Coding at Every Library - North Dakota State Library - Page 1/2

The North Dakota State Library (NDSL) and its partners propose a demonstration project to explore the feasibility of weekly, informal coding programs at small and rural public libraries across the United States. NDSL requests $249,000 over two years to support 50 public libraries, help 10,000 youth learn coding, and generate resources and a practitioner community that will enable many more libraries to offer coding programs.

Statement of National Need: Coding and Small and Rural Public Libraries

As computers become increasingly ubiquitous in all aspects of life, learning to code is emerging as a critical skill. Those who can work with a computer will be significantly more successful than those who cannot.[1] The signs are already here: over 500,000 open computer programming jobs, making up 71% of STEM-related jobs today.[2] Coding is not for a niche technology industry: ⅔ of computer programming jobs are outside of the tech sector, and this trend is growing as computer science concepts are applied to many disciplines ("CS+X").[3] Beyond the workplace, computer science has been recognized as "a new basic skill necessary for economic opportunity and social mobility."[4] Public libraries throughout the U.S. can provide access and exposure to help young people achieve the gains from computer programming, especially in rural communities. As stated in the American Library Association's Office For Information Technology Report, "Ready to Code: Connecting Youth to CS Opportunities Through Libraries," "communities [where libraries provide coding] 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."[5] Libraries face challenges: many library staff are apprehensive about leading a coding program because they do not have the expertise they think is required, struggle to find time to prepare lessons, and don't know how to build community partnerships in order to connect with experts that may help them to build successful coding activities. As a result, many libraries across the nation never try to run a coding program, especially in small, rural, and tribal communities.[6]

Project Design: Coding at Every Library

The team for the Coding at Every Library project has demonstrated success in helping library staff overcome the challenges outlined in the Ready to Code report. This proposal expands on the solutions already tested by team members in a wide variety of public libraries. As the lead applicant, **NDSL** will build on CodeDak, an initiative to provide North Dakota libraries with the resources, skills, and inspiration necessary to host Hour of Code events and support regular code clubs. NDSL's technology partner, **Prenda (website)**, provides web-based software, training and support to help library staff run successful code clubs. Also on the core team are **Crystle Martin** (University of California, Irvine), who will serve as project evaluator and lead the evaluation process and **Linda W. Braun** (LEO: Librarians & Educators Online), who will take the lead in project design and provide consulting to participating libraries. Crystle's deep experience in connected learning and research methods, specifically related to coding programs, and Linda's background in informal learning, libraries, and research focused on coding and libraries make each ideally qualified for this work. The **Association for Rural and Small Libraries** (ARSL) will consult on project design and assist in outreach, ensuring success with the project focus on coding at small and rural libraries. ND State Librarian Mary Soucie is a board member at ARSL.

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[1] Cowen, T. (2013). Average is over: Powering America beyond the age of the great stagnation. NY, NY: Dutton.

[2] [Summary of source data for Code.org infographics and states.]. (n.d.). Unpublished raw data.

[3] Catchpole, H. (2016, March 20). *CS + X: Skills for future careers*. Retrieved January 30, 2017 (Link)

[4] Smith, M. (2016, January 30). *Computer Science For All*. Retrieved January 30, 2017 (Link)

[5] Braun, L. W., & Visser, M. (2017, January 6). *Ready to Code: Connecting Youth to Opportunity through Libraries* (Rep.). Retrieved January 30, 2017, from ALA/OITP website (Link)

[6] Ibid.

Project Workplan: Through the Coding at Every Library project, we will support weekly, informal code clubs for youth ages 8-14 at small and rural public libraries all over the U.S. Building on the "out of the box" components (remote training, web-based software, support), the project team will consult with each participating library to adapt the program for their individual communities. Participating libraries will fulfill the community anchor role, helping youth gain the skills needed for college and career readiness and life success. The project will directly support code clubs at 50 public libraries, chosen through a competitive application process. All public libraries that meet one of two criteria will be eligible to apply: either 1) meet the IMLS definition of small or rural libraries[7], or 2) be a member of ARSL. Based on past experience, a small code club will reach between 50-100 individuals over the course of a year, with many coming to multiple sessions for an average attendance of 200 youth in a year, achieving a total estimated attendance of 10,000 youth nationwide.

- Phase 1 (Months 1-3): Finalize project design, conduct outreach, manage application process.
- Phase 2 (Months 4-6): Select and train participating libraries, provide consulting for tailoring to communities, develop evaluation protocols.
- Phase 3 (Months 7-18): Support participating libraries in weekly code clubs, provide additional training and consulting as needed, create online community of practitioners.
- Phase 4 (Months 19-24): Evaluate project, build resources for sustainability of impacts, disseminate results

National Impact: Code club will directly impact over 10,000 youth in small and rural communities, opening doors to technology careers and building growth mindsets. Beyond the direct impact, the project will help libraries drive coding education in small communities. The work will provide summative evaluation data to support the idea that public libraries can and should provide coding activities in their communities. The team will measure specific qualitative outcomes through surveys and interviews at the beginning, middle, and end of the project, and through reflection journals focused on development and including artifacts such as video, photos, screenshots, and links. Specific outcomes to be measured include:

1. Direct impact. The software platform will record total attendance, number of unique users, and learning objectives like skills mastered and projects built. Metrics will be analyzed by age and gender.
2. Build competence and confidence. Through the training and support provided by this project, library staff will have opportunities to take risks, revise based on challenges and successes, and reflect continually on their learning and experience. All leading to greater competence and confidence.
3. Change mindsets. One of the key features of the code club model is the connected learning approach. Instead of relying on an expert instructor to pour knowledge into their minds, coders learn on their own terms and at their own pace. Library staff are well-suited to facilitate this type of learning.
4. Community engagement. As library staff will connect with community partners, thought leaders, and colleagues to establish long-term relationships that extend beyond this project.

The project team will connect participants with each other and share challenges and successes. This will include virtual meetings and an online community to enable coding activities in libraries across the United States.

Budget: The project will require $249,000, with over 95% of the funding applied directly to supporting participating libraries in code club. This includes software, training and support (50%), consulting (20%), and community development (10%), as well as the creation of support materials and compilation of lessons learned (15%).

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[7] Swan, Grimes and Owens (2013). *The State of Small and Rural Libraries in the United States*. IMLS ([Link](#))