

WATER INNOVATION THAT CHANGES THE LIVES OF OTHERS

SYDNEY WATER SUPPORTING WATERAID

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INTRODUCTION

This paper presents a case study on innovation of team, exploring the contributions of team constructs and design methods to innovation. It investigates team-level constructs and design methods based on Agile and Design Thinking as key determinants of innovation. It proposed positive relationships between team-level elements such as team structure, team process including product design development and team heterogeneity to innovation. It studies a team journey on designing and developing innovative solutions to real world problems to deliver improved quality of life.

Notable research on team innovation highlight the acknowledgment of team constructs as critical part of social system, connecting experiences and fostering creativity (Argote & McGrath, 1993, McGrath, 1984). Individual's practices and values define the effectiveness of teams and team-level processes are imperative to drive innovation and motivate teams to attain success (Nemeth & Staw, 1989). Team imperatives encourage idea generation, critical thinking, and innovation (Bandura & Walters, 1977). Social learning theory suggests team interactions promote diversity, bring team members into dialogues, increase creativity to explore possibilities of what could be, and to create desired outcomes. Team constructs provide foundations to optimise intellectual capacity, agility and motivational energies that consequently nurture creativity, innovation and achievement. (Nonaka, 2008, Holsapple & Joshi, 2000).

A qualitative research approach is applied to capture deeper insight into the phenomenon under study. The main methods for collecting qualitative data include

individual interviews, focus groups and observations.

This study examines the journey of Team Labobo in generating innovative solutions to address a major water hygiene problem in Cambodia, intensely capturing team experiences and learnings.

CASE STUDY

In 2016, Sydney Water participated WaterAid's Water Innovators Challenge for the first time. The objective of the Water Innovators Challenge is to design innovative solutions to a real problem faced by Cambodians, and at the same time, deliver creative fundraising activities to support WaterAid projects, and develop new skills and leadership qualities to bring to the workplace and beyond.

Team LaBobo was formed in February 2016 and was comprised of eleven Sydney Water employees from various parts of Sydney Water business with cross disciplinary expertise. Team LaBobo's challenge was to improve the appeal and design of an existing handwashing unit based on specific user feedback and material restrictions. Team LaBobo's objectives were to design and promote a cost effective, implementable and sustainable solution that will improve access to water, demonstrate effective hygiene behaviours, which will increase the uptake of handwashing units among Cambodians, in the context of Khmer society and culture.



PROBLEM STATEMENT

Every year, more than 380 children under the age of 5 die from diarrhoea, due to a combination of factors including lack of access to clean water, sanitation facilities and good hygiene practices (WaterAid, 2016). Handwashing with soap is an easy, “do it yourself vaccine” against diarrhoea, known to reduce the risk of diarrhoea by 47%, if performed regularly and correctly (Curtin, 2003).

The availability of a low-cost, fun and easy to use purpose built handwashing station will be helpful in embedding consistent handwashing practices among Cambodians. However, retailed at \$20.00 USD a unit, the cost of the station is a fair portion of an average Cambodian family’s income that is estimated \$80.00 USD per month (UNICEF, 2015). Hence, acquiring a handwashing unit constitute a significant investment and is considered a considerable constraint in realising the opportunities presented by an increased uptake across Cambodian communities.

The rationale that went behind Team LaBobo’s proposed solution is grounded on three key principles:

- ▶ Make it easy for Cambodians to have access to handwashing units
- ▶ Make it attractive to entice Cambodians to use the handwashing units
- ▶ Make it useful to promote hygiene, health and wellbeing

AGILE AND DESIGN THINKING APPROACH

Team Labobo approached the problem using Human Centred Design, a toolkit sponsored by the Bill & Melinda Gates Foundation for guiding innovation and design for people living under \$2.00 per day (IDEO.ORG, 2015) and complemented this with Agile methods and Customer Journey Mapping (Figure 2). These methods underpin the decisions in considering the aesthetics and engineering the right product with constraints on cost control and unit moulding limitations.

