

## **Librarians and Children as Design Team Partners: Creating a Digital Game for Young Innovators**

**NLG-L Program Goal 2 Addressed:** Build the capacity of libraries to lead and contribute to efforts that improve community well-being and strengthen civic engagement.

**Program Objective 2.1:** Develop or enhance replicable library programming, models, and tools that engage communities and individuals of diverse cultural and socioeconomic backgrounds.

**Brief Summary.** Syracuse University's iSchool is applying for a two-year NLG-L Implementation grant. The project team will create and disseminate a fully functional, interactive web-based game with a program sessions and best practices guide to stimulate youth innovation in service of community civic engagement. The project is designed for public libraries that currently offer informal invention education opportunities for youth or those that wish to start and can be delivered in face-to-face or virtual formats. Partnering with a game developer (Data Momentum) and a digital artist, the team will bring together diverse stakeholders including public librarians, STEM educators, game-based education experts, youth experts, DEI scholars, and children as design team partners. The game will integrate the characters and setting from [Curiosity Creek](#), an educational website previously developed by the project PI and used in conjunction with library programming that supports inquiry and innovation. The impact of the game and its associated learning materials for 7–9-year-old children will be strengthening information skills for research during the invention process, motivating an interest in inventing for social good within one's local community, and encouraging participation in invention activities by children who are traditionally less involved but whose lived experiences could bring new perspectives to inventing for social good within their communities. The project team requests funding of \$249,454 with a project start date of 8/1/22.

**PROJECT JUSTIFICATION.** The American Library Association (ALA) recognizes the social and educational value of games in its initiatives.<sup>1</sup> The ALA Games and Gaming Round Table has sponsored events such as GAME (Gaming As Meaningful Education) and, in 2020, unveiled their annual *Game On* grants to assist libraries in developing their gaming programs and collections for their communities.<sup>2</sup> IMLS has also acknowledged the importance and challenges related to implementing game-based education in libraries through their funding of initiatives such as a National Forum on Libraries and Game-Based Education<sup>3</sup> and in the funding of two game proposals through the 2021 IMLS funding cycle.

There is evidence that educational games can have measurable impacts on learning. For example, gaming from a library skills perspective has been shown to improve critical thinking and problem-solving,<sup>4</sup> increase active learning,<sup>5</sup> and significantly enhance overall learning.<sup>6</sup> Additionally, public libraries across the country are increasingly using their safe and welcoming spaces to support STEM innovation in their communities through programming and makerspaces. The proposed game will take a unique approach and present new opportunities to work with game design, STEM inquiry and problem-based learning focused on doing social good in one's community. This project will also address an often-overlooked aspect of gaming which is making games accessible to persons with disabilities. As the PI's are both active in providing librarians with training that equips them to meet the needs of patrons with differing abilities and the co-PI is the founder of [Project ENABLE](#) (major provider of online disabilities training for librarians), they will focus on ways to both make the game itself accessible and to promote and model diversity and inclusion *within* the game. Principles from Ito's Connected Learning Framework<sup>7</sup> and Deci & Ryan's Self-Determination Theory<sup>8</sup> will be applied to design/development.

Interest and opportunities for gaming in libraries has increased over the past decade,<sup>9</sup> and librarians are becoming experts at facilitating game-based learning and socialization. The proposed project will call on participating librarians and their program participants to provide critical input to the development and pilot-testing of a multi-phase game specifically designed as a tool to strengthen their libraries' STEM and innovation programs for young children. Librarians will also contribute session plans that incorporate the game and apply concepts from the game to identify and address a problem in their community, shared nationally with other libraries. Game design will be informed, in part, by findings from research conducted by the PIs in interviews with 55 recognized child inventors and use them to demonstrate where children would benefit from information skills for accurate information seeking, preciseness in question-framing, and source evaluation during the invention process.<sup>10</sup>

**PROJECT WORK PLAN: Game Concept and Preliminary Work.** The work plan includes four phases: 1) Planning and Design, 2) Production and Iteration based on pilot testing, 3) Alpha/Beta Testing and Iteration, and 4) Evaluation and Dissemination with ongoing formative evaluation. The initial game design concept for iterative development during the funding period incorporates the story elements and characters of a fictional rural community called [Curiosity Creek](#), a site created by the PI that connects inquiry and invention. Video clips of recognized child inventors featured on [The Innovation Destination](#) (TID) will be game elements (TID is a prior IMLS-funded project of the PIs that will also serve as project site for game development and dissemination). In summer 2020, the team held two focus groups with children (experienced inventors and non-inventors) who provided input on various game elements. The team used this input to create a concept prototype (see short [Game Trailer](#)) and an [Expanded Visual Prototype with Game Mechanics](#).

