FULL PROPOSAL ABSTRACT, NARRATIVE, AND SCHEDULE OF COMPLETION

Make, Do, Share: Sustainable STEM Leadership in a Box

Project Accomplishments and Tangible Products. Kitsap Regional Library (KRL) has already created BiblioTEC, a highly successful, collaborative, life-changing program of STEM education for youth. Building on what we have learned, we will develop, test, and deliver a ready-to-use system that empowers small and rural libraries to become community STEM leaders. Elements can be replicated individually or together, so they can fit the needs of any library. They will include:

- Curricula for multiple participatory, hands-on STEM programs driven by interest-based projects and peer-to-peer learning
- A badging module to measure meaningful 21st century career readiness outcomes
- Training for librarians, adult STEM volunteer mentors, and teen peer leaders
- A process for permanently increasing STEM capacity, in which the librarian is not a STEM expert, but rather the facilitator of a connected community with the library at its heart, where schools, businesses, and youth themselves work together to support peer-driven, inquiry based learning.

Community Need. To prepare for 21st century careers, youth everywhere need access to the "excitement, interest, and motivation" for STEM that may be missing in schools.[1] In geographically and economically diverse Kitsap County, such programs have directly resulted in youth finding jobs and enrolling in college.

In order for communities to engage a future generation of innovators, "accidental STEM librarians" need programs they can easily and affordably implement, and a way to access the expertise in their own communities.[2] With KRL's tools, any library can increase its capacity, without anxiety or high expense, to apply STEM learning to change lives in their community.

Outcomes. Outcomes will be measured and tracked through freely shareable online badges. Each badge will be aligned with a measurable accomplishment that indicates achievement of a desired outcome.

1. Participants will build digital literacy skills through a continuous connected learning framework.
2. Youth mentors will develop both technology and leadership skills which will prepare them for the 21st century career landscape.
3. Libraries will build capacity to offer impactful STEM programming through community driven input and mentor expertise.
4. Librarians will be empowered to plan, facilitate, and participate in STEM programming.
5. Libraries will build collective community impact with schools and community partners to enrich STEM learning and career readiness.

Audience. This project will focus on youth 11-18, although some elements will also be useful for younger children or adults. It will have a particular emphasis on reaching at-risk and homeless teenagers.

Time Frame and Activities. This project will take place over a 3-year period. In Year 1: "Make". We will work with community partners to adapt our already-successful BilioTEC program into a shareable, nationally applicable resource. In Year 2: "Do". We will test and refine. In Year 3: "Share". We will disseminate locally and nationally.

Participants. Kitsap Regional Library is the lead applicant. To help inform our work we will assemble an advisory board of community stakeholders, such as The Coffee Oasis, a refuge for homeless and at-risk youth; Bremerton School District; and Applied Technical Systems, Inc. (ATS), a national technology company.

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[1] John Y. Baek, *Libraries as Places for STEM Learning: An Exploratory Interview Study with Eight Librarians*. (Boulder, CO: National Center for Interactive Learning, 2013.)

[2] John Y. Baek, *The Accidental STEM Librarian: An Exploratory Interview Study with Eight Librarians.* Boulder, CO: National Center for Interactive Learning, 2013.)

Make, Do, Share: Sustainable STEM Leadership in a Box

1. **Statement of Need**

"I don't have any dreams."

When he said these words, Charles was a struggling teen trying to turn his life around. He enrolled in job training at The Coffee Oasis, a service organization for homeless and at-risk youth. But without any dreams or goals for himself, he was not making progress.

Then Charles discovered BiblioTEC, Kitsap Regional Library's innovative STEM learning program for at-risk youth. "Suddenly a light bulb went off in this young man's head," marveled his case manager, Ken Walls. "An interest, a passion emerged. Charles' talent for the technical became apparent."

In a future he could not have imagined just months earlier, Charles is now enrolled in community college to study engineering. "This is truly a success story," Ken said. Because of library-led connected STEM learning and a powerful community partnership, Charles "found a dream."