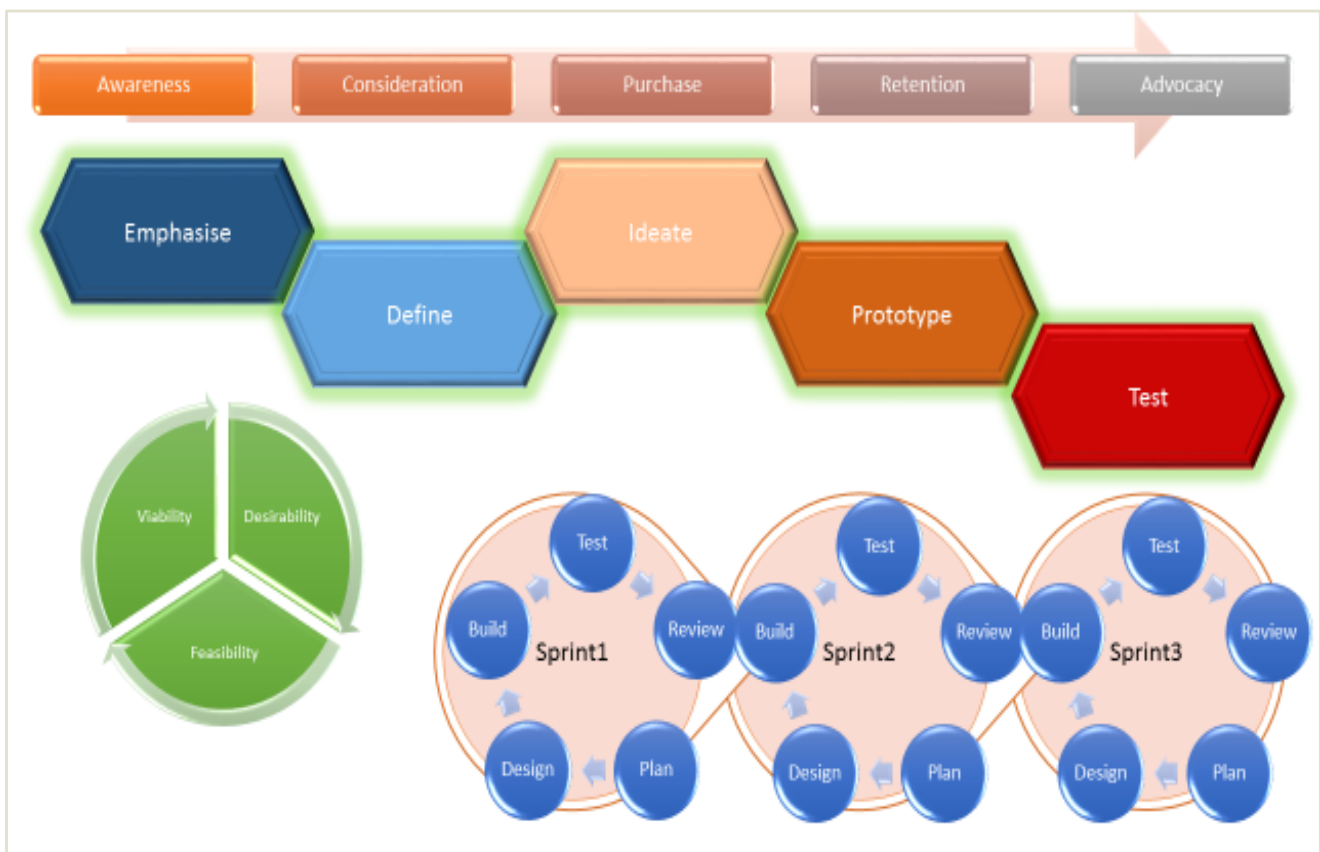


Figure 1. Team LaBobo’s Applied Methods


Phase					
Desired State	<i>I know what a Labobo is and what it is for</i>	<i>It would be nice to have a Labobo for my family</i>	<i>It would be nice to have a Labobo for my family</i>	<i>I am happy that we have a Labobo at home</i>	<i>I'd recommend Labobo to my family and friends</i>
Pain Points	<i>I've never heard of Labobo before ... I'm not sure anyone in my village has</i>	<i>The unit looks like a children's toy. I'm not sure I'd like to pay \$20 for a piece of plastic</i>	<i>I can't afford a Labobo- \$20 is a big deal for my family</i>	<i>The unit works and my children love it, but it looks a bit out of place in my home</i>	<i>I'm finding it hard to convince my family and neighbours that this product is worth it</i>

Figure 2. Team LaBobo's Customer Journey Map

UNDERSTANDING USER EXPERIENCE

Team Labobo placed emphasis on full understanding of the Cambodian experience through observation, interaction, and immersing themselves with their experiences. The goal was to develop sufficient background knowledge through these experiences and use these understandings as a springboard to address design challenges.

