



*At the crossroads of communities and campuses, libraries of all types increasingly provide access to 3D printing. **In public libraries, 428 branches offer the service, up dramatically from 250 the year before.***

# Toward A More Printed Union

## Library 3D Printing Democratizes Creation

Charlie Wapner, December 2015

**ALA**AmericanLibraryAssociation

Imagine a world in which a small upstart company competes in the marketplace against large, highly capitalized manufacturers; in which cost is no longer a barrier to scientists and engineers bringing innovative ideas to fruition; and in which an enterprising school student with a philanthropic heart has the power to solve complex community problems. Such is the world that 3D printing promises.



A patron observes 3D printers at the W.E.B. Dubois Library at University of Massachusetts, Amherst. Photo: courtesy Carol Connare

Even a cursory scan of 3D printer applications in our communities reveals unmistakable indications of this “democracy of creation.” The University of Colorado at Colorado Springs sponsored a 3D design contest with a prominent business incubator that gives aspiring entrepreneurs the chance to have a product prototype displayed by a local design studio;<sup>1</sup> users of a makerspace in Chicago printed prototypes of dental hygiene instruments and satellite trackers;<sup>2</sup> and a high school junior in Johnson County, Kansas, printed a functioning prosthetic hand for a family friend.<sup>3</sup>

An important detail about these examples: They were made possible by a *library* 3D printer. A rapidly growing number of libraries of all kinds provide access to 3D printing. In public libraries alone, 428 branches offer the service, up dramatically from 250 the year before.<sup>4</sup> Although the cost of purchasing and maintaining 3D

printers is still significant, most libraries provide this service to anyone with a library card, at no cost beyond a modest charge for the materials used in the printing process. As a result, the library is the first stop for many people interested in learning about and participating in 3D printing.

Libraries help individuals of all ages harness this technology to build cutting-edge digital skills and unlock new opportunities for learning, entrepreneurship, scientific advancement and personal creative expression.

### **People build 3D printing skills in libraries**

Anyone seeking to take advantage of the full creative capacity of 3D printing must have at least a basic understanding of how to operate this technology. Libraries not only provide instruction in how to print a design, but also in how to use a software program to build a 3D model from scratch.

In Texas, the Frisco Library offers its patrons a class that includes instruction in how to use a popular design program called “Tinkercad” to build a 3D model; download an existing design file; and use the library’s 3D printing service.<sup>5</sup> In Washington, D.C., the Martin Luther King Jr. Memorial Library offers classes on 3D scanning and printing to those who have attended an introductory session on its new, state-of-the-art “Fab Lab” facility.<sup>6</sup> And in Pennsylvania, the South Butler Community Library requires its patrons to take an orientation class before using its 3D printers.<sup>7</sup> Libraries providing instruction in how to utilize emerging digital technology is nothing new. Library professionals help ensure everyone is able to thrive online—from the first internet-enabled desktops to ebook readers to videoconferencing and coding. Libraries are prepared to continue to lead the charge as 3D printing brings the digital revolution to what scholars call, “the economy of tangible things.”<sup>8</sup>

<sup>1</sup> “3D Printing Design Contest.” Salida Business Incubator. <http://www.salidabi.org/salida-3d-printer-contest/>.

<sup>2</sup> “Books out, 3D printers in for reinvented US libraries.” *The New Scientist*. <http://www.newscientist.com/article/mg22329784.000-books-out-3d-printers-in-for-reinvented-us-libraries.html>.

<sup>3</sup> “Teen uses 3D printer to make hand for boy.” KCTV 5 News. <http://www.kctv5.com/story/24717704/teen-uses-3-d-printer-to-make-hand-for-boy>.