Like Charles, many young people need more support to be ready for the 21st century career landscape. In 2011, only 45% of Washington's fourth graders and 40% of eighth graders scored proficient or above in math.[1] Throughout the country, schools struggle with low interest and engagement in STEM classes.[2] It is hardly a surprise that in Washington alone, as many as 25,000 technical jobs remained unfilled in 2013 due to a lack of qualified candidates.[3] Despite the obvious need for better STEM career readiness, the job skills gap continues to widen. Washington's achievement gaps in math and science have not improved in over a decade.[4]

Libraries, with our enduring mission to be community connectors and learning advocates, are perfectly positioned to facilitate interest-driven, peer-to-peer STEM learning environments that permeate our local communities. However, many libraries – especially small and rural ones, which comprise more than 80% of libraries in the country[5] – do not offer these potentially life-changing programs. Librarians may feel anxious and unprepared to lead STEM programs. They may believe they are constrained by lack of funds, a shortage of time, or a lack of support.[6]

KRL's project will help librarians overcome these obstacles by making the paradigm shift described in YALSA's IMLS-funded report "Future of Library Services for and with Teens."[7] To achieve deep impacts, librarians must abandon their role as "expert" and "gatekeeper" to become co-learners and community facilitators. They do not have to be subject-matter experts in order to confidently nurture a passion for exploration. Instead, libraries can offer youth the freedom to develop their interests and skills without the time limits of a class period or the confines of a school assignment. Librarians can facilitate a connected community of project-based, peer-driven STEM learning opportunities that engage students as they grow. "Libraries are not able to do this work all by themselves," reminds the report, "nor do they need to."

KRL's project will empower librarians with the concrete tools and step-by-step instructions they need to make the shift from gatekeepers to co-explorers, from experts to community builders who facilitate inquiry-based learning in multiple settings. Our system of "STEM leadership in a box" will include core STEM curriculum for immediate programming; an open source badging module designed to be used simultaneously by multiple community organizations; training materials for staff, volunteers, and teen leaders; and a replicable collaborative community planning process. These elements can be used individually, but together they will empower small and rural libraries to collaborate with youth to inspire the next generation of STEM leaders. The capacity of the library field as a whole to achieve rich, sustainable collective impacts will be significantly increased as libraries everywhere begin building locally driven STEM learning ecosystems.

Uniquely, KRL has already developed many of these elements into a highly successful program. At the end of 2012, we received a grant from the Paul G. Allen Family Foundation to address youth employability and to bridge gaps in STEM learning among at-risk youth. The program we created, BiblioTEC, fosters peer-to-peer, interest-driven, project-based learning in computer programming, robotics, 3D printing and modeling, and game design. We partnered first with The Coffee Oasis, and then expanded our network to include social service agencies, school districts, after-school organizations, and businesses. Through these new relationships, we have experienced first-hand the value of a "learning ecosystem" in which "students are at the center of the system rather than a particular institution of learning taking center stage."[8]

Furthermore, because of Kitsap County's geographic and demographic diversity, it is a distinctively ideal laboratory for testing solutions to apply on a national scale. Our communities include unincorporated rural and semi-rural areas with limited transit, two Native American tribal lands, a Seattle bedroom community, a Naval base, waterfront villages, and a working class city where 64% of students receive free or reduced lunch.[9] All are increasingly impacted by poverty. Washington state youth unemployment was 30.7% in 2013, alarmingly exceeding the national average of 22.9%.[10] The percentage of "disconnected youth", ages 16 to 19 who are not in school or working, remains higher in Kitsap than the state average. [11]

While other IMLS-funded projects have focused on individual elements seen in our proposal, none have bundled them into a comprehensive package accessible to small and rural libraries. By including training materials and a process for building local partnerships, our proposal can sustainably increase STEM capacity in a way no other project has. For example, the University of Washington's 2014 Laura Bush 21st Century grant and Florida State University's 2013 NLG award brought together stakeholders like our summit, but did not train other libraries to do the same. The 2013 NLG award to Howard County Library and the 2013 Learning Labs in Museums grant to the University of California created STEM learning settings pedagogically similar to ours, but did not go beyond that location to build a contextualized model for other libraries to replicate. Brooklyn Public Library's 2014 NLG project created a summer badging system, but it was designed for use by the library alone instead of in community collaboration, and required expensive BiblioCommons software.

