

**Xavier University Library Makerspace  
Women of Excellence Giving Circle Grant 2015 – 16  
Final Report, May 2016**

**Grant Applicants**

- Alison Morgan, Library Assistant Director of Public Services
- Ken Gibson, Library Director
- Judy Molnar, (former) Executive Director of Technology Support

**Abstract from Grant Proposal, Spring 2015**

The Xavier University Library, in collaboration with the Infrastructure and Technology Support department in the Information Technologies (IT) division, is seeking a grant from the Xavier Women of Excellence for a makerspace. Makerspaces are collaborative spaces, often with a focus on technology, in which students, faculty, and staff can work together to create, design, innovate, problem-solve, and build things.

Makerspaces provide tools, equipment, technology, software, and expertise in a shared, open environment. Participants are encouraged to think creatively and critically, and makerspaces foster a common culture of learning, building, and creating together.

In the summer of 2014, the library was awarded from the Southwest Ohio and Neighbor Libraries Consortium (SWON) a grant of \$2500 to purchase a 3D printer, a type of equipment that commonly is found in makerspaces. The printer allowed us to pilot this cutting edge technology at the Connection Center in the Conaton Learning Commons (CLC), with the intention of expanding the pilot into a true makerspace in the 2015-16 academic year. If awarded a grant from the Women of Excellence, we will purchase additional technology to create the makerspace, envisioned in the learning commons adjacent to the Connection Center.

**Creation of Space**

Alison, Ken, Judy, and Chief Information Office Annette Marksberry spent several months during the summer and early fall 2015 investigating the best space to house the makerspace. Although our initial thought was to build it next to the Connection Center on the third floor of the CLC, for several reasons, including cost, feasibility, and existing possibilities in the library, we settled on the space occupied at the time by the Connection Xpress on the first floor of the library.

(The Connection Xpress was a small service point overseen by the Resource Sharing department that provided assistance to library patrons for circulation, OhioLINK, inter-library loan, and document scanning. To make room for the makerspace, we relocated the entire department's operations, including one full-time staff member's office and several student employees, to the Connection Center in the CLC. Tangential to the makerspace activities, but a direct outcome of receiving the WOX grant, is that this move had unintended positive consequences. It became obvious that the relocated department could be merged with the circulation department to gain efficiencies for staff and student employees, and to provide enhanced, more seamless service to our patrons. We officially merged the two departments in January and changed the name of the combined unit to Access Services.)

Once the location for the makerspace had been established, the IT/Library team worked with Physical Plan, MSA Architects, and RJE Business Interiors to design and renovate the space. Construction was done over spring break in early March 2016 and included the demolition of the existing service desk, installation of glass walls to enclose the space, and new flooring, lights, and paint. The space opened to the Xavier community on March 14, followed a month later by a well-attended grand opening event on April 14.

The makerspace has eight 3D printers: the one purchased with the SWON grant in 2014, a second one purchased that year with library funds, and six donated to the makerspace by Xavier's Center for Innovation. In the academic year 2015-16, we used the WOX grant funds to purchase materials to supplement the 3D printing, including a 3D scanner, plastic filament, and related supplies and tools. WOX grant funds also were used to purchase other technologies that include robotics, circuitry, micro-computing, virtual reality, a vinyl cutter with supplies, sewing machine, and a collection of books with making/creating ideas, projects, and suggestions for integrating making into the curriculum.

### **Outcomes from Grant Proposal with Commentary**

- 1) Building and supporting a community of “makers” on campus, who come together to create objects, problem-solve, and collaborate in a creative and innovative environment.  
*Since the makerspace opened, students have shown significant interest in learning what the space is about and how they might learn and use the different technologies available. Students in the Human-Centered Making, Computer Science, and Information Systems disciplines, in particular, have gravitated to the space with ideas for projects and a desire to learn and use the technology.*
- 2) Library and IT collaboration with faculty teaching courses where the creation of physical objects on a 3D printer and the use of other similar technologies could enhance course objectives and expand the students' knowledge of what's possible in the world; we already have had significant interest in our 3D printer from computer science, physics, and marketing faculty.  
*Since the space opened in March, we have hosted eight classes in the space: six Education, one English, and one Physics. We already have two Education classes and a series of Occupational Therapy classes scheduled for fall 2016. We anticipate the number of classes for fall will increase significantly over the summer as faculty plan their courses. In addition, we have had conversations with faculty in Accounting, Art, Chemistry, and History about their students might use the space.*
- 3) Provide the student employees in the IT division with the skills to use 3D printers and other disruptive technologies, troubleshoot issues, and train other students and faculty on how to use them.  
*In March we held two orientations for the library student employees, and we had a student staff the space from 10am – 5pm each weekday during the spring once we opened. In May, we created a student employee position description and hired two students to work in the space over the summer. We will be hiring additional students in the fall. In part, the position description includes the following criteria: “Makerspace Student Assistants provide excellent customer service and assist patrons with specialized technology needs in the makerspace in McDonald Library. Students staff the makerspace, helping users with technologies and equipment such as 3D design, 3D printing, 3D scanning, electronics, robotics, laser etching, woodcutting, sewing, and more. Students are responsible for greeting patrons, answering*

