Tool Library for Student Learning at Marston Science Library

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Sponsoring Organization: George A. Smathers Libraries

Purpose and Specific Objectives: To provide students access to tools for building, learning, observing, and repairing technology.

Students' devices, whether laptops, smartphones, wearables, or tablets, often experience a significant amount of wear-and-tear and require maintenance and repair. Students often ask the Marston Science Library (MSL) staff about the availability of tools that students may use for creating objects for class or research projects, or to repair personal technology devices. To meet this need, the MSL project team proposes compiling a tool library equipped with a diverse array of tools available for student use at the library, or to check out for later use at another location. MSL will dedicate a specific space to house the Tool Library for Student Learning. Project team members have acquired evidence supporting the hypothesis that access to tools will cultivate an active learning environment, enabling students to "repair rather than replace" technology, as well as fostering a new community of practice within the library. The community of practice will include students, faculty, and staff sharing expertise and providing instruction, while also learning new skills and improving abilities. The goal to "repair rather than replace" also supports the mission of the UF Office of Sustainability.

In the ongoing worldwide evolution of library services, tool libraries are an emerging trend both in the US and internationally (www.localtools.org/). However, the public library in Safety Harbor, Florida, is currently the only tool library in the state.
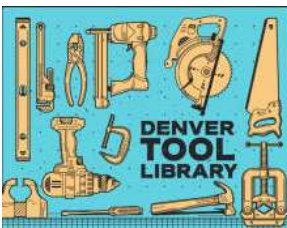
At UF, the Tool Library for Student Learning will be available to all UF students for use in the library or check-out at the MSL service desk. The MSL staff along with guest experts will coordinate "repair cafes" where students will have opportunities to collaborate and coalesce into a community of practice. Many websites, kits, and YouTube videos provide instruction for building and repairing your own technology. To support continuous learning of students at various levels of expertise, a LibGuide will be developed to showcase the available tools and include links to various "how to" instructional websites and videos. Information on the safe use of tools also will be included in the LibGuide.

Item	Photo	Description
Rolling tool cart		**Craftsman metal rolling tool cart** Each Craftsman metal rolling tool cart will be stocked with a large assortment of tools as shown below. The rolling tool carts will be used as storage for the tools.

Item	Photo	Description
Drill		**DeWalt 1/4-inch variable speed drill** For drilling in wood or steel. High performance and reversible. Assorted drill bits and screw driver heads will be included.
Tool set		**83 Piece tool set** Wide selection of tools for most any project with bag includes basic tool kit with socket sets, pliers, wrenches, screwdrivers, level, hammer, tape measure.
Soldering iron		**Craftsman soldering iron** Dual heat soldering iron, learn to solder kit, and solder fume extractor.
Computer repair kit		**55 Piece computer repair tools** Provides tools to perform regular maintenance and repairs on your computer. The set includes wire strippers, wire crimper, voltage tester, metric and standard ratchets, and assorted spare parts.
Dremel kit		**Dremel variable speed rotary tool** Complete Dremel tool kit with ergonomic body provides a 360-degree grip zone. Includes 45 tool attachments.
Phone & tablet repair kit		**Phone and tablet repair kit** Set includes screwdrivers, and tools to take apart and repair many different types of phones and tablets.
Digital calipers		**Digital calipers** For precise measurements on either inside areas and outside areas of objects using upper and lower jaws; features an LCD display and a zero set, as well as On/Off and inch/mm control buttons.
Laser level		**Auto-leveling laser** Projects horizontal and vertical lines; automatically levels; automatic reference for angled lines.
Oscilloscope		**Handheld pocket oscilloscope** 40Mega samples/sec in real time with bandwidth up to 10MHz. Full auto range option sensitivity down to 0.1mV. Signal markers for amplitude and time. USB battery charger and X10 measuring probe.