Overall, to meet the needs of youth and librarians everywhere, Kitsap Regional Library (KRL) will establish a ready-to-use system that empowers libraries to become community STEM leaders. Any librarian, regardless of STEM confidence or expertise, can prepare youth for 21st century careers with our clear, practical modules that build on each other in manageable steps. The early modules let small and rural libraries get started quickly with common-core aligned curriculum for low-cost STEM programs. Next, they learn to demonstrate meaningful outcomes with a ready-made yet flexible badging system. Finally, libraries will permanently increase STEM capacity by building a connected community with the library at its heart, where schools, businesses, and youth work together to support peer-driven, inquiry-based learning. By encouraging local communities that can sustain STEM learning long after any individual lesson plan becomes obsolete, our system is unique among the currently available resources. With the library's leadership; schools, nonprofits, government agencies, and businesses can work together to prepare our youth for 21st century careers. Because of your support of KRL's project, librarians everywhere will be able to empower their youth to enthusiastically "make, do, and share".

2. **Impact**

As a result of this project, libraries with limited resources will become STEM leaders in their communities. In order to bring outcomes with tangible value to communities nationwide, we will create a replicable framework that libraries can use to create their own community-based STEM learning ecosystems.

Tangible deliverables for the field will be based on our collaborative process in which "the many components each have a differentiated and valuable role."[12] We will provide toolkits or self-paced learning modules for each of the major activities: partnerships and collective impact, curriculum for core STEM programs, a badging module, and training materials for librarians, adult mentors, and teen leaders. The first modules will contain practical, common-core aligned lesson plans for a variety of low-cost STEM programs. These can be easily implemented so librarians can overcome STEM anxiety. Empowered librarians can then utilize our step-by-step framework to bring together community partners, growing and sustaining STEM capacity not only in the library but in the community at large. A badging system will demonstrate and track meaningful outcomes across institutions. All deliverables will be freely available on our web platform.

We will draw our outcomes, indicators, and assessment tools from the Afterschool Alliance's Framework of Youth Outcomes.[13] These synthesize "commonalities observed in evaluation reports of afterschool programs" with an extensive body of research in youth development and science learning in out of school.

Outcome 1: Participants will develop an interest in STEM and STEM learning activities.
Indicators:

- Active participation in STEM learning opportunities
- Curiosity about STEM topics, concepts, or practices

Outcome 2: Participants will develop a capacity to productively engage in STEM learning activities.
Indicators:

- Ability to productively engage in STEM process of investigation
- Ability to exercise STEM relevant life and career skills

Outcome 3: Participants will come to value the goals of STEM and STEM learning activities.
Indicators:

- Understanding of value of STEM in society
- Awareness of STEM professions

The badging system will support these learning outcomes by providing space for students to demonstrate their accomplishments across institutions. It will help students connect their specific STEM learning activities and projects to essential 21st century career readiness skills. For example, a student could be introduced to a topic in the classroom, then pursue her interest with a project at the library, where she makes a connection that gets her an internship at a technology company. At every step, she can add badges that demonstrate 21st century career readiness.

In order to define badges that truly reflect necessary 21st century career skills, the specific performance measures will be identified collaboratively. One of the first project tasks will be to bring together schools, businesses, and other stakeholders for a STEM education summit. After this summit frames the community's needs, we will form an advisory board to help define the badge specifics. The framework for these discussions will be based on findings from the National Research Council in "Education for Life and Work: Developing Transferable Knowledge and Skills in the 21st Century" and Connected Learning Research Network's "Connected Learning: An Agenda for Research in Design."[14], [15]

Program evaluation will be measured through the Center for Youth Program Quality's STEM PQA.[16] We believe that the YPQA is the most relevant source for evaluating our programs, as it thoughtfully incorporates research on OST and ISE learning. YPQA is widely adopted in Washington State, simplifying collaborations.

We believe that this model will achieve greater sustainability than past efforts because it creates local communities of ongoing support. Rather than working in isolation to encourage youth STEM learning,

libraries will create a learning ecosystem that includes peer leaders, adult mentors, and local partners. Instead of setting an expectation that library staff will become STEM experts, this model positions librarians in a role sustainable for them: as community connectors advocating for inquiry-based learning.

3. **Project Design: Make, Do, Learn**

This project establishes a system that small and rural libraries can adopt to become community leaders in STEM learning and 21st century career readiness for youth.

