

The **BRISBANE** 2 x 2 x 2 Challenge (2 litres, 2 hands, 2 eyes)

08/08/15

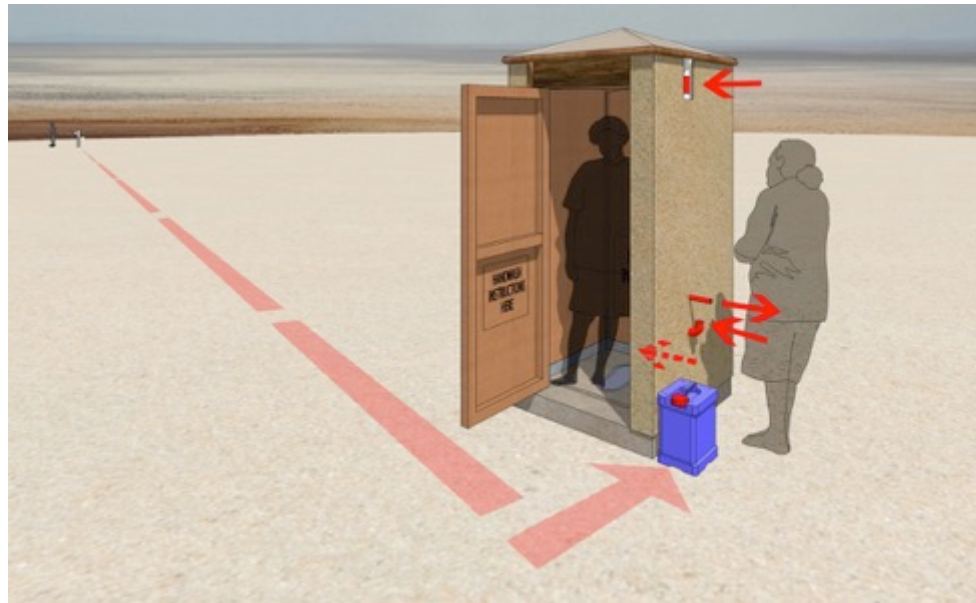
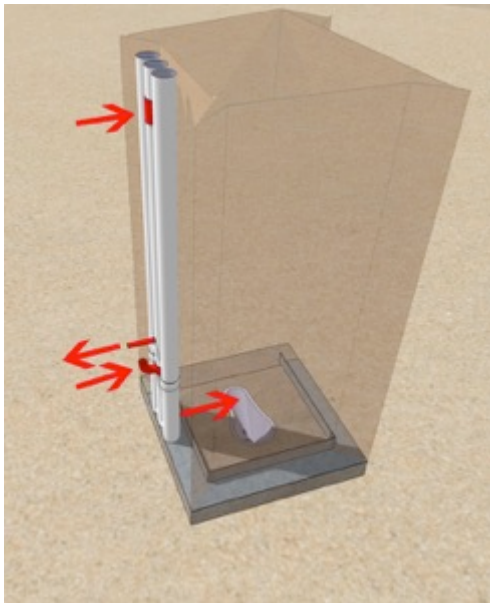
Reducing trachoma in Ethiopia: an initiative of The Fred Hollows Foundation with help from Healthabitat and students from Griffith University (Design Futures) and University of Queensland (TIME UQ)

The challenge was set for teams comprised of medical, design and engineering 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) Antibiotics



**(F) Face cleanliness & (E) Environment 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

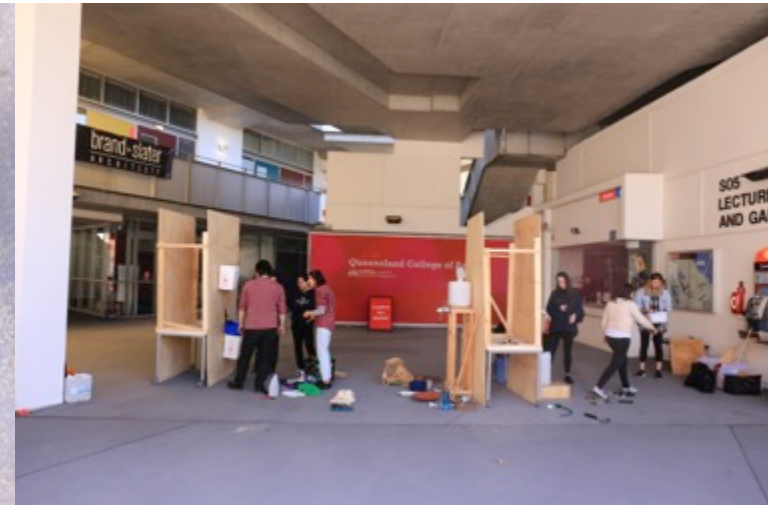
The water buckets (2 x 5 litre and 1 x 2 litre)