In addition to traditional tools, we propose to include technology tools that students often request, such as GPS units, binoculars, telescopes, and a video-equipped digital microscope. GPS units are used in several classes and also during campus-wide events such as Geocaching. This proposal includes a sufficient number of GPS units to equip a class project or use on GIS Day (www.flrec.ifas.ufl.edu/geomatics/2016).

Binoculars and telescopes are also often requested by students and can be used for star gazing as well as birding. The video-equipped digital microscope is a tool that biology and chemistry students can use to take photos or video of specimens. The annual Elegance of Science competition (www.flmnh.ufl.edu/elegance-science/) has many entries from students who capture surreal images of this seldom seen microworld.

Item	Photo	Description
GPS		**Garmin handheld GPS** Handheld satellite communicators with GPS navigation. This unit tracks and can share your location with friends, has downloadable maps, U.S. NOAA charts, and color aerial imagery. It's preloaded with DeLorme® topographic maps with onscreen GPS routing plus built-in digital compass, barometric altimeter and accelerometer.
Binoculars		**8x Binoculars** These 8x power binoculars have high quality prisms and lenses. They weigh 38 ounces and have a medium wide 5.8 degree field of view. These binoculars are ideal for sky gazing or bird watching. They are waterproof and will not fog up.
Sky watching binoculars		**Celestron Skymaster** These are Space.com's Editors' Choice for sky watching binoculars. Their 25X power combined with their large front lenses, which collect a lot of light, are perfect for resolving the majesty of the night sky – in stereo.
Microscope w/video camera		**High powered microscope with video camera** This scope provides a magnification range from 50 -2500X with brightfield, darkfield, and polarized lighting options. 5MP camera captures still images, records videos, and streams live videos on your PC and/or Apple computer; includes advanced editing-measuring software compatible w/ Windows XP/Vista/7/8, Mac OS X and Linux.

Crafting tools such as portable sewing machines and die cutting machines also are included in this proposal. The sewing machines will be checked out to art, theater, and any student interested in designing their own creations. The die cutting machines will be used by students for various creative projects.

Item	Photo	Description
Sewing machine		**Husqvarna Viking H|CLASS 100Q Sewing Machine** Ideal for creative projects this computerized sewing machine has 20 built-in stitches including quilting, utility and decorative stitches; plus, two one-step buttonholes. Unit weighs just 15 lbs (7kg), perfect for travel and classes.
Die cutting machines		**Silhouette Cameo 2 Machine and Curio Machine Bundle** Computer controlled tools for embossing, etching, sketching, and cutting in various media including craft mat, vinyl, and fabric. Many downloadable designs available. Includes software for windows XP/ Windows Vista/ or higher and Mac OS X 10.5.8 and higher. USB and Bluetooth enabled.
Jewelry making and watch repair kit		**Professional jewelry making and watch repair kit** For designing and making jewelry, and repairing watches and eye glasses. Tools includes jewelry crimpers and pliers, watch openers, watch hammer, and 3 sizes of precision screwdrivers. Includes set of 250 tiny screws in 12 sizes commonly used in eyeglasses and watch repair. Kit also includes 6x magnification illuminating eye loupe.

Impact/Benefit:

The George A. Smathers Libraries serve as a central space for all disciplines at the University of Florida. Smathers Libraries' patrons log over 3 million visits each year; with the Marston Science Library having **1.4 million visits** in 2015 and 668,525 visits during the fall 2016 semester alone. UF students are overwhelmingly the largest group of library users. Library statistics show that, in addition to science and engineering students, MSL is frequented by archaeology, anthropology, architecture, art, and natural history majors. This diverse base of students uses MSL to study, collaborate, and engage with library resources, often while using their own personal technology devices.

When students start an internship or professional job, especially in hands-on technical and engineering positions, many employers assume the recent student graduates have basic knowledge of tools, such as using a drill, socket set, or a soldering iron. For those students who have never been exposed to tools either at home or in class, the library can help enhance their basic skill sets by providing access to tools, resources, and workshops on how to use them.

