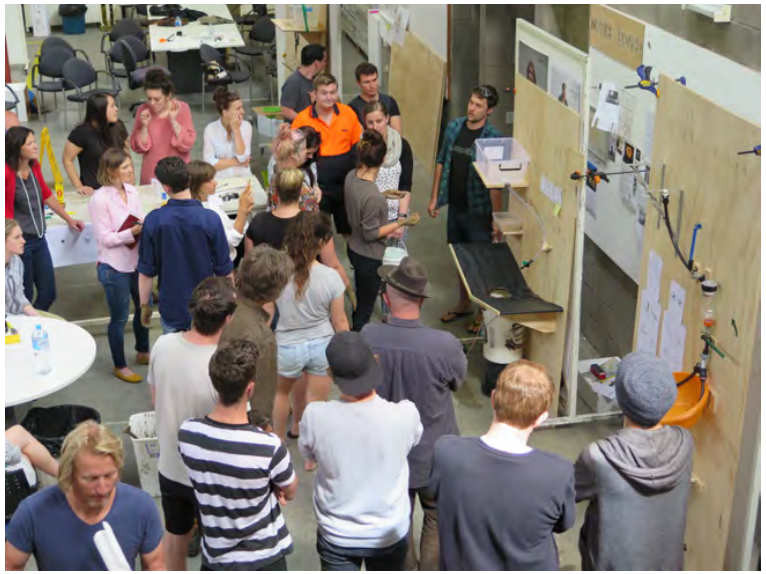
TEAM #2

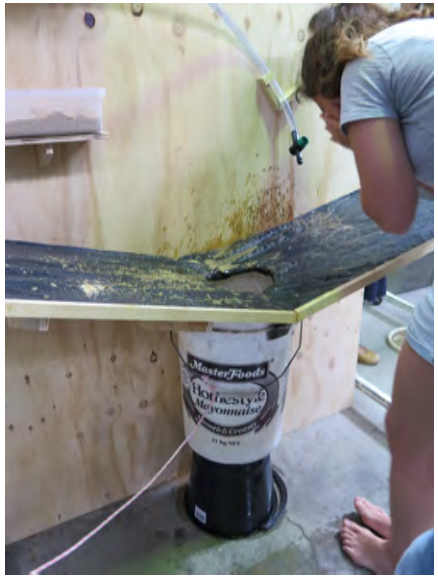
TEAM #3

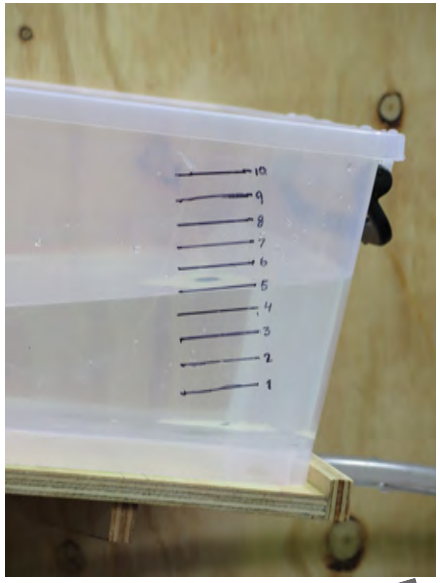
TEAM #4 (Best performing on the day)