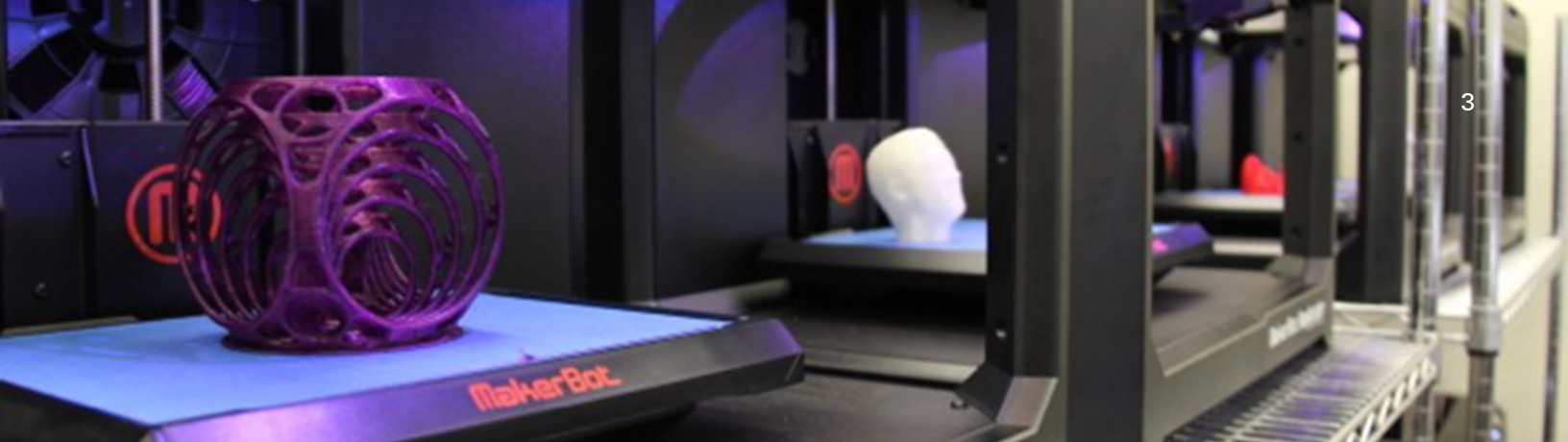
<sup>4</sup> Based on 2014 data from the 2014 Digital Inclusion Survey: Survey Findings and Results. Bertot, John Carlo, et al., University of Maryland, July 2014.

<sup>5</sup> “3D Printing Class. Frisco Public Library.” <http://www.friscolibrary.com/event/3d-printing-class-0>.

<sup>6</sup> “Calendar.” District of Columbia Public Library. <http://dclibrary.org/calendar?type%5B%5D=224&keys=>.

<sup>7</sup> South Butler Area Library. <http://southbutlerlibrary.org/pdf/3D%20Printer%20Policy.pdf>.

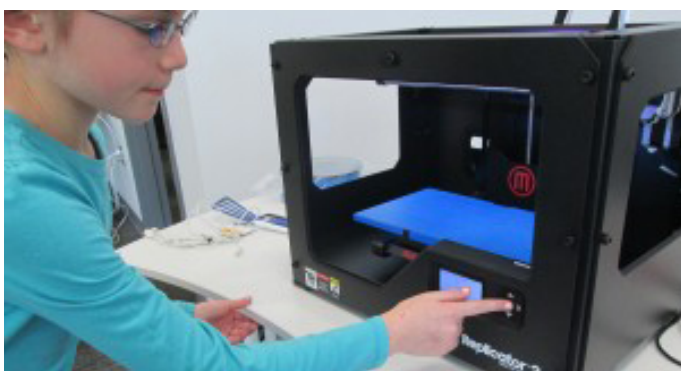
<sup>8</sup> Desai, Deven R. and Magliocca, Gerard N. “Patents, Meet Napster: 3D Printing and the Digitization of Things.” Vol. 102, Issue 6. *Georgetown Law Journal* (2014): 1691-1720.



3D printers and their creations at the W.E.B. Dubois Library. Photo: courtesy Carol Connare

### **Library 3D printing advances education and enterprise**

Libraries do not simply help individuals acquire the skills required for operating a 3D printer and then step back. They also leverage 3D printing technology to prepare students for participation in today's increasingly knowledge-based economy. From elementary school to graduate school, instructors and librarians are integrating 3D printing into the learning process to maximize



A student operates a 3D printer at the David C. Barrow Elementary School Library in Athens, Georgia. Photo: courtesy Andy Plemmons

competence in high-demand science, engineering and technical subjects. At the K-12 level, 3rd graders at the David C. Barrow Elementary School in Athens, Georgia, used their library's 3D printer to design and build their own jewelry as part of a geologic lesson on rocks and minerals.<sup>9</sup> At the university level, students at the University of Nevada-Reno use the printers at the

DeLaMare Science and engineering library to build robot parts, chemical models and more.<sup>10</sup>

Realizing the numerous ways in which library 3D printers are being applied in the learning process, several printer manufacturers have begun targeting libraries for educational partnerships. Among the most notable of these efforts is the MakerLab Club (MLC), an initiative of American manufacturer 3D Systems to create—"...a community of U.S. libraries and museums committed to advancing 3D digital literacy and providing their members and communities with access to 3D printers and programs."<sup>11</sup> Over 1,300 libraries and museums joined MLC, gaining access to webinars, training, and equipment discounts, and 100 of these institutions received free 3D printers.<sup>12</sup>