> *A tool library would be hugely beneficial to myself as a student, both for personal and school related projects. I've already purchased my own soldering iron set along with wire strippers and electronics equipment in order to complete a personal lighting/wiring project due to the lack of availability anywhere else. I didn't have friends to borrow from, and the university's resources are all locked away in the relevant lab classrooms. I've been required to purchase digital calipers and an engineering tool set for class related projects in my Senior Design course as well. At my internship this summer it was expected that I knew how to use basic power tools and hand tools (torque wrenches, pliers, voltmeters, etc.). I can imagine going in without this knowledge would have been an embarrassment for me to my company. I confidently feel that the more resources one has to learn how to apply this sort of equipment knowledgeably the better they'll end up, especially when pursuing a career in the STEM field. - Austin Marcellus, Mechanical Engineering Major '17*

The MSL tool library will enable individual students, classes, faculty, staff, and student groups such as GRiP UF (www.GRiPUF.com), who design and manufacture 3D printed prosthetic devices for children, to diversify their services and take projects from the design phase all the way through to the build phase.

> *As president of GRiP UF, a student organization focused on the research, development, and implementation of 3D printed objects/devices to assist the differently abled, I can see great value in adding these tools to the library's reserve. GRiP members often meet in Marston Science Library to brainstorm ideas and CAD models, as well as to test and assess newly 3D printed objects. Dremels, calipers, and drills would greatly improve our ability to quickly assess the devices and edit them as necessary. - Jessica Bergau, Zoology Major '17*

The GPS units will benefit students participating in both class projects and recreational activities. It is important for classes that the students have the same model GPS with the same functions. The few GPS units the map library currently owns are old and their functions are out of date. Many employers assume students have used GPS units before; therefore, the library can help enhance students' basic skill sets by providing access to this technology.

> *The availability of GPS would benefit my work with the University of Florida GeoPlan Center allowing me to collect specialized data points for the University. As a planning student with a focus in GIS, I have used GPS receivers on tablets and on my phone to collect information for class projects in both the Geography and Planning Departments. Allowing students to check-out GPS receivers would greatly improve my class projects and studies. -* Kaysie Salvatore, Urban and Regional Planning Graduate Student

Sustainability

The Libraries commit to financially sustaining the technology tool library, with Library IT providing additional technological support. MSL staff will provide routine maintenance of the tools and equipment included in this proposal. Most tools will be stored in the rolling tool carts, while larger items will be stored behind the circulation desk. The tools can either be used in the library or checked out to patrons.

Timeline

Start date: 7/1/17; end date: 6/30/18.

Budget

The proposed quantity and current price of each of the tools provided in the table may be adjusted based on what the latest available technologies are at the time of the tech fee award. The proposed total budget is $28,554. This project does not require recurring resources.

In some cases, such as the Garmin GPS, additional quantities have been requested so that they may be used by a class and some units will be available for checkout at Library West.

Technology	Quantity	Price/item	Total
Rolling tool cart	2	$120	$240
Drill (variable speed with drill bits)	2	$147	$294
Tool set (wrenches, screwdrivers, sockets, pliers, hammer)	8	$80	$640
Soldering iron	2	$108	$216
Computer repair tool kit (electronics repair)	2	$85	$170
Dremel kit (w/tools for cutting, sanding, polishing, grinding)	2	$89	$178
Phone and tablet repair kit	2	$25	$50
Digital calipers	2	$50	$100
Laser level	2	$30	$60
Oscilloscope	2	$166	$332
Garmin GPS	29	$450	$13,050

Technology	Quantity	Price/item	Total
Binoculars	7	$210	$1470
Sky watching binoculars	2	$300	$600
Microscope with video camera	1	$8330	$8330
Sewing machine – portable for check-out	6	$399	$2394
Die cutting machine	1	$350	$350
Jewelry making and watch repair kit	2	$40	$80
TOTAL			**$28,554**