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CASE STUDY

2019 Sir Ken Robinson Innovation and Creativity Award

WINNER: Royal Australian Navy (Innovation)

Deployable 3D innovation workshops

Origins and principles

In September 2015 the Navy set out to harness the innovative creativity within its workforce. Top down 'permission to innovate' on its own was not enough; being a large government organisation steeped in hierarchical organisational design, where the risk of failure has life threatening consequences, the organisation was naturally hesitant to innovate or take risks. The challenge was to create an innovation framework that would lead to widespread innovative behaviour as the new norm.

One of the newest tools at the time was 3D printing, also known as Additive Manufacturing (AM). Once the Centre for Innovation was established and provided development training for initial unit innovation co-ordinators, 3D printers were installed for remote units, especially ships. This had never been done before and the security and software implications required buy in from a diverse stakeholder set, as well as financial support.

Specialist training in this medium did not exist in Navy training schools. The 3D printing capability would have to address three key outcomes:

a. Promote and embody the Strategic intent;
b. Prepare for future capability; and
c. Develop an innovation mindset and a culture for local ownership within Navy.

The Navy is a technical environment and the people within it have to be able to multi-task. Ship deployment duration and group operations are increasing and other forces are placing a lot of emphasis on rapid development of ideas which could give them a tactical advantage. Navy is also seeking initiatives to retain and maintain skills of its people as well as keep professional interest levels high.

Each of the 3D printers was to be a complete step change in Navy practice and there was some scepticism and distrust. Some early products created were ambitious. Safety could not be compromised and they needed to work in the low risk space. Focus on utility and creating local conversations or examinations of practices for improvement were the target areas. Aiming too high with expectations would have set the program up to fail

Implementation

By purchasing 3D printers for use on ships, each unit could develop their own innovation programme. With guidelines provided and embedded by local Commanders, the printers became the catalyst and focal point for creating the physical momentum for innovation.

Introducing the concept had to be championed, developed, costed and then presented as a package to the Navy Executive for approval. This meant potential success required scrutiny and questioning for efficacy and was not guaranteed. The issue of measuring ROI is not easy when savings are not necessarily bankable savings, but potentially cost avoidance, or increased capability and sea days, which is not always quantifiable.

In order to launch the program with fit for purpose 3D printers, there was a degree of user testing, approval and advice from a number of areas including academia, industry and Defence Science Technology Group. By communicating with potential first hosts, we could deliver a deployed innovation

solution that was easy to use, relatively easy to install and the utility to create useful and useable items of a reasonable size.

Ongoing support for sustainability was a risk factor in achieving funding approval. This has had to be factored into the budget going forward. Positive forward estimates for new kits were based on early feedback. Maintaining regular contact and passing credit where due, with regular stories in the 'Navy News' maintained a vitality in the project.

As DNCI developed and implemented the Navy Innovation Framework, a supporting strategy and implementation plans were developed. The best path forward was determined as utilising sea going ships as much as possible. This recognised the ships as the 'front line' of innovation. If there were any gains or outcomes then it was important people at sea felt this was very much about improving life at sea and the war fighting capability of ships. DNCI personnel were focussed on helping innovators across Navy make improvements or mentoring them to implement the ideas they had at the grass roots level. However, as DNCI could not be in each location in person, it was vital there was some method to create conversations, promote innovation, upskill the workforce and develop infrastructure to manage all ideas. This is where the 3D workshop packages made the difference.

Having championed this unique case at the highest levels, gaining approval and funding took 6 to 8 months due to technical/security review and approval process. The first four units were purchased and were introduced through local innovation events. 3D printing capability had been obtained for the Centre for Innovation and it was soon realised that this drew people in due to its cutting edge technology. With a 3D design and print capability, people could make what previously would have been complicated quite simple and with low risk. The sense that change was occurring has been empowering. The strategy of innovation was not based purely on the 3D printers, but these gave people contemporary technology to implement 'change' rapidly and cost effectively in the workplace. Implementation of innovation across Navy has in many cases seen the youngest members in the role of Unit Innovation Champion due to their confidence in adoption of new technology and in questioning the status quo.

Interest was high but the depth of awareness was low. This required explanatory frameworks with key enabling documentation that could be generic, amended locally to suit the unit make up, and be owned by the ship. However, these locally produced programmes always have reach back to DNCI for advice, guidance and sponsorship. This consultative and collaborative approach satisfied local commanders who could then have common packages that made it clear to their people what Navy was trying to achieve.