With the initial boundaries established to help frame Design Thinking activities, Team Labobo applied Agile methods by quickly setting some initial requirements through literature research. Basic understanding of the end users' needs from an outsider's perspective allowed Team Labobo to come up with an initial hand-drawn design that was iteratively processed.

CUSTOMER JOURNEY MAPPING

In applying Sydney Water's principle of *having the customer at the heart of everything we do* (Sydney Water, 2016), Team LaBobo developed a customer journey map to understand the Cambodian people's journey towards engaging with the LaBobo handwashing unit as a product.

Based on the information gathered through primary and secondary research, potential pain points and desired perceptions have been mapped out across the following customer journey phases. Team Labobo became more aware of Cambodian's needs, developed insights and

started forming views on experiences.

This has been the rationale behind the proposed set of overarching solutions presented in Figure 2: Team LaBobo's Customer Journey Map that incorporated:

- A more visually appealing unit that has its function extended beyond handwashing through product re-design using the Human Centred Design and Customer Journey
- A set of financial enabling options that will increase the chances of an average Cambodian family owning a unit
- A staged marketing approach that combines education and awareness at target market segments, prior to the hygiene unit's introduction to rural Cambodian households and then the urban population.

Team Labobo iteratively applied Human Centred Design process, based on a 3 stage "Hear-Create-Deliver" process. In the "Hear" stage Team Labobo showed the designs to the various groups of stakeholders to gather feedback including:

- Cambodian Buddhist Society
- Khmer Community of NSW
- Western Sydney University IT Students
- Sydney Water Subject Matter Experts

The stakeholders were comprised of people who have a natural understanding of Cambodian sensibilities and people with technical expertise.

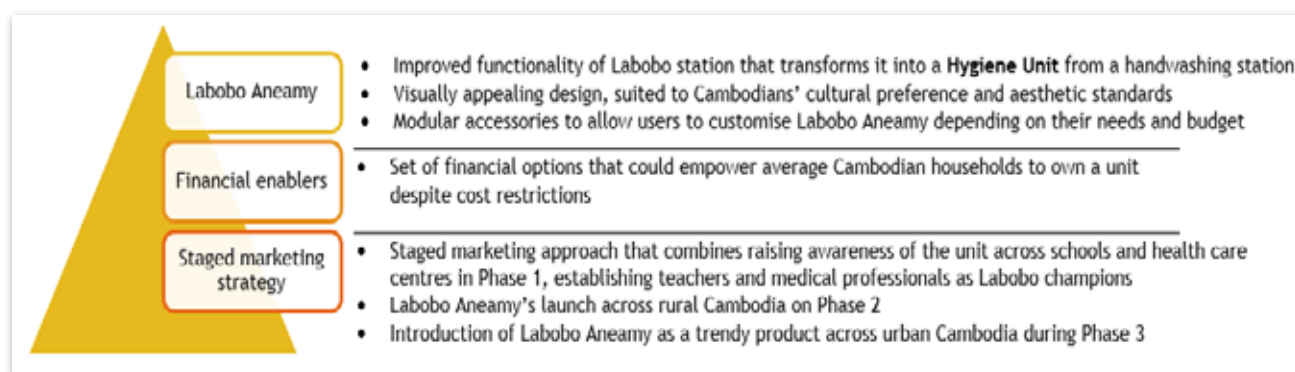


Figure 3. Overview of Proposed Solution

The feedback was used to identify themes and opportunities which were then gathered and added into a "Backlog Refinement" list.

In the "Create" stage, Team Labobo prioritised the improvement opportunities and worked closely in implementing the design enhancements. A regular scrum meeting would be conducted with team members to ensure active discussions on the progress of the design.