Project goals:

1. Participants will build digital literacy skills through a continuous connected learning framework.
2. Youth mentors will develop technology and leadership skills which will prepare them for the 21st century landscape.
3. Libraries will build capacity to offer impactful STEM programming through community-driven input and mentor expertise.
4. Librarians will be empowered to plan, facilitate, and participate in STEM programming.
5. Libraries will build community impact with schools and community partners to enrich STEM learning and career readiness.
6. A comprehensive web platform/website will be created and documented; providing templates for sustainable curriculum, badge development and community-building for STEM programming.

Key activities:

1. Host a summit with education and technology leaders to begin a community conversation around STEM learning and community needs.
2. Continue the conversation with key stakeholders by forming a workgroup to share expertise and inform the development and implementation of 3-12.
3. Create core competencies for BiblioTEC graduates which demonstrate workforce-ready leadership skills.
4. Create badging system to track and demonstrate achievement of these competencies.
5. Develop training for librarians, mentors, and teen leaders.
6. Develop a public platform/website for youth to showcase their achievements and for librarians to access information on how to replicate STEM learning success in their communities.
7. Develop next generation science standards-aligned, connected learning lesson plans.
8. Engage librarians in understanding their role as community connector and facilitator of inquiry-based learning.
9. Recruit and train community mentors.
10. Provide programs.
11. Create a cadre of teen leaders who inform and lead evolution of next generation programs.
12. Disseminate a trial launch of web platform with partnering library systems.

Year 1: Make

In Year One of the grant cycle, we will focus on planning, training, and design. We will build a network of partners to define and test STEM curriculum, create a local needs assessment, develop measurement and assessment tools, create training modules, and begin development of the badging system and website.

Build STEM Community with Summit and Advisory Board (Key activities 1-4).

In order to inform our work and begin creating a robust learning ecosystem for local youth, KRL will host a summit. We will invite community stakeholders such as educators, business and technology leaders, and youth-focused organizations to discuss the current state of STEM learning, shared goals and outcomes, and steps needed to bolster joint efforts to achieve those goals.

Upon completion of the summit, we will form an advisory board comprised of STEM librarians and community partners. This committee of will identify the priority of curriculum needs, discuss content for trainings, collaborate on programs, share resources, and support conceptualization of the cross-platform badging system. They will also identify candidates for youth mentors.

Define Core Competencies and Begin Badging Development (Key activities 2-3).

One of the advisory board's key functions will be to consult on the badging system. The connected learning badges will showcase the 21st century workforce competencies youth can achieve in the library, at school, with businesses and community organizations, and even at home. Demonstrating how individual projects relate to broader STEM competencies builds upon the work of Joanna Normoyle, who created a badging process for UC Davis's Agricultural Sustainability Institute with funding from DML's Badges 4 Lifelong Learning Competition. [17] Her system helped students see the evolution of their skills along the way to greater goals, and provides them with an "e-portfolio" so they can show what they know to prospective schools and employers.

Curriculum Development and Testing (Key activity 7). We will formalize curricula from BiblioTEC to provide next generation science standards -aligned lesson plans for an in-depth course for teens, an after-school series for middle schools, and individual youth-led classes for a variety of ages.

Preliminary course design and testing has already been accomplished as part of BibioTEC. Our 100-hour course changed the lives of multiple students, like Charles, who have overcome homelessness, enrolled in college, exited the criminal justice system, and found new confidence to pursue their dreams. Two of the graduates became paid interns at the library, where they have helped reach hundreds of their peers in youth-led classes.

We will develop these successes into a set of sharable, replicable STEM curricula. Curriculum developers will work with BiblioTEC librarians to align the curriculum to Next Generation Science Standards. Topics will include a wide range of high-interest STEM areas, such as digital design, 3D modeling/printing, computer programming, circuit building, and robotics. Each module will utilize open source software and free resources.

The first program we test in Year 1 will be an after-school program for middle schools. Sixth through eighth graders will design and build a working bridge model using 3D modeling, engineering, and circuit board programming. They will showcase their final project at a countywide annual STEM event.

Create Training, Development, and Implementation of Evaluation Tools (Key Activities 5, 8, 9).

We will create three tiers of trainings that utilize the assets of our libraries and partners. Librarians will understand the inquiry-based learning process as well as their role as program mentors.[18] Librarians will also be trained to recruit and prepare both adult subject experts and teen peer leaders. In Year 3, we will

also finalize evaluation and assessment tools and train lead staff in the purpose, use, and/or implementation of tools.