Using the template from the Navy Innovation Framework it was clear that the application of 3D printing could be an enabler of change. One key aspect was having a tool that made it a 'safe space to fail'. No harm could be done, people could try and try again on an idea, and, in doing so, modify their initial thought. The 3D printers have given a physical representation to the notion of fixing problems.

Once the availability of 3D printers had been announced to the ships, they started to request deployable innovation workshops. With these workshops DNCI also provided installation, training, introductory paperwork and innovation culture development briefs they could adopt.

Setting the tone, leadership and support at this stage was an important aspect to building confidence. It was at this point DNCI also focussed on ships who were deploying the longest. This would allow any programme to have time to establish itself properly. Rather than have the units installed in isolation it was also clear that someone on each ship had to be accountable. They required the energy and intuition to be key motivators for change. Having already established some early adopters' DNCI ensured that there were at least two people nominated per unit. This would lead to further embedding of the innovation mindset. The process was as much about social change as it was for materials capability.

One of the first units to 'adopt' a deployed innovation workshop went immediately on a 6 month deployment and was able to help rectify a defect that would normally have required a great deal of time and money to resolve. This was immediately publicised across Navy and led to further enquiries. DNCI, at this point, managed to secure a regular page in the Navy newspaper and started to highlight outcomes. This gave credit to innovators and ships teams and increased awareness as part of the development strategy. Navy was not only interested in ideas, but would support, report and reward those who had taken the time and effort to innovate. This in turn has helped in the development of trust, credibility and more outcomes which provided greater momentum.

By the time the first units went to sea DNCI was able to ensure the innovation was fully funded, user consulted, collaborative in nature, supported with material and with guidance and was a catalyst for the original and current strategic intent.

Benefits and Outcomes

The original challenge was to create a culture shift for all Navy people to innovate as part of their daily activities allowing them to submit their innovations in order for Navy to tap into the skills of its people.

DNCI has striven through this innovation to take some risk and be prepared to lead from the front, implementing its own activities including the 3D printing program to re-shape the way Navy re-supplies its ships with spare parts. By challenging the status quo and introducing better ways of communicating, the 3D printer program has been the Trojan horse for a broader mindset change and pragmatic grass roots innovation success, with over 75 individual innovation ideas having been implemented.

The program is directly aligned with Navy's Strategy which outlines the need to innovate to create the Navy of the future. The program is also aligned with the Chief of Navy Innovation Statement and DNCI has achieved all of the success criteria set out in the statement. Success has been demonstrated through many use cases where Navy's mission has been supported through improved availability to put ships to sea and improved war fighting capability.

The 3D printing program has improved capability by providing a means to develop spare parts whilst at sea in order to remediate break downs, keeping the ship operational and on task in mission critical environments. DNCI has recently 3D printed Navy's first metals spare part which is now in place at sea.

DNCI has drafted a 3D printing policy for Navy, providing the necessary governance regime in order to ensure safety, seaworthiness and appropriate assurance processes so that 3D printed spare parts can be used in operational ships at sea.

Navy has transitioned from a behavioural state of 'why bother to innovate – it won't work' to one achieving real outcomes to improve processes and take advantage of emerging opportunities. The 3D printer workshops at sea demonstrate progressive thinking and an innovative mindset to our Navy people at sea and this in turn helps develop their practice and mindset to innovate. DNCI has created an on line store to manage design files. The digital designs are stored in a secure location while being accessible by Navy personnel for replication.

Regular workshops are conducted in the Centre for Innovation to upskill the workforce. Practice and results have since led to collaboration with Navy Fleet Support Unit to provide 3D printing training in preparation for AM. The positive development of this innovation project has improved DNCIs own practice, enabling DNCI to draft policy documents and engage with SME's to champion Navy adopting an AM capability. DNCI has been at the centre of a Defence proof of concept for AM and continues to upskill the workforce to meet the need.

In order to recognise the efforts of Navy people, DNCI has created an award system which involves citations for innovation and the passing of an innovation medallion to further embed meaning at the local level.

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Summary

In seeking to develop a culture of innovative thinking and practice, the Navy's delivery of deployable 3D workshop packages to ships has created remote crucibles for innovation. DNCI have challenged the status quo, innovated and continue to be an opportunity focussed organisation mindfully disrupting Navy.