Additionally, the PIs' current one-year grant from the [Lemelson Foundation](#), a leading funder of youth invention education initiatives, will result in *Get SET!* - an automated online **S**ource **E**valuation **T**ool to help young inventors evaluate their information sources and will be a valuable integrated game component of the project. Project activities will include the participating librarians' design of lesson plans that integrate the game into their innovation programs with feedback provided to the project team and shared with our technical partner for possible iterations.

Research has shown that including children as design team partners is an effective practice when developing products for children;<sup>11</sup> the project team will select a diverse group of ten children to participate as co-designers with the project team and represents an important part of the project. These co-designers are in addition to the child program participants in the innovation programs offered by the participating librarians. Another project activity includes development of a targeted marketing effort with the help of a graduate assistant working with the PI's.

The PI and co-PI are experienced in outcome-based evaluation. On-going formative evaluation throughout the project and final (summative) evaluation with data collection measures and intervals will be detailed in full proposal. Measures will include pre and post assessments (child program participants), interviews (child co-designers), and observations (by librarians of their program participants and reported in their journals). Project outcomes include that child participants in gameplay (n = >100) demonstrate improvement in information skills, are more aware of the values of diversity and inclusion in innovating and problem solving and can apply those skills and the invention process steps for public good. Project outcomes for participating librarians (n = 15), and child co-designers (n = 10) are articulated in our project's logic model, a graphical representation of our theory of change which can be accessed [here](#), if desired, but will be delineated further in the full proposal with a detailed evaluation plan with outcomes, indicators, and benchmarks.

**DEMONSTRATED EXPERTISE:** The PIs have a strong track record in developing demonstration projects fostering inquiry, curiosity, and innovation, and that help librarians provide better service to persons with disabilities. They have published articles on learning in technology-pervasive learning environments, are well-established researchers in information literacy, motivational design and innovation, and experienced in using outcome-based measures for project results. The project advisors include a youth librarian, DEI scholar, game expert, and an innovation education scholar.

**DIVERSITY PLAN:** The game industry suffers from a systemic underrepresentation of diverse populations in games.<sup>11</sup> In the proposed game, all characters contribute to game play through their unique talents and abilities, regardless of their sex, race or differing abilities. Players will observe characters and situations in which the diversity of perspectives represented by characters' lived experiences are welcomed and neurodiversity is embraced as differences rather than deficits. To ensure that the voices of diverse librarians and children involved in the project are heard, every effort will be made to include representation from underserved populations. The game itself will be iteratively tested and revised to increase accessibility, including by persons with vision and hearing disabilities. Multi-language accessibility is also planned. Finally, one of our advisory committee members is a DEI scholar and trainer with numerous publications.

**DISSEMINATION:** Project deliverables will be disseminated through the [The Innovation Destination site](#) which will also promote the the freely accessible digital game, program session book including best practices from participating librarians' experiences, a collection of vetted session plans, an introductory video for librarians, and several children's videos that address problem points during the invention process where youth need better information skills for accurate information seeking and source evaluation using criteria that includes usefulness, authority, accuracy, etc. A webinar will introduce the game to the library community. PI's will publish articles in trade journals that address youth innovation and share the links to the resources and will promote on library listservs and through the university's social media outlets.

**PROJECT RESULTS:** It will be inventive thinkers who make the greatest contributions to society.<sup>12</sup> With few games designed to stimulate both inquiry *and* STEM invention for use by public libraries and to support the values of DEI, the proposed game and its associated materials can impact librarians' ability to contribute to children's informal learning and motivation for engaging in invention activities that benefit their communities while scaffolding invention research with critical information skills. Librarians will be able to quickly pivot to virtual delivery of the game and materials should the need arise, enhancing the project's potential national impact in a time of crisis. The project is also adaptable for other audiences including school libraries and museums and will be included in project marketing plans. Project evaluation outcomes may be useful to researchers interested in further exploring how games can promote STEM interest and inventive thinking in library settings.

**BUDGET:** The project requests \$249,454 total IMLS funding - \$75,00 (game development and web integration); \$8,000 (digital art); \$57,298 (PIs' salary/fringe); \$24,282 (student support); \$25,000 (librarian/child/advisor stipends), \$8,400 (dissemination and publication); and \$51,474 (F&A – SU's negotiated off-campus rate: 26%). [*References and a detailed evaluation plan will be provided in the full proposal, if invited*]