*questions about the makerspace and the library, providing introductions to the technology and equipment, circulating materials that check out, and handling sales of materials to patrons. Students will work on projects to support the makerspace, including developing and teaching workshops, assisting with University classes that visit the space, and exploring new technologies.”*

- 4) Support the computer science and innovation curriculums as they offer new programs that include a human-centered making course focused on what it means to be a society of creators as well as a society of consumers.

*Dr. Gary Lewandowski, Computer Science faculty member and creator of the Human-Centered Making program, was the library’s collaborating partner on the SWON grant and contributed significantly to the inspiration and plans for the makerspace. He donated a laser etcher and CNC mill to the space, and we anticipate a significant partnership with him and his colleagues going forward as we help support the making and technology programs on campus.*

### **Impact on Women at Xavier**

From grant proposal: “Makerspaces are often associated with the “hacking” communities within the STEM (science, technology, engineering, and math) fields, fields that traditionally have more men than women in them. However, in recent years there has been a concerted effort within the STEM fields to encourage more women to participate. A makerspace at Xavier will help inspire our women students to learn how to use cutting edge and disruptive technologies, experiences that will help them gain design and critical thinking skills while here, and give them competencies that employers will look for when they are job-seeking. Since we’ve had our 3D printer at the Connection Center, several of our most avid users have been female; that trend should only continue as we encourage and support women in this creative community.”

Since we opened the makerspace, one of the most interested and talented users of the space has been a female sophomore named Jessie Carper. Jessie is a Computer Science major, enrolled in the Human-Centered Making courses, and both an IT help desk and makerspace student employee. She embodies the spirit of the making community on campus, designing and printing her own 3D objects, crafting projects out of wood and acrylic on the laser etcher, utilizing the robotics equipment to enhance her programming skills, and enthusiastically recruiting other students to use the space. In addition to Jessie, the majority of the students in the English and Education classes who have visited the space have been female, and many of them returned on their own to finish projects or explore other equipment, tools, and crafts. Female faculty and staff have also taken a significant interest in the space and we anticipate the use of the space by females across campus to continue to increase and play an important role in the vibrancy and diversity of the making culture at Xavier.

We have a number of events planned in the makerspace for summer 2016, one of which is participation in Xavier’s Summer ICE camp. Summer ICE, which stands for Innovation, Creativity, and Exploration, is another WOX grant-funded initiative that provides a week of activities on campus for middle-school girls interested in the STEM fields. Our digital initiative librarian, Christian Sheehy, who is actively involved in the creation, implementation, and success of the makerspace, is working with the women faculty members involved in Summer ICE to craft a day’s worth of activities for the young girls participating in the camp.

## **Events and Next Steps**

We are encouraged by the enthusiastic response we already have received for the makerspace within the Xavier University community. What we hadn't anticipated, but are equally thrilled about, is the interest in the space from groups outside of Xavier, many of which are looking to create a makerspace of their own and are looking to us for inspiration and advice. For example, in March we hosted staff and administrators from Summit Country Day School, who are in the process of creating a makerspace for their students to open in the fall.

One outreach event we particularly enjoyed this spring was a collaboration with the Campbell County Public Library (CCPL) in northern Kentucky. Alison and Christian visited CCPL's monthly Minecraft Club for tweens and teens (Minecraft is a video game that encourages players to build structures and communities within a shared world; it's been described as "virtual Legos"). We set up laptops with a program called PrintCraft, which allowed the club members to build Minecraft structures, such as castles and dragons, that could be converted into computer files and 3D printed. We brought the files back to Xavier, printed them on the 3D printers in the makerspace, and then took the printed objects back to the players at the next club meeting. Typically CCPL's Minecraft Club hosts about 30 tweens and teens, but on the night of our visit there were 54 players in attendance, many of whom came only to see PrintCraft and the concept of 3D printing in action. It was a very rewarding experience for all of us.