Web Platform Development (Key activity 6). KRL has partnered with national software company Applied Technical Systems (ATS) to develop a web platform for BiblioTEC participants to access resources, share information, and showcase accomplishments. We will expand and strengthen this platform over the second year of the grant cycle. The intent of the platform is to make our tools and learning modules available to libraries everywhere. Content will include:

- Introductory elements and resources to current STEM initiatives (What is badging?, how to run your first STEM program)
- Extensive access to curriculum (intensive 100-hour, after school programming, individual classes)
- Documentation of how to develop STEM programs with partners (summit, advisory board, mentors)
- Access to and instructions for the badging module (how to use and create badges, outcome measurement, the conceptual framework for the system)

Year 2: Do

Year 2 will focus on implementation. We will train our librarians to test the programs and badges system-wide, and use their experiences to refine our tangible deliverables.

Testing and Refining (Key activities 2-11). In Year 2, we will implement the badging system as we refine the curriculum by iterating our STEM programs at all nine library branches. We will train staff system-wide to develop youth-led classes and train mentors (both adult STEM subject experts and youth peer-to-peer leaders) in multiple communities, gathering data to improve the process.

During that time, we will also hire and train teens that complete participation and badging requirements as peer leaders. These teens will take part in professional development training to continue to grow their leadership and career skills. They will then put their training into practice by teaching STEM skills to their peers and younger children through project-based learning.

The badges will utilize the Mozilla Open Badge system, making it simple for other libraries to access and add to our work in the future. When the project is complete, other libraries will be able to share the badges we have created. More importantly, they will have an established process to define and create badges that represent the competencies that are most important in their own communities. By year's end, the badging system will be ready for testing with two outside library systems in Year 3.

Launch Web Platform (Key activity 6). Year 2 will see the completion of the web platform for system-wide use. This important tool will offer access to the following components:

1. Toolbox: open access to badge development, mentor resources, research highlights and development templates
2. Calendar: list and description of events
3. Summit Information: data form, framework
4. Professional development/mentor development: volunteer criteria, recruitment, training
5. Content portal: curriculum, badges
6. Forum: message board, videos, social media access

By the end of the project, an empowering, replicable package of curriculum, badges, and instruction will be available to librarians and youth everywhere.

Year 3: Share

Year 3 will focus on dissemination to libraries across the country.

Partnering with Library Systems (Key activity 12). In Year 3, we will partner with two libraries in our region to launch this STEM leadership system in their communities. These partners will be involved throughout the process; we will select them in Year 1, include them in training during Year 2, and support them in implementing programs, summits, and badges in Year 3. KRL librarians will work closely with partnering librarians and staff, in-person and remotely, as they implement their pilot STEM leadership systems.

Outreach (Key activities 8-12). The activities outlined in the Communication section will begin in Year 3. KRL will inspire library staff around the country by presenting talks and workshops at conferences. Along with the ALA, WLA (Washington Library Association), and ARSL conferences, KRL staff will also take part in Digital Media and Learning and the National Afterschool or Summer Learning conferences. We will speak about the process of creating and implementing STEM curriculum and badges, and share access to the web platform.

4. **Diversity Plan**

It is fundamentally important to engage homeless and at-risk youth with the STEM skills and passion that can prepare them for an evolving workforce. By providing what may be their only access to inspiring STEM education and tools, libraries can give this underserved population a crucial opportunity to gain the technology and leadership skills employers are seeking.

KRL has successfully engaged this population over the past year by partnering with nonprofit The Coffee Oasis, bringing BiblioTEC to a familiar setting for homeless and at-risk teens and young adults. BiblioTEC's educational philosophy holds the interest of disenfranchised youth by centering the learning process on their personal interests. Through a connected learning environment, participating youth share their skills and experiences to accomplish real-world projects they care about. They learn to collaborate, coming to see themselves and each other as dependable co-workers and leaders. By focusing on personal passions and teamwork, this STEM learning environment helps youth blaze their career paths.

Once engaged with library STEM learning, these young people become mentors for other youth participants. They create a comfortable and productive learning environment for their peers. As they share what they have learned, these peer mentors further develop their own career and educational interests.

