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MOBILE MAKERSPACES

Suffolk County Community College Libraries, Eastern Campus

A Guide to Creating a Mobile Makerspace

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Introduction

Makerspaces encourage learning through design and fabrication using a variety of different mediums. Some “makerspaces” include welding equipment, robotics components, and 3D printing facilities. As space on college campuses and libraries is at a premium, mobile “makerspaces” offer an immediate solution to allow collaborative, experiential work spaces given limited space resources. A 2009 survey of SUNY library directors found that 81% of survey participants had space converted or reassigned to non-library activities over the past 10 years. At the Suffolk County Community College Eastern Campus Library, a mobile makerspace concept was piloted in 2014/15 through funding from a SUNY Innovative Instruction Technology Grant.

The Mobile Makerspace Concept

The mobile makerspace pilot consisted of two carts of makerspace equipment. The equipment was placed throughout the library during the semester to determine the spaces best suited for the makerspace and to reach the largest number of students. Additional space was needed to provide seating and working surface area.

The Equipment

Mobile makerspace components

The mobile makerspace consists of three components: 3D printing technology, a video creation suite, and electronics & coding equipment.

Getting Started with 3D Printing

Equipment	Website/information
Makerbot 5 th Generation Printer	http://store.makerbot.com/replicator
Makerbot Digitizer Scanner	http://store.makerbot.com/digitizer
3D Doodler	http://the3doodler.com/
3D Doodler Accessories including: Doodlestand, nozzle set, pedal and filament	http://the3doodler.com/
Dell Optiplex 9020 Mini Tower	http://www.dell.com/
PLA Filament- assorted colors	http://store.makerbot.com/filament/pla
Extra smart extruder head	http://store.makerbot.com/smartextruder
Build plate tape for 5 th generation printer	http://store.makerbot.com/catalog/product/view/id/159/category/22/
Metal Label Peeler (to remove 3D printed objects from build plate)	http://www.thelibrarystore.com/product/ad16-00010/s
Copernicus 3D printer premium cart	http://www.copernicused.com/product/td5001/3d-printer-cart-premium-model

Video Creation Suite- (Penn State’s One Button Studio)

Equipment lists and information about the One Button Studio can be found at: http://onebutton.psu.edu/wp-content/uploads/sites/1698/2015/02/OBS_Equip_2_15.pdf.

The list below is a modified list of equipment purchased to create the One Button Studio at Suffolk County Community College Eastern Campus Library.

Equipment
Rode VideoMic Go Lightweight On Cam Mic
iMac
Blackmagic Design H.264 PRO Recorder
One Button Studio App (Penn State University)
Nikon D7100 SLR Camera
Impact Interview Green Screen Kit
Griffin Technology PowerMate Assignable USB Multimedia Controller
Mini HDMI Cable
Insteon Indigo 6 Software
Tripod
USB Dongle
Flash drive(s)
AV Cart

Coding & Electronics Equipment

Equipment	Website/information
Raspberry Pi 1 Model B Starter Pack - Includes a Raspberry Pi	https://www.adafruit.com/products/1014
Starter Pack for Arduino (Includes Arduino Uno R3)	https://www.adafruit.com/products/68
Adafruit 1.8" Color TFT Shield w/microSD and Joystick	https://www.adafruit.com/products/802
MaKey MaKey by Jay Silver and Eric Rosenbaum	https://www.adafruit.com/products/1068
littleBits Base Kit	https://www.adafruit.com/products/1659
LittleBits Arduino Coding Kit	https://www.adafruit.com/products/1889

Designing the Space

The equipment for the mobile makerspace required the use of two carts. The equipment was in the open library space for students to view and work with.

What configurations worked well?

- Located in high traffic spaces of the library.
- Locating equipment near a staffed service area
 - Encouraged questions and discussion
 - Allowed for quick troubleshooting
- Away from door drafts and high sun glare areas

Challenges in designing spaces to house the mobile makerspace?

- Seating and table space is needed to allow students to work on projects
- Some of the equipment needed to be recalibrated after moving the makerspace.
- Equipment noise posed a problem for some students near quieter study areas.
- 3D printing technology required frequent staff attention so makerspace needed to be located near a staffed area.

Online Resources

3D printing resources

- Free 3D Drawing Programs
 1. [Tinkercad](#)
 2. [SketchUp Make](#)
 3. [3D slash](#)
- Free 3D Objects to Print
 1. [Thingiverse](#)
 2. [NASA- 3D printable models](#)
 3. [Smithsonian X 3D browser](#)
 4. [Pinshape](#)
 5. [YouMagine](#)

Video Creation

- [One Button Studio –Penn State](#)
- Free screen capture software
 1. [Screencast-O-Matic](#)

Project Ideas for the Classroom

1. [Make it @ your library](#)
2. [Makerbot in the Classroom- An introduction to 3D printing and design](#)
3. [Khan Academy- Discoveries and Projects](#)
4. [Make magazine-projects](#)

Raspberry Pi resources

- Operating System downloads
 - [Noobs](#)
 - [Raspbian](#)
- Tutorials and projects
 - [Tutorials](#)
 - [Project ideas](#)

Arduino resources

- Software downloads
 - [Arduino 1.6.5](#)
- Manuals
 - [Getting Started](#)
- Project ideas, instructions, etc.
 - [Playground](#)



Suggested Readings

Carlson, Scott. (2015). The 'Maker Movement' Goes to College. *Chronicle of Higher Education*, 61(32), A26-A28.

Farkas, Meredith. (2015). Making for STEM Success. *American Libraries*, 46(5), 27-27.

Harris, J., & Cooper, C. (2015). Make room for a makerspace: students, faculty, and staff members are learning new things, working with their peers, considering new ideas, exploring, tinkering, inventing, and making. *Computers in Libraries*, (2). 5.

Johnson, L., Adams Becker, S., Estrada, V., and Freeman, A. (2015). *NMC Horizon Report: 2015 Higher Education Edition*. Retrieved from Austin, Texas: <http://cdn.nmc.org/media/2015-nmc-horizon-report-HE-EN.pdf>

Kyungwon, Koh, & Abbas, June. (2015). Competencies for Information Professionals in Learning Labs and Makerspaces. *Journal of Education for Library & Information Science*, 56(2), 114-129. doi:10.12783/issn.2328-2967/56/2/3

Moorefield-Lang, Heather. (2015). Change in the Making: Makerspaces and the Ever-Changing Landscape of Libraries. *TechTrends: Linking Research & Practice to Improve Learning*, 59(3), 107-112. doi:10.1007/s11528-015-0860-z

Pryor, Steven. (2014). Implementing a 3D Printing Service in an Academic Library. *Journal of Library Administration*, 54(1), 1-10. doi:10.1080/01930826.2014.893110

Thompson, Greg. (2014). The Maker Movement Connects to the Classroom. *Education Digest*, 80(3), 34-37.