We have several events scheduled throughout the summer, including:

- Cincinnati Museum Center Making Camps
- Hamilton Fairfield Neighbors and Newcomers
- Kenton County Public Library (visit in preparation for creating their own makerspace)
- SWON Library Consortium Technology Interest Group
- Xavier Summer ICE

We are excited to embrace these activities, in addition to planning at least one program a month in the makerspace for our students, starting in the fall, and continuing to partner with faculty on ways in which to integrate the makerspace technology and equipment into the curriculum.

## **Conclusion**

The makerspace fills a vital need on campus as the innovative and creative culture of "making" spreads and becomes popular in communities of users who wish to build things themselves while designing and sharing with their peers. By using the technologies we are making available in the makerspace, by learning how to use them in an environment that encourages the sharing of information and ideas, and by creating in a space that allows risk-taking and rewards attempts as much as it does successful completion, our students are gaining invaluable experience in being part of a community that seeks to answer questions that it can solve itself. Our students are becoming stronger critical thinkers, focused on ways in which they can intentionally and tangibly improve the society in which they live. All of this would not be possible without the generosity of the Women of Excellence Giving Circle and the award to us of the close to \$10,000 grant in the spring of 2015. We are grateful and appreciative of this gift and will continue to put it to good use in the makerspace for years to come. Thank you.

**WOX Grant Final Report Budget - University Library Makerspace - May 2016**

<b>Purchases</b>	<b>Actual Cost</b>	<b>Budgeted Requests</b>	<b>Estimated Cost</b>
Makerbot 3D printer, 5th gen replicator*	\$0.00	Makerbot 3D printer, 5th gen replicator	\$2,899.00
Makerbot PLA and ABS Filament (8 spools)	\$502.44	Makerbot PLA Filament (20 spools \$48 ea.)	\$960.00
Matter and Form 3D scanner (1)	\$509.00	Makerbot Digitizer 3D scanner (2)	\$1,898.00
Full Spectrum Laser Hobby Laser Cutter**	\$0.00	Full Spectrum Laser Hobby Laser Cutter	\$3,499.00
Silhouette Cameo Electronic Cutting Tool and Supplies	\$322.87	Silhouette Cameo Electronic Cutting Tool	\$299.99
Silhouette Vinyl Rolls Matte (10)	\$104.15	Silhouette Vinyl Rolls Matte (20 \$9.99 ea.)	\$199.80
Silhouette Vinyl Rolls Glossy (10)	\$104.14	Silhouette Vinyl Rolls Glossy (20 \$9.99 ea.)	\$199.80
<b>Sub-Total</b>	<b>\$1,542.60</b>	<b>Estimated Total</b>	<b>\$9,955.59</b>
<b>Additional Purchases</b>			
<b>Technology</b>			
3D Doodler and Supplies	\$132.98		
Arduino Kit (1)	\$79.94		
Drones (4)	\$90.26		
Eggbots and Supplies (2)	\$463.31		
Google Cardboard (4)	\$119.07		
Lego Robot Kits (2)	\$1,066.09		
Light Box	\$98.95		
Little Bits Electronics Synthesizer Kit	\$159.00		
Makey Makey Kit	\$49.95		
Ozobots (5)	\$314.79		
Raspberry Pi Kits (5)	\$399.95		
Samsung Galaxy Tablet	\$227.99		
Singer Sewing Machine and Supplies	\$165.45		
Snap Circuits (5)	\$256.50		
Spheros and Supplies (4)	\$534.29		
Yeti Microphones (2)	\$218.00		
<b>Sub-Total</b>	<b>\$4,376.52</b>		
<b>Miscellaneous Tools and Supplies</b>	<b>\$1,553.89</b>		
<b>Books on Making and Makerspaces</b>	<b>\$385.76</b>		
<b>Actual Total</b>	<b>\$7,858.77</b>		
<b>Estimated Total</b>	<b>\$9,955.59</b>		
<b>Amount being returned to WOX</b>	<b>\$2,096.82</b>		

**Notes**

\* The Center for Innovation donated six 3D printers to us; no need to purchase an additional one

