



CAREERS for AMERICA'S YOUTH in the DIGITAL AGE

<libraries / ready to code>

Computing jobs are the number one source of new employment. These jobs are among the highest paying, but yet there are 500,000 hard-to-fill openings. Such employment is on a trajectory to grow by 12.5% through 2024 as technology becomes ever more intertwined with work of all kinds. Absent decisive action, the shortage of qualified workers will only grow. What more can we do to prepare America's youth for these jobs of the future? Libraries are part of the answer. Coding— and computational thinking, the broader intellectual skills

behind coding—prepares young people for tech-related careers and much more. One skill learned through coding is persistence in problem solving through experimentation, for instance, which applies to fields such as engineering and business management. Developing opportunities for youth to code helps drive job growth and innovation across a range of economic sectors in the digital age.

The issue is urgent. Fewer than half of K–12 schools offer any kind of computer science (CS) education, and parents are demanding more opportunities for their children. The nation's 120,000 libraries represent a cost-effective ▶

“To broaden interest in coding-related careers and advance coding skills, decision makers should consider including libraries in their plans and policies.”

MICHAEL PETRICONE, SR. VICE PRESIDENT,
CONSUMER TECHNOLOGY ASSOCIATION



PHOTOS BY PAUL ALLMAN

At Lakeview Elementary School in Norman (Okla.) the school library is a hub of coding activity. Students learn computational thinking concepts, such as algorithms, by testing and revising paper airplane designs. Coding is connected to students' personal interests by creating games and stories with the MIT-developed Scratch block-coding program. At the school, teachers, parents, and the school librarian report an increased interest in learning when students are actively engaged in coding. In fact, one of the most promising areas of learning is with CS+X, in which the "X" represents virtually any other field, such as fashion design, music, or transportation.

and efficient solution. Most libraries already possess broadband, hardware and software, staff expertise, information resources, and have related programs in place.

We urge decision makers in the U.S. Departments of Education, Labor, and Commerce; other federal agencies and the White House; the U.S. Congress; and the technology, business, and philanthropic communities to leverage libraries in their plans and proposals that engage youth in coding.

Libraries Stimulate Interest

For decades, the library has been a place for learning of all kinds, a place to try out new things, and the place where those with fewer resources at home can expand their horizons. Many librarians view coding and computational thinking as a fundamental new type of literacy. Not

surprisingly then, libraries have begun to actively engage with youth to promote awareness of and respond to interest in coding-related learning, education, and careers.

“You [youth] will be able to choose from careers that may not have even been invented yet.”

MO-YUN LEI FONG, DIRECTOR,
K-12 EDUCATION OUTREACH,
GOOGLE, INC.

Alicia Craig, parent of an 8-year old, notes that her son

“has become very excited about the coding behind many things in life.” Her son participates in a coding club at the

Orange County (Fla.) Library System. “He is increasing his curiosity and motivation to continue learning to code.” Craig also observes that her son has improved his logical thinking and problem solving abilities, as well as the ability to collaborate with other kids, thanks to the library coding club.

Public library spaces and technologies that are free to all provide a platform upon which people can initiate their own efforts to educate others. Teenager Kyleigh M. recently started a coding club at Onondaga Free Library in Syracuse (N.Y.). She knows many of her peers do not understand much about coding, and she wanted to share her excitement about it. Kyleigh showcased a simple type of programming to illustrate “how enjoyable coding can be when you first start.”

Youth, mostly girls, learned about social media concepts while coding with Scratch at the Santa Monica (Calif.) Public Library. They enjoyed creating projects that resembled their preferred social media platforms (e.g., Instagram). In one session, they created a quiz, similar to those on Facebook or BuzzFeed.