Mud for dirtying hands



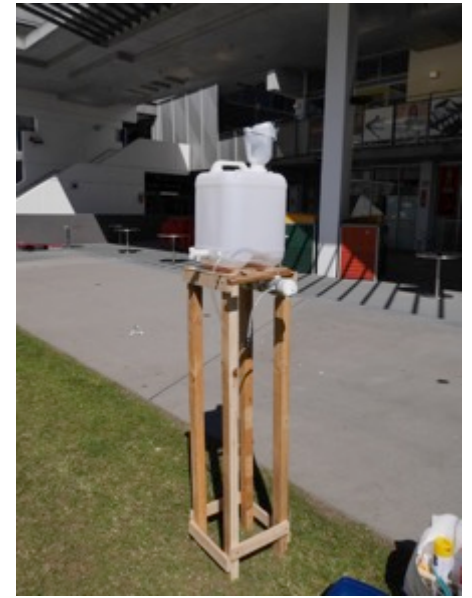
Ply panels for each team



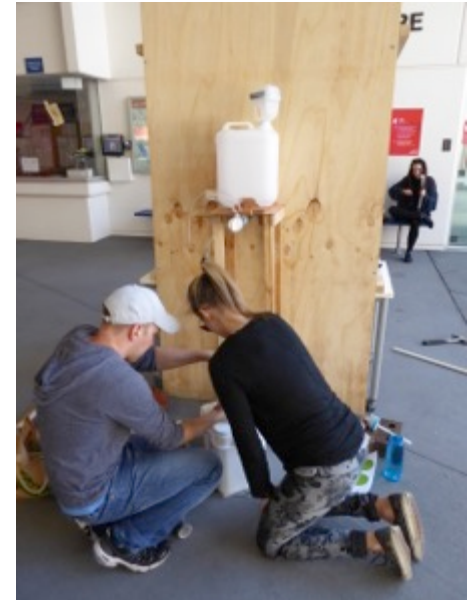
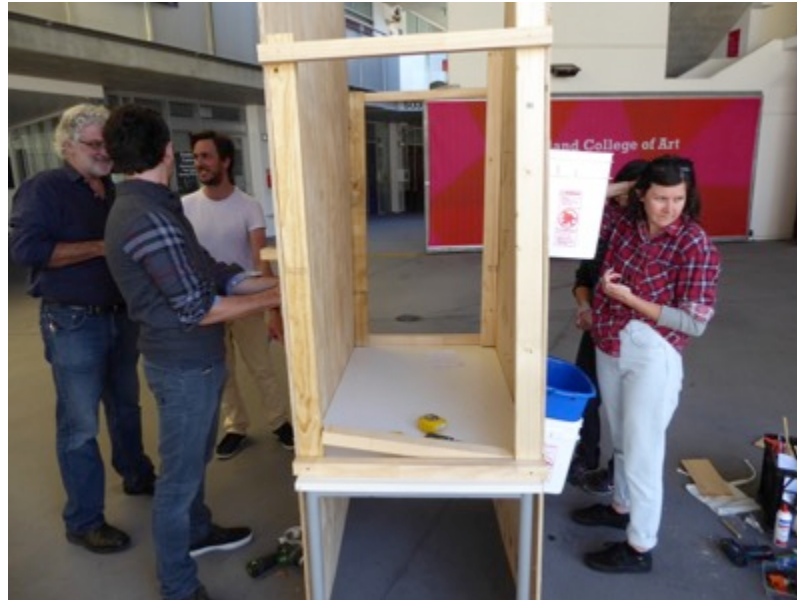