With better understanding of the needs, opportunities and constraints, the gained knowledge informed Team Labobo of the next steps to develop the best possible solution.

This iterative approach allowed Team Labobo to observe, emphasise and leverage stories to learn and form insights, provided a strong platform to frame the right problem in order to create the right solutions.

EXPLORING OPTIONS AND SOLUTIONS

Developing insights were discussed to synthesise and brainstorm possible solutions. The results were interpreted in terms of the product under development, to help Team LaBobo establish features, functions and any other elements.

As Team LaBobo generated ideas for product development, focus was on 'thinking outside the box' to explore new solutions, and alternative ways of viewing the problem. The central motivation was to get as many ideas or problem solutions as possible, so that Team LaBobo could prototype and test solutions in iterative ways to find the best way to solve a problem and provide greater opportunity to drive user intimacy.

A monthly sprint check-in meeting was conducted to

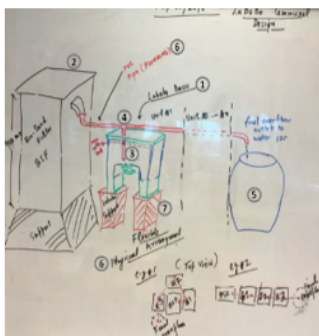


Figure 4. Defining the Design Challenge

demonstrate the most up-to-date design solutions and discuss how design features could be tied into other elements, including focus on marketing strategies and the fundraising strategy called Funnovation. Discussions on design features were being conferred for adding, changing or deferring considerations. Iterative sessions on updated designs to the panel of stakeholders allowed design changes to occur after each sprint.

The sprint sessions allowed Team LaBobo to focus on incremental improvements by reiterating the "Hear-Create" steps of the process. Models were first created by hand drawings, then artistic rendering and finally in 3D modelling software as design slowly matured. Adhering to the Human Centred Design, Team LaBobo intended to produce actual physical prototypes, which formed the final step in the "Hear - Create - Deliver" process.

Hand drawn design



Artistically rendered design



Initial 3D rendered design

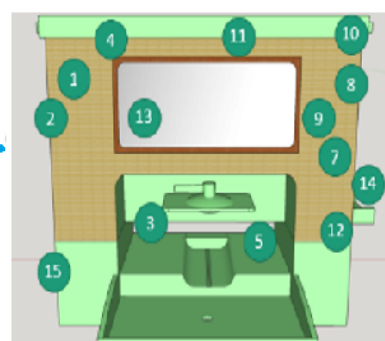


Figure 5. Evolution of LaBobo Designs

PROTOTYPING AND VALIDATING SOLUTIONS

The best options based on the criteria of desirability, feasibility and viability and from the developed insights derived from the customer journey map were considered by Team LaBobo to prototype and test.

The prototype stage allowed Team LaBobo to explore potential solutions with rapid prototyping, allowed to

test the potential solutions quickly and cheaply. The real value of the prototyping was the level of reactions and feedback received from stakeholders.

The team produced 3D printed models to validate and test the physical properties of the designs in real life, including the strength, flex and fit of the prototype accessories, to see how they performed was crucial. Through iterations, numerous adjustments were made to 3D models to further enhance the design.

The final design incorporated the following developments

- ▶ Modular designs, various add-on elements
- ▶ Mirror for grooming purposes
- ▶ Multiple functional grooming product holder
- ▶ Fun elements to engage young children to encourage handwashing behaviour
- ▶ Basic water filtration
- ▶ Kitchen friendly with hooks to attach utensils
- ▶ Water level indicator
- ▶ Re-designed decal incorporating local Cambodian culture