Library 3D printers also create new opportunities for local economic development. The earlier example of the prototyping competition at the University of Colorado is just the tip of the iceberg. Several libraries with 3D printers offer incubator services that help patrons bring their 3D printed prototypes to market. The W.E.B. Dubois Library at the University of Massachusetts at Amherst has gone so far as to open a facility entirely devoted to encouraging entrepreneurship through 3D printing. The facility, known as the MakerBot Innovation Center, includes 50 3D printers, and officials there plan to launch an entrepreneur-in-residence program, hold business plan competitions and offer coaching services for start-ups.<sup>13</sup>

<sup>9</sup> Diaz, Shelley. "School Librarians Score 3-D Printers Through MakerBot/DonorsChoose." *School Library Journal*, 22 Nov. 2013. <http://www.thedigitalshift.com/2013/11/k-12/school-librarians-score-3-d-printers-makerbotdonorschoose/>.

<sup>10</sup> Chin, Yvette M. "U. Nevada Library Offers 3D Printing Across the Board." *Library Journal*, 7 Aug. 2012. [http://lj.libraryjournal.com/2012/08/academic-libraries/u-nevada-library-offers-3d-printing-across-the-board/#\\_](http://lj.libraryjournal.com/2012/08/academic-libraries/u-nevada-library-offers-3d-printing-across-the-board/#_).

<sup>11</sup> "The MakerLab Club." 3D Systems, n.d. <http://www.3dsystems.com/education/partnersandresources/makerlab-club>.

<sup>12</sup> "3D Systems and YALSA help over 100 libraries and museums to bring 3D printing to their communities." American Library Association. 27 Feb. 2015. <http://www.ala.org/news/press-releases/2015/02/3d-systems-and-yalsa-help-over-100-libraries-and-museums-bring-3d-printing>.

<sup>13</sup> Enis, Matt. "UMass Amherst Library Opens 3-D Printing Innovation Center." *Library Journal*. 21 Mar. 2015. [http://lj.libraryjournal.com/2015/03/technology/umass-amherst-library-opens-3d-printing-innovation-center/#\\_](http://lj.libraryjournal.com/2015/03/technology/umass-amherst-library-opens-3d-printing-innovation-center/#_).



A student shows off a 3D printed creation at the David C. Barrow Elementary School Library. Photo: courtesy Andy Plemmons

### ***Policymakers: libraries have much to contribute to policymaking***

Government decision makers clearly understand the value of 3D printing technology. NASA recently launched a 3D printer into space to experiment with the creation of spare parts for the international space station, and the U.S. Department of Veterans Affairs recently administered a Prosthetic and Assistive Technology Challenge, through which makers engineered and printed items designed to help veterans with disabilities conquer daily challenges.

Thus, government agencies should look to libraries for collaboration and partnership as they continue to search for ways to advance entrepreneurship, education, science, engineering and more through 3D printing. There are approximately 120,000 libraries in the United States, of which over 16,000 are public library locations.<sup>14</sup> Virtually all public libraries have internet access. People of all ages and backgrounds—in urban, suburban and rural communities alike—use library internet access, along with the physical and digital content accessible from libraries and the expertise of librarians, to access key

government services, address healthcare needs, further their education, launch business ventures and more. In short, libraries are cornerstones of the communities they serve; together, they represent a robust and unrivaled public infrastructure—and this makes them ideal partners in government initiatives involving 3D printing. The library community can leverage its infrastructure and know-how to help government entities harness the power of 3D printing technology and accelerate economic, social, and scientific progress in every part of our country.

Additionally, the library community can and should play a leading role in setting the direction of the public policy that coalesces around 3D printing technology. Librarians know that policymakers seek to build a framework that will govern how 3D printers are used in the years to come. We already are working to lay this foundation. Across the country, librarians are beginning to craft acceptable use policies for 3D printers and sharing them with others in the field. This makes librarians well suited to serve as a resource for policymakers as they consider difficult 3D printing questions related to patents, copyright, other intellectual property regimes, free expression and more.

### ***So—when you think of 3D printing and innovation...Include libraries!***

Libraries are leading the charge toward a “democracy of creation.” As a result, the library community stands ready to participate in ongoing and future initiatives and programs involving 3D printing and related policy conversations.

<sup>14</sup> “ALA Library Fact Sheet 1: Number of Libraries in the United States.” American Library Association. n.d. <http://www.ala.org/tools/libfactsheets/alalibraryfactsheet01>.



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