Preparation





Pre - Challenge testing



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 1

1st place

Face washing – good

Hand washing – good

Floor washing – good with remnant water via basin

Water remaining - + 5 litres

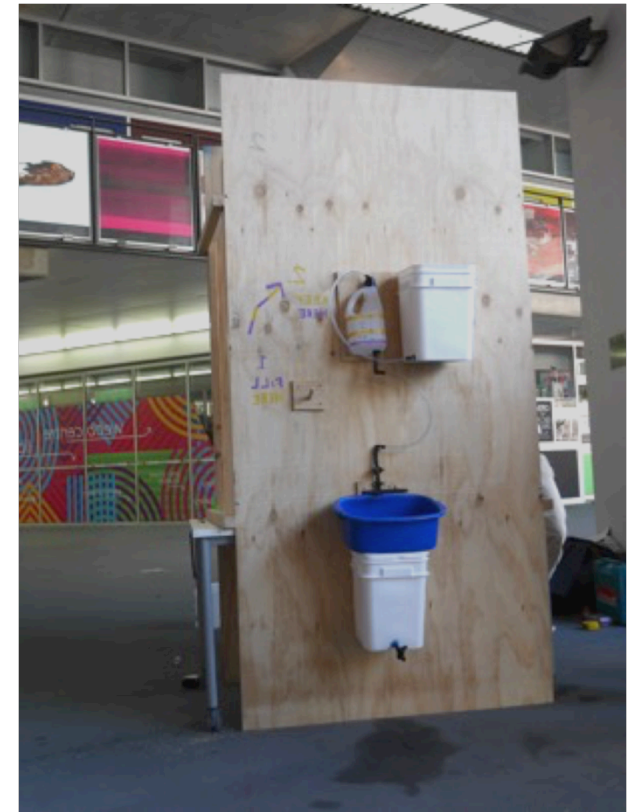
Cost – within budget

Technology – common parts in tap, 1 moving part.

Basin too small

Usable – simple to fill and use, waste water captured

For kids – height OK, no particular kid friendly parts



TEAM 2

2nd place

Face washing – good steady stream recharged when needed

Hand washing – as above

Floor washing - simple sink collected water and stored for floor wash, good

Water remaining - + 7.5 litres

Cost – within budget

Technology – simple using common containers

Usable – simple stream OK

For kids – sink useful for mothers and young children



TEAM 3

4th place

Face washing – good – slow stream

Hand washing – as above

Floor washing – good with remnant water via basin

Water remaining - + 7.8 litres, stop valve foot operated

Cost – (?)

Technology – common parts simple construction

Usable – simple to fill and use, waste water captured

For kids – height OK, basin unstable, water gun also possibly too attractive for kids



TEAM 4

3rd place

Face washing – OK – very slow

Hand washing – as above

Floor washing – very little water used

Water remaining - + 11 litres,

Cost – over budget

Technology – simple with one moving part.

Usable – no lifting required. Effort and coordination needed for foot pump action was difficult

For kids – mother and child use well considered.



FACE

Replica Dirt: Nutella, vegemite, LSA, Honey
Measure: Equal cupcake cups and painted onto forehead, cheeks and nose of 5 adult faces with same brush



HANDS

Dirt: Soil and Water
Measure: 2 x 10 cent pieces at bottom of bucket, each hand had to find a coin before pulling hands out



FLOOR

Dirt: Soil and Water
Measure: One full cup of soil and dirt, poured and smudged on concrete floor under within a marked out zone of 900x1200mm

PAPER TOWEL

After washing, 5 members on each team* dried their hands and face on paper towels squares (1 per hands and 1 per face)

The marked floor area adjoining the test panel, representing the toilet floor, was blotted with a square of paper towel after washing down by the group.

The judges could review the remaining dirt captured on the paper towels as a measure of the effectiveness of each Team's system.



** NOTE: Where teams had less than 5 members, they were helped by volunteers to make up the 5 needed for washing as this represents the average family size in Ethiopia.*

GUEST JUDGES

Jennifer Taylor *Architect*

James Conner *Architect & Planner*

Dr. Sandra Meihubers *Dentist, Teeth & Toilets*

Kevin O' Brien *Architect*

Susan Ellison *Architect*

Paul Bardini *Industrial Designer*

Clare Carroll *CEO Straddie Camping QLD*

Dr Eleni Kalantidou, *Griffith University*

The Challenge logistics and teams were coordinated by Dr Eleni Kalantidou



TEAM #1

1st place

Team members:

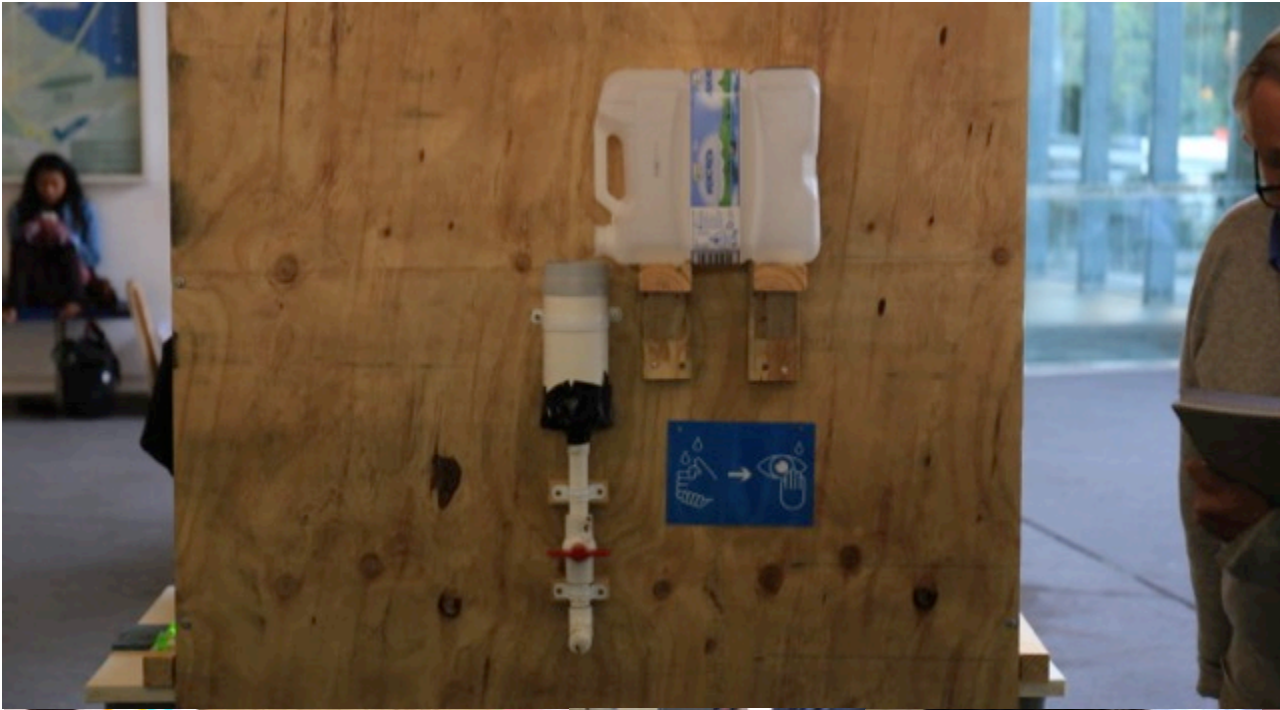
Alex, Chris, Luke

SUMMARY OF UNIT

- Removable water “tank” to charge the next reservoir
- Small reservoir, with filter, to control a limited amount of water used for washing
- Single tap and spout
- Small ice cream container used as basin with small holes drilled into base to drain into bucket under,
- Sauce bottle was intended for washing to be filled with water to wash faces and eyes but was not used in the testing.
- The system has two taps as moving parts



TEAM #1



TEAM #2

2nd place

Team members:

Emma, Akira, Geraldine, Steph

SUMMARY OF UNIT

- Bucket reservoir for tank filled and installed at high point in the system
- Bottle acts as reservoir to measure and contain water and is filled using gravity and stored at a high point to disconnect the flow from the main reservoir
- Garden irrigation spout heads were used for both face and hand washing with spout angled to allow both sides of face to be cleaned easily
- A plastic basin tub was installed on an angle to drain water into a bucket under
- Tap on the bucket was used for controlling the hand and face washing waste water used for cleaning the floor
- The system has two taps as moving parts



TEAM #2



TEAM #3

4th place

Team members:

Maddie, Bethany, Teoh, Shaun

SUMMARY OF UNIT

- A high level main storage container with screened water filling point was placed on an independent timber frame not linked to the ply wall panel
- A reservoir under the tank and in structure with turning mechanism for pre-filling a smaller container with known small volume (250ml)
- Hose for directing water had mini-shower head like spout for directing water to face and hands
- The basin was made from a found object (to represent a local clay basin available in Ethiopia) with hole cut out for the drain
- Two filtration points for water drainage. The first in the basin was a place that held a mini bucket which stored dirty water and filtered it to be reused for hand washing
- The bucket under the first drain also had a bio filter for further cleaning water
- For floor cleaning, there was a specially designed water siphon gun that sucked up dirty water from the waste water reservoir (red) and sprayed it out using pump action onto the floor
- Extra rubber cleaning blade on stick to help push the dirty water away efficiently.



TEAM #3



TEAM #4

3rd place

Team members:

Kara, Lucy, Shannon, Mhy-Lanie

SUMMARY OF UNIT

- Tank on floor (blue) with purpose built foot pump (an outboard motor fuel pump with wooden foot pedal) to direct water through a supply pipe located over a basin (black)
- Pumping and washing at the same time proved difficult
- It had a generous sized basin and direct drainage to grey water
- A hose was connected to base of tank for grey water supply to toilet floor
- A stand for grey water store was built for the better gravity feeding water to floor.



TEAM #4



Thanks

- All the teams for their ability to work and learn with those from other disciplines, for their thinking work and effort producing proto-type solutions,
- The University staff and tutors who volunteered their time and the facilities of Griffith University,
- Medical students of the group Towards International Medical Equality (TIME) University of Queensland
- To the judges for their time, expertise and encouragement of good ideas,
- Dr Eleni Kalantidou for coordinating the event and providing an end of event feast for all the participants,
- Dr Eleni Kalantidou, Sandra Meihubers and Heleana Genaus for photographs of the event.



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