Libraries as community catalyst empowering low-income youth to cultivate symbiotic relationships between Artificial Intelligence (AI) and local industry.

Artificial Intelligence (AI) is here. As it rapidly reshapes workplaces, it generates new societal challenges -- particularly for low-income communities. Michigan State University and Indiana University, in partnership with the Capital Area District Library (CADL) in Lansing, MI as well as the Woburn Public Library (WPL) in Woburn, MA, request $249,866 for a two-year National Leadership Project Grant to develop **an AI program for youth in low-income communities**. Our project explores the new role of libraries as a community catalyst to enable low-income youth to 1) have access to the core knowledge of AI to be competitive within workplaces and 2) take an active role by designing AI technologies to benefit local industry. This project employs a participatory design approach that considers participants as co-designers of AI technologies. Our project will generate publicly available open-source AI education modules and webinars to support other libraries in the development of their own AI literacy programs, which will be distributed through both academic and non-academic channels (e.g., national conferences, social media). If the pandemic continues, our research will be performed online.

Statement of National Need

Since the internet emerged in the mid-1990s, public libraries have been early adopters, and have played a critical role in increasing online access within their communities. We are currently facing a new chapter in AI technology; the United Nations, since 2015, has organized an annual global summit to evaluate the impact of AI on society. While AI influences many people, only a relatively small population of engineers determine how the public interacts with AI in everyday life. The public's limited access to AI knowledge reinforces a digital divide and inequity issues at a national level. In this new era, libraries have tremendous potential for nurturing AI literacy within their communities. Building on the role of public libraries as facilitators of digital literacy, the goal of this project is to explore how library-based AI literacy programs can serve low-income youth communities.

Project Design | An Exploratory project of library-based AI literacy programs

Phase 1: Understanding how low-income youth communities conceptualize AI (Summer 2021)

This phase aims to understand 1) youth participants' current knowledge of AI and 2) career paths of low-income youth. We will interview 10 participants ages 10-14 in the Lansing public school district (and their parents), and three middle/high school teachers from this district. The interview questions will be co-developed with librarians based on their experiences with youth library programs.

Phase 2: Developing an Artificial Intelligence curricula and materials (Fall 2021 - Spring 2022)

The research team together with the librarians will build two AI education modules and materials, whose design will be based on our interviews (Phase 1). The first module will contain education materials covering the core concept of AI. The second module will aim to help participants envision how AI concepts can be applied in their local industry. We will use existing AI education platforms such as Teachable Machine.

Phase 3: Running AI literacy programs in two libraries (Summer 2022- Fall 2022)

We will recruit 10 low-income youth at each library. To strengthen retention, we will ask the students and their parents to fill out commitment forms. If necessary, we will invite new participants and provide individual learning support for the missing sessions. The research team and the librarians will co-teach the participants and collectively design the education materials. The designed materials will be reviewed by our advisory board.

We will teach the basic concepts of AI (Module 1) and discuss how AI can be applied to local industries (Module 2). We will cover both modules in four 1.5-hour courses. In Module 1, participants will develop their own AI systems based on our education platform, and also discuss the sociopolitical impact of AI systems in society. In Module 2, participants will discuss how AI could benefit workplaces, by envisioning AI systems for the settings. Local industry partners will be invited to discuss how AI can be a part of their workplace. In Lansing, MI, we will focus on manufacturing because of the prevalence of manufacturing industries, and thus jobs, in that area (and the US). PI has already built relationships with a manufacturing plant. In Woburn, MA, we will work with a healthcare industry with which the librarians of WPL have an established relationship.

We will run our program at CADL first. The WPL librarians will access the program through teleconferencing to observe the teaching process. After conducting the first program at CADL, the advisory board will provide their feedback on our materials, which will be incorporated into our materials for the WPL sessions. After each session, the research team and the librarians will meet to develop guidelines for librarians outside of this project. Also, when completing all sessions, we will gather feedback from our participants, industry partners, and parents to re-design the materials based on feedback.

Phase 4: Delivering outcomes and disseminating findings (Spring 2022)
We will publish an open-source AI education curriculum, which consists of a general module for basic AI knowledge, and application modules covering collaboration with local industry. A series of webinars that explain how we run our programs will be provided via our website for other librarians. Our curriculum will be disseminated through various channels including library science conferences and librarian-specific social media (e.g., Maker Faire, Internet Librarian, YALSA, PLA, and VOYA).

Diversity Plan

To ensure participation of low-income youth in our program, we will conduct our research within libraries near low-income communities. We will screen participants by zip code, a standard method that our libraries have used in programs for low-income communities. Because low-income participants have limited resources, we will allocate extra funding for their incentives, education materials, and transportation (e.g., bus tickets). CADL and WPL represent urban and suburban areas, respectively, which will enable understanding of best practices for deploying the AI programs in libraries across a broad range of communities.

National Impact

This project will confirm that in this new era of technologies, libraries play a critical role by empowering low-income communities and their local industry. Our project will increase the accessibility of AI education for librarians to help youth in low-income communities across the country as we develop replicable models of our curricula. The provided webinars illustrating our curriculum design process will enable libraries to develop their own modules in collaboration with their local industries. This replicable and extendable library AI curricula will eventually benefit a wide range of low-income communities built on different types of local industries.

Roles of Members

Dr. Lee (PI), an expert in participatory design research in robotics (Lee et al. 2012-2020), and Dr. Choi (co-PI), an expert in machine learning (Choi et al. 2014-2020), will lead the intellectual and technical effort on this project. Lee has finished initial participatory design studies with workers in manufacturing settings and with healthcare professionals about how to employ AI technologies. She also utilized the education platform in her class at MSU. Dr. Choi has developed and offered an introductory AI course for Library and Information Science students at IU. She will use the lessons learned from the course for this project. Two PhD students will assist the PIs as they develop curricula, conduct research, and analyze collected data. Jill Abood, Community Engagement Librarian of CADL, Courtney Tang, Digital Services Specialist of CADL, John Walsh, an assistant director for Technology and Innovation at WPL, and Adriana Mendes-Seldon, a Family and Community Engagement Liaison of WPL, will collaborate with the research team to develop AI programs based on their experiences on youth programs. A youth STEM education specialist (Dr. Joseph Krajcik, MSU), an youth AI education expert (Dr. Haewon Park, MIT), and previous IMLS grant awardees for participatory design projects with children (Drs. Jason Yip and Jinha Lee, UW), will serve as an advisory board, providing feedback via regular meetings (1 meeting/semester).

Budget Summary

Salaries, Wages and Fringe - $38,723 (PIs' Summer salaries); Travel - $5,380; Prototype Materials - $3,500; Student Support - $112,032 (Two GA salary, tuition & stipend); Other Costs - $3,830 (Participant Incentives, Library Consulting Fees and Services); Indirect costs - $86,404; Total project costs: $249,866.