TEAM #5







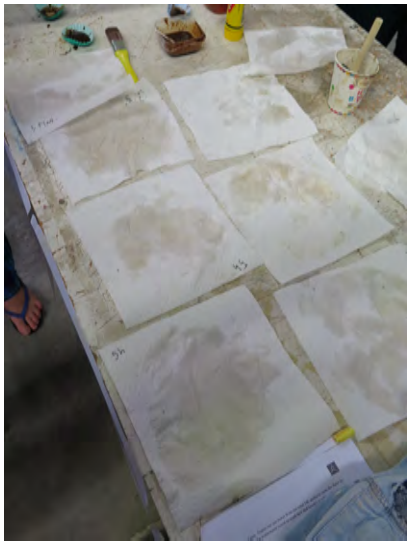
TEAM #6

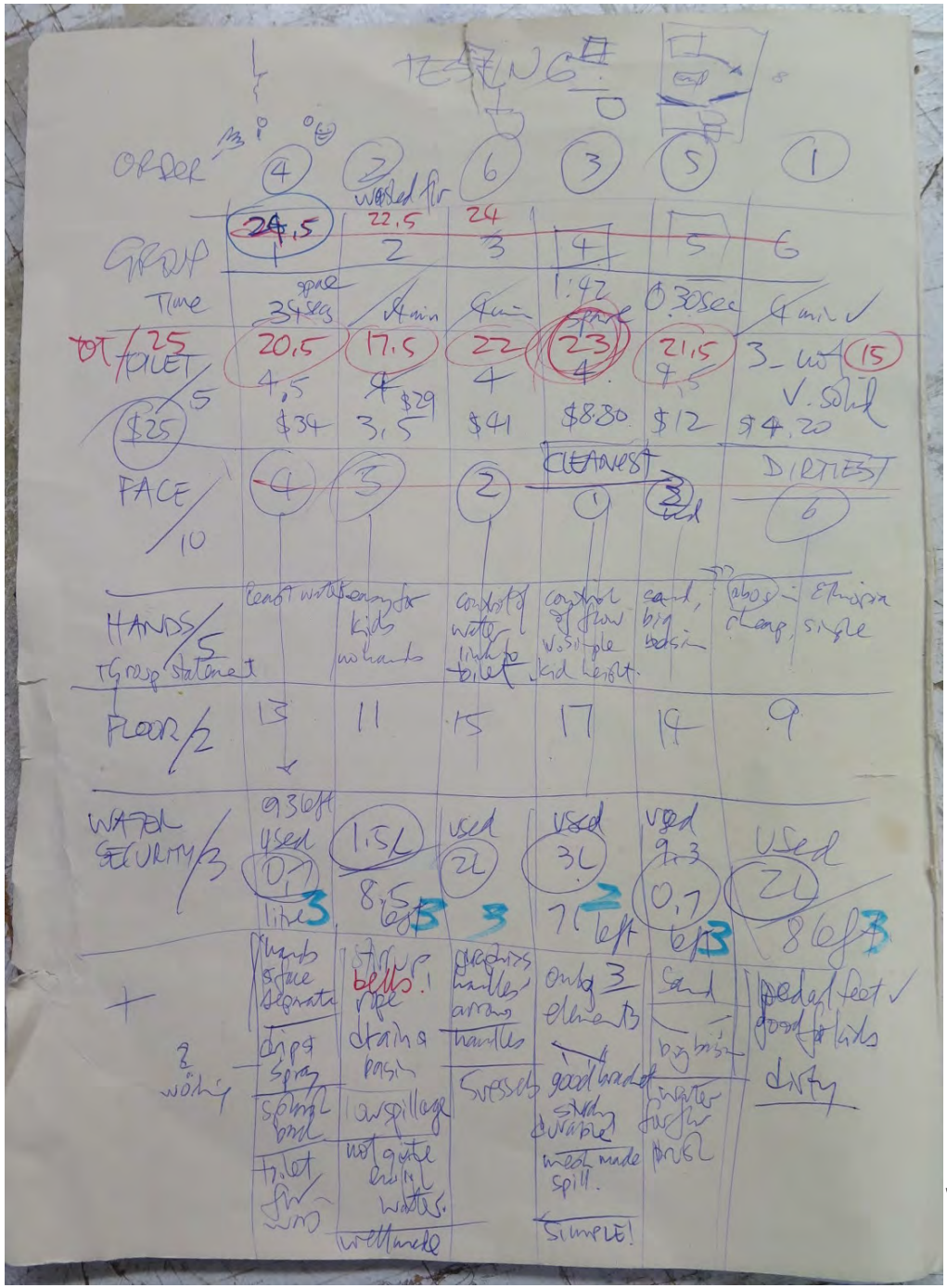






The crowd, score sheet, and sample of towels used to assess remaining dirt on hands, faces and floor.





Thanks

- To all the student teams for their ability to think about the complex issues involved in an apparently simple design brief, to design the essential parts of the solution and then build the ‘mechanisms’ and test their design products in public.
- To the University of Newcastle (Architecture) staff and other departments of the university and all the tutors for all their work and enthusiasm

Healthabitat – environmental health and design

November 2015
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