

Makerspaces, innovation and creative learning

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Makerspaces have started appearing around the world, some of them at public libraries and higher education institutions. In this editorial I'll discuss what makerspaces are, look at examples and give some tips on how to get started. I also look at how the maker culture can help innovation and creative learning, and how the maker mindset can help build practical hands-on experience in students while providing a bridge to the industry and the wider community.

So, what is a makerspace?

At [Artefacto](#), we like the [Library as Incubator Project](#) definition:

“Makerspaces are collaborative learning environments where people come together to share materials and learn new skills.”

It is worth adding that makerspaces often have some of the latest digital technologies such as 3D printers.

This phenomenon or movement started over ten years ago with the appearance of the first hackerspaces or hackerspaces, a particular kind of grassroots makerspace where everything is seen as ‘hackable’, and [FabLabs](#), another type which started in academia at the MIT media lab. It's worth noting that there are progressive pedagogies associated with making as a way of learning, one of those being ‘constructionism’ as proposed by Seymour Papert (Mathematician and MIT media lab founder) which simply put is “learning by making”.

Makerspaces come in different shapes and sizes and over the last decade a plethora of these spaces have sprung up all over the world, from the USA to India, from Shenzhen to Accra. What these spaces have in common is the mindset “We are makers, not just consumers”.

People come together in makerspaces to learn, make and share. Often experimenting, innovating, failing, creating personalised objects, developing new skills and knowledge with a strong open, community ethos. It is no coincidence that the maker movement has happened in parallel to the rise of open source software and hardware, the appearance of new tools such as Arduino and Raspberry Pi, publications such as [Make](#) magazine, internet platforms such as [Instructables](#), [Thingiverse](#) and [Kickstarter](#) and shops such as [Adafruit](#).

But makerspaces are more than just places filled with the latest tech to make things; they are communities, communities of practice, innovation and creativity.

It is not uncommon to find makerspaces with programmes for children and young people that allow access to technologies they wouldn't easily have access to otherwise, or clubs targeting people

underrepresented in engineering or software development, for instance coding for women (eg [Digital Skills for Women from the MadLab](#) in Manchester).

Where are they?

There are thousands of makerspaces around the world today. In the UK alone there are around a hundred such spaces. Many universities now have one, often found in the engineering department. A great example is [The Institute of Making at UCL](#), which is described as “a multidisciplinary research club for those interested in the made world: from makers of molecules to makers of buildings, synthetic skin to spacecraft, soup to diamonds, socks to cities”. Membership is available to all UCL staff and students.

Lecturers in engineering and computer science are finding out that many students lack practical hands-on experience. Makerspaces can provide that experience while they can also act as a bridge between academia and industry or the university and the local community.

One of the reasons makerspaces appeal to higher education institutions is that they can be whatever type the institution wants them to be, from engineering to arts and entertainment or a cross in between! Most unlike the traditional lecture room, makerspaces allow students to expand their skills while providing a safe, creative outlet to experiment, invent and fail.

Let's take another example from the [MakerLab Makerspace at Boise State University, USA](#), situated at the campus library:

“This is the best thing I believe that we have accomplished. We have developed a strong network of individuals from all disciplines who come together and work on projects. We have seen a lot of projects succeed because of our innovative practices. We don't have a hierarchical structure. Anyone can be a maker. We focus on diversity and inclusion. It's a priority to us to develop a safe space – emotionally and intellectually as well as physically.”

Makerspaces provide a platform where members can build amazing and interesting projects. For instance, if you have a 3D printer you can join the [e-NABLE](#) Community, a group of individuals from all over the world who are using 3D printers to create free 3D printed hands and arms for children in need of an upper limb assistive device in their local area. What better way to use technology, help the local community and provide practical experience to students?

What are the benefits of a makerspace?

In the same way as public libraries have been championing digital literacy by providing training, support and basic courses, makerspaces in higher education libraries could provide access to new technologies and innovation by allowing students to get together from across the campus to work on course projects but also on extra curricular projects or as a way of developing new skills or socialising. Where in a university campus could you find art, engineering and psychology students working together creating something unique, interesting and engaging? A higher education makerspace could just be that place. By setting up a makerspace in your library you get the interaction between the STEM and arts and design, creating the perfect STEAM environment.

A library makerspace can open up a whole world of collaboration and possibilities. Why not have a display in the library where students can showcase their work? Why can't the library in collaboration with students develop their own technology to make campus life better in using maker technology, design thinking and rapid prototyping? From open source information displays using Raspberry Pis to drones that can deliver items across campus, everything is possible!

Projects developed in a makerspace with commercial potential could form part of an incubator or accelerator programme and if successful could provide financial help to the makerspace to make it

self-sustaining.

It's worth noting that skills developed while engaging in makerspace activities such as problem solving, collaboration, creativity and communication are some of the skills employees are finding lacking in graduates. Importantly, making is also a way of socialising and increasing well-being through the creative process.

So, what's next?

We are seeing more makerspaces at HE institutions but issues such as engaging BAME groups and women should not be ignored (according to some surveys the maker movement is still overwhelming male, well-educated and affluent).

The emergence of relatively easy to use open source platforms and technologies commonly found in makerspaces is a great opportunity for individuals who may not have thought of themselves as being techy or able to engage with technology to do so in creative and positive ways.

Mark Maves and Vincent Wilczynski, in their article '[Higher education makerspaces: engaged students, hands-on skills, interdisciplinary connections](#)', say:

“The academic makerspace has emerged as a nascent and intriguing tool as higher education explores ways to enhance learning and innovation. It appears to hone critical thinking, develop teaming skills, advanced capabilities in the application of knowledge, and foster self-directed learning. Makerspaces forge new collaborations and interdisciplinary interaction across the campus, enrich the discussion about what ‘hybrid’ learning is, and contribute to the cultivation of a workforce that can work nimbly in an innovation economy.”

In the meantime, here are some top tips to get your makerspace started:

- let others know about your plans and get them to join your effort
- start small, keep it simple and build up from there
- be inclusive, target underrepresented groups from the beginning
- get student engagement, encourage student-led workshops, include students in the decision making
- encourage collaboration and provide a platform for people (students, lecturers, staff) from all departments and backgrounds to participate
- make sure there is something for everyone, provide a mix of courses and activities, from short to long, from more crafty to techy
- create a learning environment that's non-intimidating for new users as well as the more experienced

And remember, it's not about the tech or the actual physical space (even though both of these are important), it's about the mindset, the community.

These views are the author's own and do not necessarily reflect the views of UKSG.



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