

An interdisciplinary Makerspace for research-led education at ANU

Our vision for an ANU makerspace

Interdisciplinary environments are the cornerstone of human endeavour, and can broaden the horizons of our students. Diversity is synonymous with creativity, and our belief is that ANU needs a truly interdisciplinary, epicentre of education that feeds directly into research. A learning commons that forges creativity and stimulates the curious mind, in a mixing pot of disciplines and methodology.

A makerspace...

- Where undergraduates, graduates, teacher and researchers from all disciplines come together; that all but demands frequent interaction.
- With *real* research tools, the knowledge, and the resources for people to experiment, investigate, work on projects, and solve problems.
- Where knowledge effortlessly flows between peers, teachers, staff and academics alike. A truly research-led teaching environment, providing students the confidence to be true 'self-learners'.

Makerspaces are new in academia, with few examples of a truly institution wide implementation. One highly successful example is the Institute of Making at University College London (UCL). This excerpt from their annual report captures the essence of what is possible:

"A typical snapshot of activity at the Institute is as follows: a Computer Science Professor uses the laser cutter to repair a robot he uses for teaching; an English undergraduate uses the Materials Library for a coursework project on 'stickiness'; an Architecture undergraduate spends all week building a wind turbine, learning the electronics she needs from a fellow student who is making a watch; a [Fine Art] student learns how to 3D scan objects; a Physics PhD student uses one of the 3D printers to make a piece of equipment for his research; a one day research workshop on 'Repair' gathers together researchers from across UCL."

Indeed, *doing* is a different way of *thinking*. ANU was conceived through a federal act of parliament to lead the nation in creating a research sector, and was highly successful in doing so. It also now has world class under- and postgraduate education. There is a global changing paradigm of tertiary education. MOOCs, flipped classrooms, inquiry-based learning, workshops, and learning *by doing* are rapidly replacing the traditional lecture and tutorial. ANU is the institution that *should* lead the nation again in this paradigm, and a makerspace is the ideal example of research-club and environment that fuses these modern teaching philosophies.

Our goal for 2015/2016

Dr. John Debs has been awarded a College Educational Fellowship in 2015 investigate the feasibility of such a space. A steering group with representation across campus was formed as part of the fellowship to help guide it's design and implementation. As part of the Physics Education Centre's refurbishment of teaching and learning, we plan to convert our decommissioned electronics workshop into a trial space, which will sit adjacent to our studio teaching spaces and Physics drop-in centre. We are optimistic that this space will begin preliminary operation in semester 1 of 2016, perhaps with a combination of 3D printing, soldering stations, basic workshop tools, and programable devices such as arduinos, as well as a dedicated teaching presence in the drop in centre.

Our long-term vision: 2017 and onwards

We believe that an ANU learning commons, centred around *doing and making*, in a highly supported multi-disciplinary environment will set ANU apart, generating a teaching and learning culture unseen in an Australian institution. The on-flow effect that such an environment can have for both the university culture, and research could be profound. The Institute of Making at UCL is an excellent case study of what is possible. It's effect on the UCL community in just two short years is staggering, including collaborative research funding, influences on teaching and learning, outreach and community support, as well as influencing policy. With plans underway for a new Physics Building, a new Engineering building, PECs unique position to implement a trial space now, and the redevelopment plans for Union Court and the Chifley Library, ANU is in a prime position to lead this new paradigm of teaching, learning, and multi-disciplinary research. We believe such a central learning commons should be included in major planning discussions, and want the opportunity to support this belief with hard evidence from the trial space.