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Technology Matters

Going Beyond "Learn to Code" in the Library: Partnerships and Resources for Delivering Successful Advanced Technical Training

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Abstract

As more libraries offer "learn to code" and digital skills training programs to patrons of all ages, there is a significant opportunity to offer more sophisticated services for advanced learners, even up to the level of professional workforce development. By partnering with local institutions or online programs, libraries can potentially offer in-house training to their community members who might not be otherwise well-suited for traditional in-person or online training programs. In addition, we have identified a wealth of resources that libraries can use to support self-directed learners and institutional online learners in the community. We also note the critical importance of providing career coaching and planning services to those learners interested in pursuing a technical career.

Keywords: job readiness, workforce development, training, coding, website development, application development, technology, STEM

Introduction

Libraries have been in the "learning" business for a long time, since well before the first public access computer was installed or the word "coding" entered popular parlance. But over the past two decades we've seen the Internet evolve into a fantastic venue for learning – from short "how-to" videos on YouTube to full degree programs from traditional universities. Libraries have responded in kind, offering a multitude of programs to deliver digital skills training in a wide variety of topics: basic computer use, basic office software skills, basic Internet skills, and now basic app coding or web development. In this article, we'll explore some of the more sophisti-

cated instances of libraries participating in technology training beyond the basic level, all the way up to entry-level workforce development programs.

Existing Examples in the Library Community

Virtually every library offers Internet access and 98% offer some type of formal or informal technology training.¹ We know that libraries have long been a destination for "professional learners," which a Pew report defines as people who "had participated in job-related learning activities that either upgraded their skills or prepared them for new jobs" in the previous year.² But many libraries are now going beyond "Intro to Web Browsing" and even beyond "Intro to



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HTML" and offering advanced technology training that can help prepare patrons for 21st-Century jobs.

Some examples of libraries that are already offering advanced digital skills and/or partnering with other training providers or educational institutions:

- The Providence (RI) Public Library offers the standard courses on "Computer Basics" and spreadsheet usage, but also offers some advanced topics, such as their "Data Navigators" course, in which students explore "how to transform data into actionable information," using tools such as Tableau. In addition, their "Rhode Coders Club" provides a ten-week introduction to web development.
- The Denver Public Library offers dozens of technology classes, including general coding classes as well as specific computer languages such as Javascript and python.
- "Code Louisville" is a federally-funded free-for-students twelve-week training course in full-stack web development, based around the Treehouse curriculum, in partnership with the Louisville (KY) Free Public Library.
- The New York Public Library's "Project_<code>" is an intensive ten-week class covering web development basics offered at multiple branches, which is just one of over eighty technology-related classes offered in the city, in partnership with Codecademy.
- The St. Joseph County (IN) Public Library collaborated with the City of South Bend and a local community organization to create a "CLICK" facility ("Center for Learning, Information, Connectivity, and Knowledge") in their community. This public computer lab and office space offers technology and digital literacy programming.

The demand for advanced technical training exists. Library marketing data firm Koios has developed a methodology to analyze Google searches within a particular city or region and has found that computer programming is one of the most in-demand "how-to" searches in many areas.³ Speaking of Google, they have recently announced a new initiative in partnership with the American Library Association and the Public Library Association to fund programs and deliver workshops in all fifty US states, including how job seekers "can grow their skills in order to find new jobs and advance their careers."⁴

Career Planning and Coaching Considerations

Before we examine specific skills, programs, or curricula, we should note the importance of a solid plan for offering pragmatic career planning and coaching to those students who are seeking a career in information technology or web/app development. For instance, some bootcamps and for-profit training providers have been known to make inflated claims about the potential salary and job availability for certain skill sets.⁵ Even popular culture is full of the myth of easy money in the technology sector or that "anyone can program" – while it's true that almost anyone can learn to write at least basic code, technical careers are certainly **not** well-suited to everyone.

Libraries have long been a welcoming center for job searchers, or those seeking to learn about new career opportunities. It's critical that learners who express an interest in pursuing a technical career are fully informed about the local and regional job market for potential skill sets and disciplines, as well as the opportunity to interact with professional technologists via Q&A sessions, mixers, internships, mentorships, or job-shadow experiences.

Most libraries won't have an in-house workforce development or employment specialist, of course, which is an excellent opportunity to



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partner with an existing agency or institution.

