Through the work of libraries Ready to Code, communities will see young people who are ready to take on their futures, who have robust career options, and who guarantee the economic and social vitality of the cities, towns, and reservations in which they live.

With 500,000 current job openings in the field of computer science, all 115,000 of the nation’s school and public libraries are crucial community partners to guarantee youth have skills essential to future employment and civic participation. To discover how libraries support computer science, coding, and computational thinking skills acquisition by youth, the American Library Association’s Office for Information Technology Policy initiated a year-long “Libraries Ready to Code” research project. Research identified priority areas including securing additional funding, professional development opportunities for library staff, and broader strategic partnerships. This report overview introduces these priorities and highlights recommendations.
Librarians, educators, elected officials, policy makers, and parents need to make sure that young people know how to code. Coding however is more than learning how to program a piece of software. Knowing how to code requires computational thinking skills and an understanding of how to troubleshoot, problem solve, and think critically. It requires trial and error, instituting iterative processes, collaboration, and reflection. When a young person learns to code they gain STEM skills (which includes computational thinking) plus an ability to persist, and a confidence in what they are able to achieve.

School and public libraries are located in rural and tribal locations, in suburban and urban communities, in small towns and our very largest cities. Many of these libraries host coding activities for all ages of children. They do this to fill a need and to guarantee that youth have the skills required for the future these youth will help design. Decision makers in local, state, regional, tribal, and federal agencies should see libraries as a community resource that is ready to assist young people in learning to code and to do so in a way that extends and enhances classroom-based learning.

GAINING SKILLS FOR TODAY AND TOMORROW

Youth need computational thinking skills now that reflect the world they currently live in and the one they will be a part of in the future. With 500,000 computer science jobs currently available, and an expectation that the growth rate will be twice that of any other job over the next several years, there is a national economic imperative to prepare youth. All community members working with and for youth must be a part of this preparation.

School and public libraries are perfectly positioned to assume a leading role in preparing youth. Libraries are open during out-of-school time when youth are able to participate in informal learning activities that augment their classroom experience. Libraries have an infrastructure that enables learning which includes space, staff, technology, and connections to community members from work environments infused with computational thinking and with expertise in coding. When youth connect with role models in these fields, they can see themselves in, and aspire to, a similar future. For libraries to take the next step in this work, they need high-level funding and support for building out the technology made available inside their buildings and for re-envisioning their models of operation in order to better serve communities of today and tomorrow.

EXPANDING THE PLAYING FIELD

Girls, youth of color, young people living in poverty are a few of the populations that require out of classroom time coding opportunities. Many of these young people only have access to technology when visiting a public or school library. Even when these youth have technology access at home, the quality and capacity of that access is frequently limited with a young person having to share a smartphone or tablet with other family members and data plans limited to a minimum number of megabytes per month.

Libraries are the ideal location for these youth to gain the coding experience they need. Staff in libraries provide access to the tools and access to mentors and experts to guide in using those tools. Libraries have the space required for coding experimentation and staff can help all youth to evaluate their learning in order to understand

71% of all new STEM jobs are in computing
8% of STEM grads are in computer science
67% of computing jobs are outside the tech sector
500,000+ unfilled computer jobs across the nation

what took place and take the next steps to build skills. Throughout the country libraries are in locations not always served by other organizations outside of school. From southeast Seattle to the Ak Chin Tribal Community Library in Arizona, library staff are connecting with disadvantaged youth to support learning coding skills that lead to computational thinking achievement.

To ensure libraries continue this critical work, decision makers need to expand their understanding of what libraries provide to communities. The library is an institution committed to guaranteeing the economic and cultural success of all those they serve. As a result they are well attuned to the youth coding needs of these communities and are ready partners for meeting these needs.

**LEARNING THROUGH DOING**

In public and school libraries youth participate in hands-on learning and connect that learning to the activities that fuel their personal passions and interests and lay the groundwork for future career opportunities. Take Senait, now pursuing a CS degree at Harvard University. When she was 17, Senait propelled her interest in computers and coding into a library program for young girls. She saw that in her community not enough girls were taking advantage of opportunities to gain technology expertise in school. So, she approached her public library and asked them if she could start a Girls Just Want to Compute club. The library gave Senait the support she needed to develop the club, teach girls in her community technology skills, and train other teens so they could lead the club when Senait left for college. That’s only part of the story. Senait also gained confidence in herself and skills that go way beyond knowing how to use computers and coding. The library gave Senait the chance to become a leader in her community and to gain a set of valuable life skills that set the course for her success in college and beyond.

Senait is just one example of a young person having opportunity to pursue personal interests and build on formal learning experiences through the school or public library. In order to continue and increase these types of experiences, library staff require opportunities to gain skills necessary for supporting young people like Senait. This staff education must come from graduate schools of library science, information schools and professional development experiences for both pre-service and in-service library staff. These educational institutions in turn require funding and research and development to make curricular changes a reality.

**LEARNING THROUGHOUT THE DAY**

While some K-12 institutions provide computer science instruction as a part of the classroom experience, there are still many that do not. This is when the school and public library are an essential launch pad for youth to begin learning coding skills. In the locations in which computer
science is a part of the school day, libraries are the place youth can go to broaden their classroom learning while at the same time tie that learning to personal passions and interests. The knowledge and skills that are a part of computational thinking are required beyond a 9 to 5 environment. By giving youth the chance to continue their learning outside of the classroom, they are able to scaffold the learning across experiences. This leads to a growth in competence and confidence.

**CS + X**

Computer science is not a field only for those planning to work in technology specific businesses and professions. All fields from advertising to construction and from theatre to environmental science have a place for the knowledge and skill that comes from learning to code. CS + X, now an academic program at several institutions of higher education, lays out a framework for learning computer science within the construct of another field of study. It is this framework which libraries already employ when they provide youth with opportunities to learn to code as a part of learning what it takes to be a professional disc jockey. Or, when libraries offer fashion design programs that include opportunities to build websites and apps to display the fashions created. The librarian serves as a guide helping youth connect their interests to career paths they might not have otherwise envisioned by connecting the real world of coding to their personal interests.

To succeed in integrating computer science with personal interests, the library must engage with community agencies and partners. These community members have, for example, the knowledge and skill youth need to write, record and perform music or create fashion that can be worn by others. Through community relationships, librarians assist youth in finding their pathway to achieving goals in academics, careers, and life. It is within this synergistic environment, connecting youth to their real life passions and interests, in which communities will ultimately thrive.

Overall, when libraries across the United States champion the computational thinking learning needs of youth, communities will see young people who are ready to take on their futures, who have robust career options, and who guarantee the economic and social vitality of the cities, towns, and reservations in which they live.

To learn more about ALA’s Libraries Ready to Code initiative please visit [ala.org/librariesreadytocode](http://ala.org/librariesreadytocode).

Please read the full report available on the Libraries Ready to Code website ([ala.org/librariesreadytocode](http://ala.org/librariesreadytocode)).

**Google** Libraries Ready to Code is made possible with generous support from Google, Inc.

The Office for Information Technology Policy advocates for public policy that supports and encourages the efforts of libraries to ensure access to electronic information resources as a means of upholding the public’s right to a free and open information society.

**Contact:** Marijke Visser, Associate Director, Office for Information Technology Policy, ALA, [mvisser@alawash.org](mailto:mvisser@alawash.org).

© 2017 American Library Association. This work is licensed under a Creative Commons Attribution License, available at [http://creativecommons.org/licenses/by/3.0](http://creativecommons.org/licenses/by/3.0)