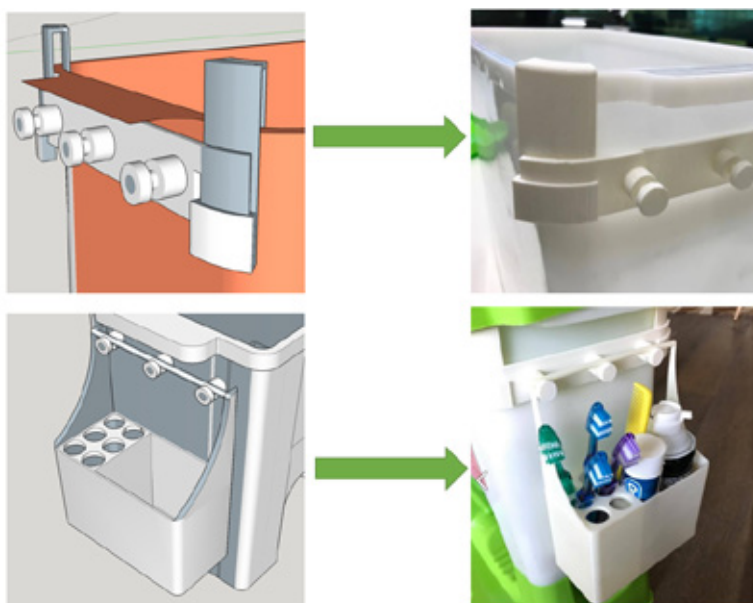


Figure 6. Physical Testing and Iteration of LaBobo Design in Real Life

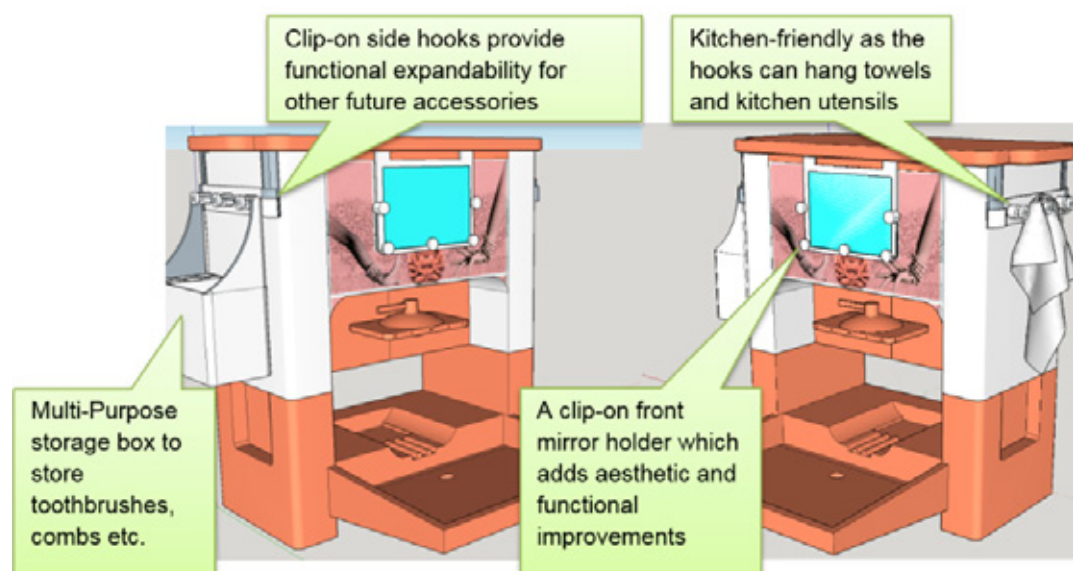


Figure 7. LaBobo Hygiene Unit with Modularised Components

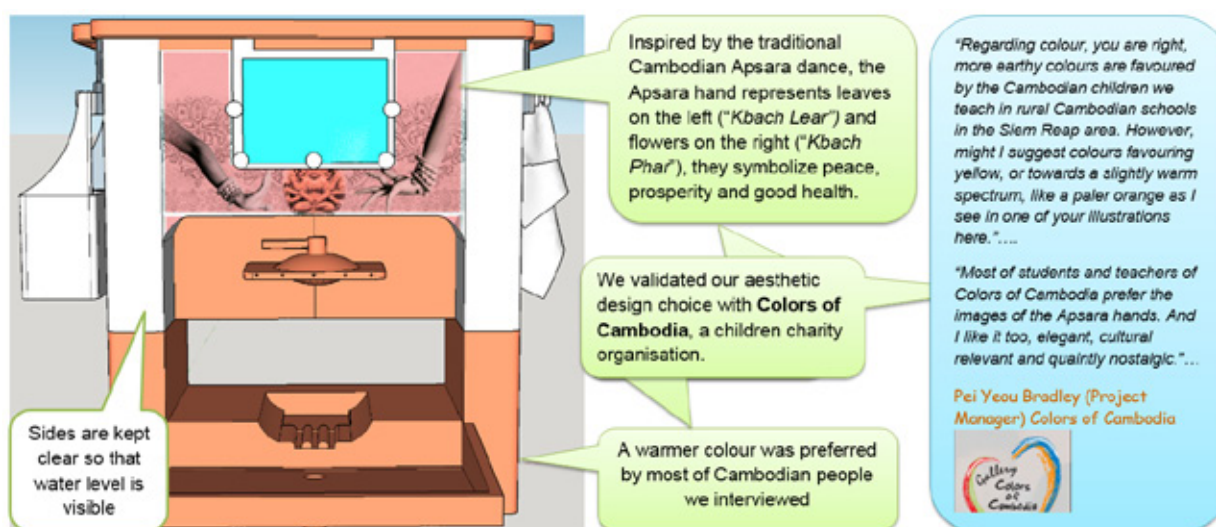


Figure 8. Innovative Front Decal Improving Visual Aesthetics

The results transformed LaBobo into a multi-purpose hygiene station, which potentially primes the users visually and encourages handwashing behaviour. In addition, by making it household kitchen friendly means it can be placed at various vantage points including near food preparation areas which are critical junctures for hygiene

AESTHETIC INNOVATIONS

Team LaBobo developed several front decals inspired

by Cambodian culture and traditional values. Figure 8 is an example of a front decal that is inspired from the traditional Cambodian Apsara Dance, the apsara hand represents leaves on the left ("Kbach Lear") and flowers on the right ("Kbach Phar"), they symbolise peace, prosperity and good health. The selected decal is one of the most popular from Colors of Cambodia, which is a charity organisation aimed at giving Cambodian children to learn and practice arts and crafts.