Some potential relationships include:

- State, county, or local workforce development agency office
- State, county, or local employment / unemployment services office
- State library or state library association's workforce development liaison
- Leadership of local or county government technology department
- Local high school guidance department
- Local community college or university job placement department
- Local community college or university technology department or program
- Leadership of local technology companies or corporate technology departments

We'll stress again that career coaching and planning services are critical to the success of any advanced training program, so carefully consider all of these sources for potential relationships. Students should be able to get realistic information about career options and opportunities as well as advice or even mentorship throughout their learning experience.

Evaluating and Selecting a Coding Curriculum

There are hundreds of courses, curricula, and training providers on the Internet, with wildly varying costs – so how do you know which one to pick? Start by asking the most important questions: what do your patrons want and need? Other relevant questions to consider:

- Have certain topics been requested?
- Have existing training students asked where they can learn more after completing the training that your library currently offers?

- Are you planning on having an in-person instructor, or instead relying on online learning solutions presented in your training room via video?
- What technology skills are in demand now and in the foreseeable future for your community or region?

There are many paid training providers that offer a group subscription suitable for libraries that wish to offer their courses to their students. In fact, your library or consortium might already be paying for tech training content providers such as Treehouse, Lynda, or Codecademy. Once subscribed, you can select which courses you'd like to offer to your patrons, or make the service generally available for self-directed learners. Students then access the training videos and course materials from your library's computers or via their library card. Many training providers also offer support for learners, such as chat rooms for answering questions about the material, which makes paid training an attractive option for libraries without an instructor. A deep dive into the specific features and advantages of each paid provider is outside the scope of this article, but we will list several of the more popular providers to begin your research:

- Codecademy (<https://www.codecademy.com>)
- Lynda.com (<https://www.lynda.com>)
- Treehouse (<https://teamtreehouse.com>)
- Udemy (<https://www.udemy.com>)

Of course, there are plenty of free curricula to choose from as well, both for self-directed solo learners and for classroom-based instruction. When evaluating free curricula for classroom instruction, you'll want to work closely with your instructor to make sure they approve of the content and methodology. Scheduling is also a critical concern. Going past the "my first website" level of web development or programming does



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require a significant time commitment for students. You'll need to make sure your training program is long enough to accommodate the entirety of the course content while still being realistic for attendees.

Some of the most popular free training providers include:

- freeCodeCamp (<https://www.freecodecamp.org/>) is a 501(c)3 nonprofit whose mission is to deliver coding training via online videos and lessons. It's a popular alternative to the paid tech training content providers mentioned above. Certifications are available in various topics, such as Responsive Web Design or Javascript Algorithms and Data Structures; each certification requires 300 hours of lessons and study to achieve.
- MDN Web Docs (<https://developer.mozilla.org/en-US/>), formerly known as the Mozilla Development Network from the Mozilla Foundation, provides comprehensive technical documentation about web and browser technology, including standards, and a complete learning pathway for HTML, CSS, and Javascript. The site is a go-to resource for professional developers around the world.
- Khan Academy is a 501(c)3 nonprofit that provides online training in dozens of academic subjects to people all over their world. Their "computer programming" section includes a full learning path from introductory HTML all the way to building Javascript video games.⁶
- edX partners with many universities to provide online learning versions of their classes and programs.⁷ Most edX programs are free, but you can choose to pay to have your work certified, earning a certificate of completion for the program. For example, the

"Introduction to Computer Science and Programming Using Python" course from MIT is approximately fifteen hours per week for nine weeks – and students can study for free, or pay \$75 for a certificate of completion.

Technical Concerns

Thankfully, people can get all of the software they need to learn to code without paying a dime, thanks to free and open source tools. Every computer you already have in your library has a text editor (think Notepad.exe) and a web browser, which are the only two critical components for developing a website. However, you may also want to consider the following:

- Code editing software (sometimes referred to an Integrated Development Environment or IDE) is special software designed to assist programmers with time-saving tools and integrated reference materials. The most popular code editors are cross-platform and free to download, including Atom (<https://atom.io>) open source from GitHub, Adobe Brackets (<http://brackets.io>), and Microsoft's Visual Studio Code (<https://code.visualstudio.com>).
- If your training model involves streaming video and self-directed learning, make sure that your Internet connection and network equipment can handle multiple simultaneous high-definition video streams.
- A whiteboard and projector are helpful for any classroom-based instruction.