\*\*Dr. Gary Lewandowski donated a laser cutter to us; no need to purchase one

**Photos**

*Newly renovated space, March 2016*

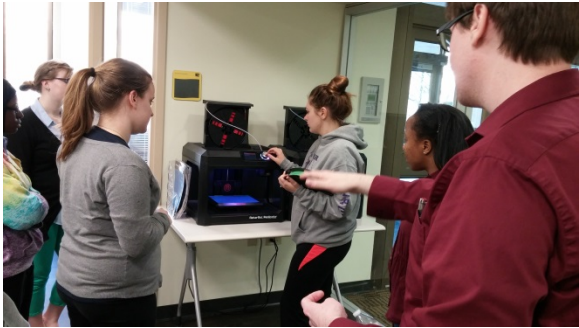




Grand Opening, April 14, 2016

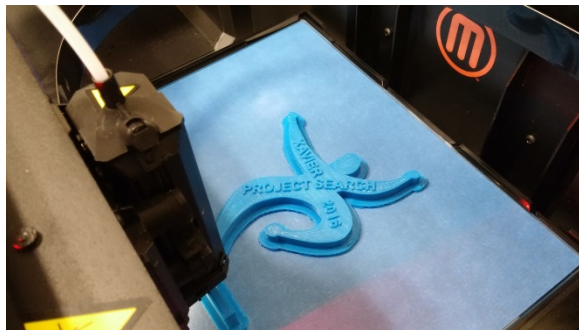
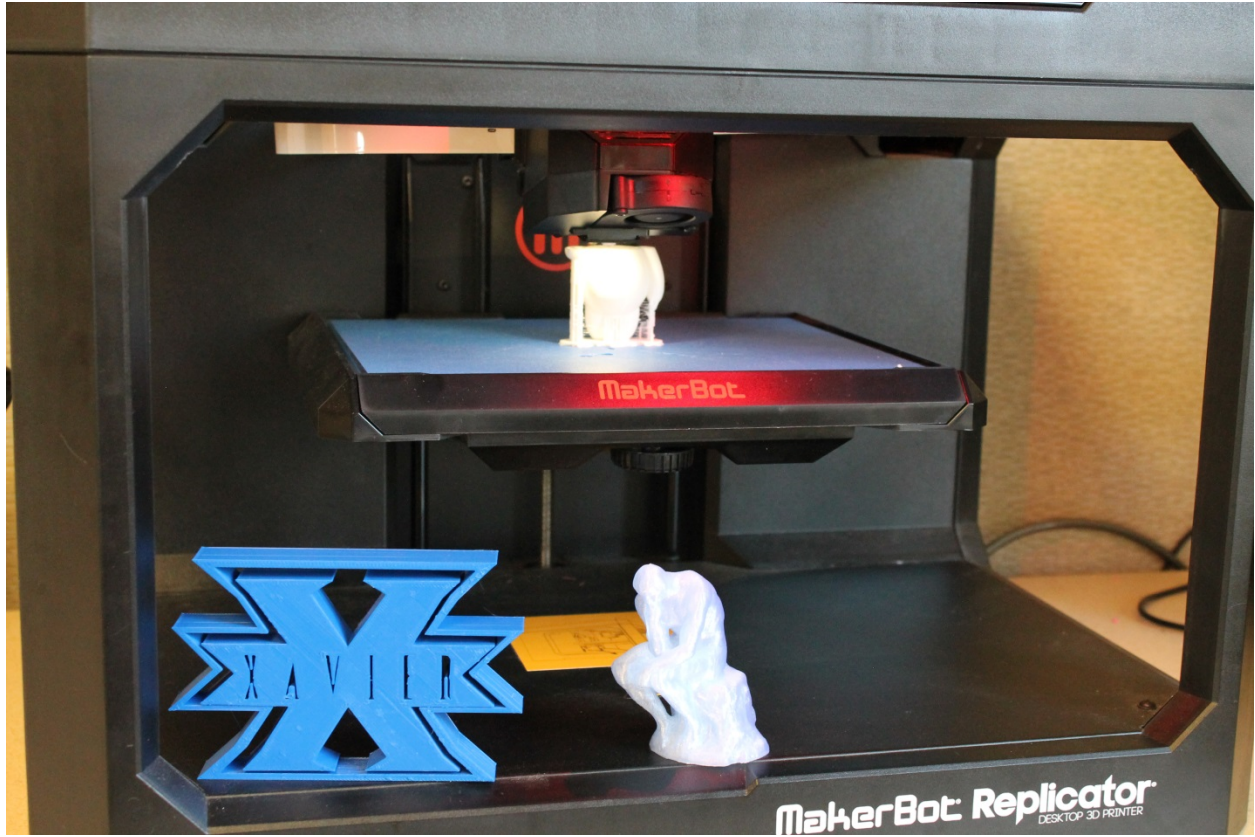


*English class, IT Club Tech Week, and Student Employee Orientation*





3D Printing



Women of Excellence Giving Circle Lunch Display, April 28, 2016