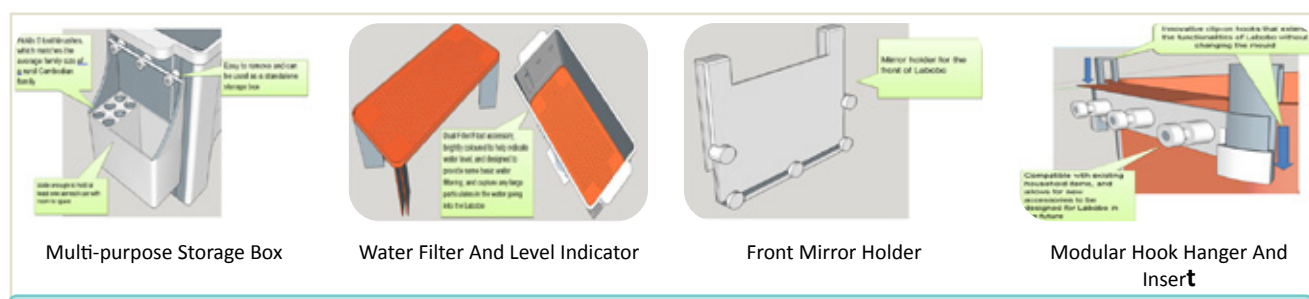


Figure 9. Modularised Functional Units

VARIOUS PARTS OF LABOBO – MODULARISED FUNCTIONAL UNITS

All modularised functional parts can be purchased separately to maintain the low price of the original LaBobo. The estimated total cost of the LaBobo unit including all the designed components was assessed at 25% below the \$20.00 USD threshold imposed as part of the challenge.

CASE STUDY SUMMARY

The transformation of an existing handwashing unit into a low cost, multi-purpose hygiene station with functions extend beyond that of handwashing. It will be integrated into Cambodian lives to include washing their faces and brushing their teeth. It will be a hygiene unit that will be a staple to family homes, schools and local health care centres.

The use of an iterative and incremental agile development method based on Scrum, provided Team LaBobo an excellent opportunity to deliver a product that is flexible, and the Human Centred Design approach guided the design thinking with an eye on cost control and sustainability. This allowed Team LaBobo to work as one unit to develop a product design that challenged the assumptions of the traditional, sequential approach to product design development.