Partnering With Schools and Institutions and Supporting Existing Online Learners

Your local school district or high school and local colleges or universities are natural partners for building learning programs in your library. In addition to certificate and degree programs in various technology disciplines, many schools



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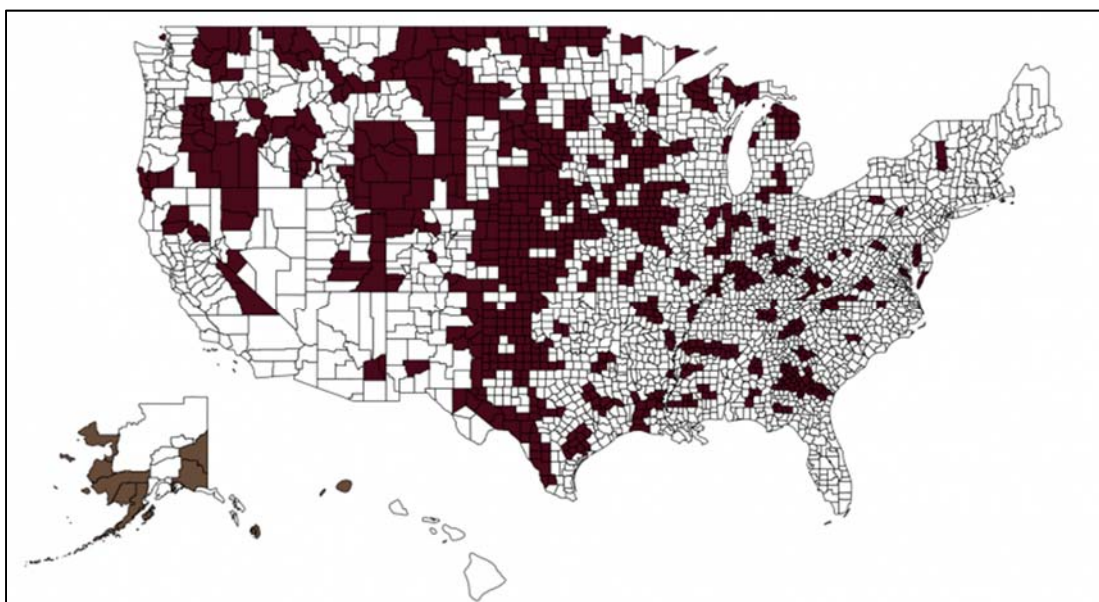
will have some sort of career counseling or job placement program that will be a valuable ally, as noted above. Due to the rapid growth of online learning programs at traditional colleges and universities, your library may have already developed a relationship with one or more institutions as a test proctor for online learning students taking exams on your public access computer.

If your learners are interested in pursuing professional certificates in a technology discipline, such as computer repair or networking, your local community college likely offers suitable programs. Because many learners will want to pursue a degree, either in-person or via online learning, you should consider establishing relationships with your local college or university's admissions office, as well as any community relations office if one exists. These relationships

are pathways for referring potential students to secondary education institutions.

In rural areas, libraries can be an indispensable node in the regional educational network, especially in "education deserts," which are regions where "there aren't any colleges at all, or if one community college is the only broad-access public institution nearby."⁸ And career prep doesn't have to be limited to adults – even middle schoolers benefit from career preparation programs in the library, since "libraries are well poised to provide after school College and Career Readiness (CCR) services that support youth in exploring career pathways in a fun, informal community setting."⁹

Figure 1. Commuting Zones Designated as Education Deserts, United States, from the American Council on Education (ACE). Based on 2013 data from the Bureau of Economic Analysis, the Bureau of Labor Statistics, and the Census Bureau. ACE merged that data with 2013-2014 data from the U.S. Department of Education's Integrated Postsecondary Education Data System (IPEDS). For more information, see ACE's *Education Deserts: The Continued Significance of "Place" in the Twenty-First Century* (2016), available at <https://www.acenet.edu/news-room/Documents/Education-Deserts-The-Continued-Significance-of-Place-in-the-Twenty-First-Century.pdf>.



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Libraries are and will continue to be a valuable resource for students at local institutions as well, of course. For example, the Columbus (OH) Metropolitan Library partnered with Columbus State Community College to add all library locations to the college network, allowing students at the community college to easily access coursework and on-campus-based applications from any library branch.¹⁰ In essence, this turns every public library in the city into an auxiliary computer lab for the college. This sort of partnership has obvious benefits for both institutions.

