

Thesis Project Portfolio

Design and Construction of a Kinetic Art Weather Display

(Technical Report)

The Inclusivity of MakerSpaces

(STS Research Paper)

An Undergraduate Thesis

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Sociotechnical Synthesis

MakerSpaces are a relatively new creative workspace aimed to broaden accessibility to advanced technology and encourage collaborative projects. As with the entirety of the Maker Movement, MakerSpaces have a goal to include more people into the STEM field that might not have been able to otherwise. There are various kinds of spaces in operation from those inside a company office, to spaces run by the local public library, to spaces opened by an individual with a passion to build. These spaces offer tremendous opportunity for others to explore their creativity and try something new with machinery and tools that historically were only available to professionals or universities.

The technical portion of the thesis acts as a demonstration of the capabilities within a MakerSpace. The team developed from scratch a “weather clock” display as a kinetic art piece to be hung in the engineering school. The clock uses an API to read the current weather conditions and the system of mechanical and electrical components move pieces inside the display to mimic the real time weather. Every aspect of the design was created in SolidWorks, a major tool in ensuring the design was feasible before the build. Important resources to the success of this project were the advanced machines available such as the laser cutter, 3D printer, and CNC mill. Additionally, a wealth of materials were available to aid in design and construction.

The STS portion of the thesis investigates the extent to which these MakerSpaces really are inclusive. While their goal is to provide more access to technology and workspaces, there are ways in which the movement has the potential to exclude people from participating. This research is divided into two categories: economic exclusion and social exclusion. These are then synthesized as much of the methods of exclusion are related. There are spaces that do operate in a way to foster inclusion, however there are often still ways in which exclusion occurs.

The capstone portion of the thesis offered a great example of the advantages to having access to a MakerSpace as the team had very minimal limitations in regards to what we could design and build. Giving others this opportunity has the potential for them to gain technological experience as well as inspire people to pursue a STEM profession or education. However, if these spaces are only available to the same groups who would've had access anyways, the potential for further innovation and technological advancement is heavily limited. It's important to understand why these exclusions may exist in order to find ways of preventing them so that everyone has the opportunity to use a space if they desire.

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