Collaboration with key stakeholders including the Cambodian Buddhist Society, Khmer Community of NSW, leading water industry experts, and Sydney Water experts were crucial in the designs of a minimum viable product, financial enablers and supporting strategies such as Funnovation fundraising initiatives.

The key principles of Agile and Design Thinking have been applied by exploring the design in its social nature, preserving knowledge, and collaborative validation with stakeholders capturing a true Cambodian experience.

RESULTS

Team LaBobo's applied methods produced dramatic results where an existing handwashing unit has been

innovatively transformed into a full functioning hygiene unit that our Cambodian stakeholders christened as Aneamy (meaning Hygiene in Khmer). Aneamy is visually appealing, affordable, and durable, plus it caters for Cambodians' lifestyle and it comes in modularised functional units.

Team LaBobo's innovative process accelerated the realisation of key achievements including:

1. Development of enhanced design of the LaBobo with prototype model device actively and iteratively validated by key stakeholders particularly the Khmer Community of NSW, Cambodian Buddhist Society, WaterAid and Sydney Water.
2. Development of new marketing strategies that matched with the Cambodian's cultural, social and financial practices. A ground-breaking approach to increase awareness and appreciation of the water challenges in Cambodia, heavily validated by the stakeholder groups. The potential cost of producing the full functioning hygiene unit Aneamy is around 30-40% less than the original cost as defined in the challenge brief.
3. Development of innovative set of financial options that empowered the average Cambodian households to own a hygiene unit despite purchasing constraints. Team LaBobo developed many financial enablers for low income families, and together with cost consideration, were the key determining factors in product design and development. The financial enablers and cost controls collectively bonded in delivering a sustainable solution.
4. Development of Funnovation, an innovative approach to raise funds to support the charitable works of WaterAid. The fundraising strategy was more than just raising money. The fundraising programs represented the true meaning of giving, raised awareness of the good deeds of WaterAid and of water issues across the world, particularly in Cambodia. The application of innovative ways to generate funds produced brilliant results as Team LaBobo managed to successfully raise over 300% more than the original commitment and importantly, everyone had lots of fun!

5. Demonstration of Sydney Water's Signature Behaviours (Sydney Water, 2015) in all aspects of planning, designing, problem-solving, raising funds and collaborating with stakeholders as Team LaBobo actively demonstrated the Sydney Water values including Customer at the Heart of Everything We Do.
7. Team LaBobo's learning and experience created an enriched mindset applicable across the workplace fostering greater creativity, innovation and achievement in line with Sydney Water's Core Values (Sydney Water, 2015).

In October 2016, WaterAid as the organiser of the Water Innovators Challenge announced Sydney Water Team Labobo as winners (joint) of Water Innovators Program 2016 (WaterAid, 2016). The winners were selected from over 30 teams from various countries who took part in the challenge to find water, sanitation and hygiene solutions for real-life problems in Cambodia.

RESEARCH IMPLICATIONS

The central objective of this study is to investigate team-level constructs as key determinants of innovation. This study proposed positive relationships between team-level elements to innovation such as team structure, team process and team heterogeneity. Team imperatives are vital in focusing at all stages of the processes including how to work differently in practice and the governance including how decisions are made, the authority of individual team members and which functions to involve. The design of effective processes and governance must include all aspects of engagement including internal and external groups. Clarity on team roles and responsibilities must form part of the innovation effort.

A holistic approach across team structure, process and governance can be broken down into manageable design opportunities to manage complexity and foster creativity. Applied in an iterative process, the value is optimise in achieving a compelling business contribution. Knowledge management is rigorously incorporated in the broader innovation lifecycle from idea generation to product design and development. It is critical to capture and disseminate insights and key leanings that beneficially contribute to the growth of individuals, teams and workplace maturity.

Team heterogeneity in values, educational background, and field of expertise highlights the positive effect on team and workplace dynamics. While the heterogeneity of age has no significant influence on innovation, the absorption of various team members' skills, talents and capabilities, and the inclusion of the organisational workplace, collectively made valuable impact to promote creative thinking, design collaboration and responsive competitiveness.