Work With a Bootcamp - or Start Your Own

Coding "bootcamps" are intensive, full-time technical training courses presented by experienced programmers lasting several weeks to several months, with a focus on a specific technology skill set or discipline. Many bootcamps have a proven track record of helping their attendees build sufficient coding skills to enter the workforce as software developers. However, the cost of most bootcamps – ranging up to tens of thousands of dollars – puts them out of reach of many interested potential programmers. In addition, some bootcamps have put profit ahead of pedagogy, inflating graduate salary data, or are outright scamming students.¹¹

Libraries have the essential components for creating a full-fledged bootcamp program or partnering with an existing bootcamp in the region: accessible facilities, networked computers, and a reputation for lifelong learning. Depending on funding sources, such as job readiness or workforce development funds, your library could create intensive digital skills and coding classes for unemployed adults or those who need new careers.

Even if a full bootcamp program isn't feasible for your library, librarians should at a minimum be aware of local and regional bootcamp pro-

grams and be prepared to offer advice to interested patrons on how to properly research those offerings.

David Yang, the co-founder of one of the first and largest bootcamp companies, Full Stack Academy, wrote a 2016 article titled "The Coding Bootcamp Hype Cycle" where he noted some of the pros and cons of the bootcamp approach of development training. His advice for students evaluating a program is also sound for libraries considering a partnership with a program:

"Due diligence is important, and I tell all students considering a coding school to reach out to alumni, visit the campus (in-person or virtually) and look for blogs/reviews by students. Great coding bootcamps will have plenty of these and be happy to provide them to you. I also recommend checking out students' projects to see if you are impressed by what they build."¹²

Coordinating Mentorships, Internships, and Job Shadows

If you're working with an accredited secondary educational institution on a formal partnership or joint programming, it would be wise to take advantage of their existing frameworks or departments that handle mentorship and internships, especially if college credit is involved. Most libraries won't have the expertise in-house to administer a formal internship program.

However, coordinating mentorships, job shadow opportunities, site visits, and similar opportunities could be an important resource that your library can offer both youth and adults considering potential technology careers. Consider contacting local companies – both tech-focused or companies with internal technology or programming departments.



Finding Technical Instructors for In-House Training

In a famous scene from "The Simpsons," daughter Lisa and mother Marge are discussing how to pay for Lisa's college tuition, when Marge suggests that she could teach piano lessons for money. Lisa points out that Marge doesn't currently play the piano. Marge retorts "I only have to stay one lesson ahead of the students."

Similarly, it's possible for a non-technically-inclined library professional to acquire the skills necessary to teach coding, simply by studying the lessons / curricula ahead of time. However, the situation is not ideal since the trainer won't have the skills to quickly and confidently answer related questions that may come up during training.

For a library without significant in-house technical expertise, there is a real "chicken and egg" bootstrapping problem when it comes to launching even a simple coding program. Virtually every librarian is qualified to share basic skills, like email or web browser basics, either one-on-one or in a simple class. But when it comes to website or application development, there are a **lot** fewer librarians who are confident coders.

Depending on your region, finding a technical instructor for in-house programs can be a challenge. Not every programmer has the skills necessary to successfully deliver in-person training – just like not every trainer has the skills necessary to teach computer programming. Consider finding existing coding teachers, such as high school or community college technology instructors. You may also consider contacting local computer user groups. No matter how you find your instructor, it's critical to find someone that meets the needs and expectations of your community members.¹³

Supporting Self-Directed Learners

If starting a library-hosted code training program seems too ambitious for you, be sure to support your self-directed learners. The Web is littered with stories of completely self-taught professional developers who never set foot in a classroom. This method requires an intensive amount of discipline, but you can encourage these learners in a few ways:

- Bookmark self-directed learning success stories, like this very detailed article by Sergei Garcia.¹⁴
- Advertise any paid training providers that your library makes available for patrons and make it easy for patrons to sign up and begin.
- Make sure at least one librarian is familiar with some free code training programs for interested learners.
- Consider beginning a "learning circle" where interested learners study a topic solo but meet together to share what they've learned and discuss the topic.

Summary

In the 2010s, libraries have continued to supplement their technology training offerings with more relevant technology topics. As more people seek out digital skills for their work or learning needs, libraries are equipped to become trusted providers of advanced technical training, such as website and application development. By partnering with existing job readiness, workforce development, and educational institutions, libraries with adequate resources can successfully implement these training programs. In addition, even the smallest libraries can encourage their patrons' learning through the use of distance learning options.



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