Developing Coding Abilities Through Libraries

Libraries host coding activities year-round. An increasing number of libraries host summer camps or courses on coding. For example, the Boise (Idaho) Public Library operates Summer of Code classes. One 9-year-old named Mason joined the Introduction to Javascript and Computer Animation classes and by the end of the summer had created a functional Magic 8 ball game that randomly displayed one of 16 responses with a “shake.” Mason began creating other games in Javascript that incorporated conditionals, variables, arrays, and logic.

In addition to technical skills, youth develop teamwork skills through coding classes. At the Desert Foothills Library in Cave Creek (Ariz.), a coding course for youth was held during summer 2016. “It was truly amazing to see these young thinkers teaming up in small groups, using problem-solving skills to master different tasks. Every child that received guidance of some sort from a peer that day was able to help someone else in turn,” said Head Librarian Colleen Crowley. “These youth are getting a jump start on these important life lessons in a friendly and safe situation

“If we want to achieve the national agenda of having young adults who are pursuing STEM-related careers, the library is the mechanism to get young people interested.”


ASSOCIATE PROFESSOR
MEGA SUBRAMANIAN,
COLLEGE OF INFORMATION STUDIES,
UNIVERSITY OF MARYLAND

where they can learn and grow from each other.”

Students at Silver Spring (Md.) International Middle School work together to tackle several coding challenges collaboratively as the school librarian and science teacher co-teach a robotics course as part of their science, technology, engineering and mathematics (STEM) curriculum. Students use a combination of library-provided laptops and student-owned devices to code a web-based challenge and program a robot to perform specific tasks. At the end of class, students reflect on the process and review outcomes.

Growing the Pie

Women, African-Americans, and Hispanics are significantly under-represented in the tech-related workforce, and making coding more accessible to all is essential to address this gap and increase economic opportunities. As widespread, welcoming, and well-



The “Girls Who Code” program at Cobb County (Ga.) Public Library system draws young women from all over the county to learn CS concepts, learn from each other, and work through challenges and obstacles. The girls collaborate on a “Computer Science Impact Project” targeted to help their community. They are raising awareness of the dangers of texting while driving by creating an original website that requires players to resist various distractions while “driving.”

established places of exploration libraries are ideally positioned to reach youth from under-represented groups, help them learn and develop coding skills, and grow their representation in the technology sector. Libraries are ideal laboratories and partners for groups like the National Center for Women & Information Technology and Code2040. ■

“Yeah, I like it. No other class does this. It’s cool.”

GIRL IN CODING CLASS AT
THE LIBRARY, SILVER SPRING
INTERNATIONAL MIDDLE SCHOOL

TAKEAWAYS for decision makers ►►►►►►►►►►

- The nation’s libraries represent a ubiquitous community resource that is well-positioned and cost-efficient for promoting coding and providing technical learning opportunities for youth. Library spaces and technology are a platform upon which effective coding and computational thinking programs can be built.
- Coding programs at libraries are successful but currently exist only at a small fraction of libraries. There is a great opportunity to leverage libraries to increase the number of tech-capable leaders in the next generation of Americans.
- Libraries are especially well situated to spark interest in coding and support the development of coding skills among groups typically under-represented in the technology industry.
- Libraries are prime candidates for collaboration with the federal government, corporations, philanthropic organizations, and other prospective partners. Examples include the Congressional App Challenge and Hour of Code.

ABOUT AMERICA'S LIBRARIES



The 120,000 libraries across the United States are a powerful force in addressing public policy priorities. Libraries advance Education, Employment, Entrepreneurship, Empowerment, and Engagement for Everyone, Everywhere—The E's of Libraries®.

Libraries serve America's cities, towns, counties, and states; on school and college campuses; on military bases; in hospitals, government agencies, corporations, and other institutions. Library professionals provide diverse programs, services and resources tailored to community needs.

The American Library Association (ALA) is the oldest and largest library association in the world, with more than 57,000 members. The ALA Annual Conference, held in June, typically attracts over 20,000 participants. ALA maintains a Washington Office to engage federal and national decision makers and influencers.

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