Team-level antecedents of innovation highlight individuals with strong positive perceptions of the organisational knowledge base including opportunities to seek further knowledge, have higher propensity to advocate innovative discussions and flourish creativity. By the same token, individuals who have general preference on exploring new opportunities but building on existing structures and processes for delivering success are positively influenced to link innovation growth to corporate values and strategies. Hence, fostering of team-level antecedents provides significant factors that positively relate to innovation, which strengthens organisational knowledge, flourishes creativity and drives strategic growth.

The value of Design Thinking in situational discussions particularly in product design and experience is crucial in the early stages with Agile as a complementary approach with focus on the benefits of iteration process and accelerated mindset. A valuable organisational instrument on building adaptive innovation capacity that accelerates team-level antecedents of innovation.

CONCLUSION

The result of this qualitative study is grounded on the dynamics of Team LaBobo. In general, results support the main hypotheses. The results reveal that team structure and processes are of support for innovation and that team collaboration display the strongest relationship with innovation. Team heterogeneity is of support for team processes and that team processes are strongly related to innovation measured at the team than the individual level. The results demonstrate the development of team structures and processes including organisation platform, strategic intent, and culture are crucial mechanisms for translating team heterogeneity into innovation.

Agile and Design Thinking frameworks as applied have showed strong relationships with creativity and innovation, inspiring team collaboration and igniting creative discussions. Agile approach helped Team LaBobo to respond to the challenge through iterative work practices and insightful experiences, driving innovative intentions to be accelerated in product design and development as well as delivering successful fundraising programs, and more importantly, fostering workplace collaboration.

The team processes, structures and development methods as applied by Team LaBobo positively delivered exceptional results as Team LaBobo produced a high quality design that transformed an existing handwashing unit into a multi-purpose hygiene unit, an innovative fundraising program that exceeded funding expectations, and defining learning experience for individual members of Team LaBobo, creating a positive difference to the workplace, communities and WaterAid beneficiaries. A rippling effect that changes the lives of others.

THE PRIMARY AUTHORS



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Raymond is employed by Sydney Water as Digital Business Partner and is part of Digital Services team. He is passionate about all things digital and provides thought leadership in future digital thinking and planning. Raymond joined Sydney Water in 2014 and as a trusted adviser, he actively partners with the business to value the benefits of innovation, disruptive technologies and emerging solutions as a vital enabler of Sydney Water Lifestream Strategy.

Raymond is the team captain of Team LaBobo, winners of WaterAid's 2016 Water Innovators Challenge. Raymond has Bachelor of Science in Computer Sciences, Master of Business Administration and studied his doctorate degree.



Elline Camilet

Elline is a Project Coordinator for Sydney Water's Customer Direction and Experience team. She joined Sydney Water in 2015 as part of the Graduate Program and has since built a diverse range of experience coordinating projects across Treatment, Networks, Transformation and Delivery Management.

She is passionate about a collaborative approach to delivering high quality outcomes that satisfy stakeholder requirements and using her Engineering background with her newfound love for Human Centred Design to develop solutions that will make lasting impacts in developing nations.

Before joining Sydney Water in 2015, Elline has held roles as a junior process engineer and coordinated engineering projects for Tooheys Brewery and Caltex Kurnell Refinery as a Co-Op scholar. She is an active member of the Australian Water Association's Young Water Professionals and Engineers Australia's Women in Engineering committee.

Elline has a Bachelor of Engineering (Chemical) (Hons 1) from the University of New South Wales and is currently completing a Masters in Project Management from the University of Technology Sydney.



Steven Lin

Steven is the Business Reporting Manager in Customer Delivery Civil Delivery team in Sydney Water. Previously worked as an Operations Officer in Wastewater

Treatment and Networks with strong passion on delivering exceptional business results through effective use of people, process and technology.

Steven has extensive knowledge of planning and process improvement in Civil Delivery operations. Steven honed his skills after a successful graduate program in 2009, along with his passion for business change and innovation.

Steven completed his Bachelor of Engineering (Chemical) and Graduate Diploma in Commerce at the University of Sydney, and currently studying MBA at UNSW (AGSM).

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