The badging system also fosters inclusion, as it offers a meaningful way for youth with nontraditional school and work experience to showcase their accomplishments and skills. Like achievements listed on a résumé, the badges they earn in and out of school will recognize and validate their successes.

These are not the only young people lacking 21st century career readiness. Teens from many backgrounds are not getting enough meaningful STEM education; demonstrated by high youth unemployment and a lack of qualified applicants for STEM jobs. Therefore, although our project is designed to be particularly impactful and inclusive to at-risk youth, it is welcoming to all.

5. **Project Resources (Personnel, Time, Budget)**

Two KRL employees will serve as key staff. Teen Technology Librarian Seth Ciotti will oversee this grant as Program Manager. Seth successfully led KRL's BiblioTEC program. For this project, he will direct all development, implementation and dissemination of the programs, badging, and educational website. His time will be allocated at 100% to this project.

Youth Services Manager and past YALSA president Shannon Peterson will serve as Project Director. Shannon directs the vision of KRL's youth programming and oversees professional development for the youth librarians. Her time will be allocated at 50%. Her primary duties will include managing the overall budget, collaborating with community partners, and training librarians in their roles as STEM facilitators. Shannon will strategically allocate the time of the eleven youth services librarians. In Year 1, some librarians will spend up to 30% of their time on this project. As training and programming increase in Year 2, all youth librarians will dedicate roughly 25%. In Year 3, as the focus shifts to dissemination, it will remain at 20-25%. Five teen interns at 10 hours per week will dedicate 100% of their time to supporting the project's programming and outreach.

We will consult with several outside organizations. Local software company Applied Technical Systems (ATS) will provide the technical expertise for the development of the educational web platform and badges. With the support of the Bremerton School District, we will contract with a curriculum developer to align the BiblioTEC curriculum with common core standards. University of Washington iSchool students will be recruited to assist with development of the badging program as part of their Capstone graduation requirement.

The timeline for the project is as follows:

Year 1: Make. This year will focus on planning and design.

- Curriculum Development and Testing (Key activity 7)
- Build STEM Community with Summit and Advisory Board. (Key activities 1-4)
- Training, Development, and Implementation of Evaluation and Assessment Tools (Key Activities 5, 8, 9)

Year 2: Do. Year 2 will focus on implementation and refinement of products from Year 1.
Testing and Refining (Key activities 2-11)

- Web Platform Development (Key activity 6)
- Outreach (Key activities 8-12)

Year 3: Share. In Year 3, we will disseminate the system we created in Year 1 and honed in Year 2.

- Partnering with Library Systems (Key activity 12)
- Launch Finalized Web Platform. (Key activity 6)
- Outreach (Key activities 8-12)

The facilities, equipment, and supplies to support this project will be a blend of existing KRL resources and grant-funded purchases. We will host programs and training in our buildings, and have already made an initial investment in laptops, 3-D printers, and consumables to support STEM programs. To test our curriculum in multiple locations, we will need additional supplies for robotics, 3D design, game design and electronics.

Beyond the use of the facilities and our continuing support for technology maintenance, KRL and community partners will provide cost matching. KRL will provide additional administrative support from our operating budget. Because our community partners are strongly invested in supporting youth STEM success, they have pledged in-kind support such as after school busing and teacher stipends from the Bremerton School District, an intern stipend from The Coffee Oasis, and website and badging development from ATS.

6. **Communication Plan**

KRL will engage libraries locally and nationwide by building on demonstrated successes. We will begin with strong communication in our own community, where we will develop a model for building a robust, connected ecosystem for STEM education opportunities. Building on that positive outcome, two small or rural libraries will implement our system, with our support, in Year 3. By demonstrating that our process can be easily and successful replicated, these libraries will become our allies in engaging the field at large.

Locally, KRL will create advocates by becoming a leader within the STEM community. In Year 1, we will organize an annual summit that will begin a countywide conversation on connected STEM learning. One outcome of the summit will be a STEM advisory board, which will keep the community engaged. Similarly, KRL librarians will join the boards of groups such as West Sound Academy and the West Sound Technology Association. We will establish ourselves as a community STEM resource through our regular presence at schools, the Boys and Girls Club and similar, and events such as the West Sound STEM showcase. Throughout, trained librarians will recruit and train volunteer mentors from the community.

BiblioTEC graduates will play an important role in disseminating STEM learning to their peers in the region. Each element of the BiblioTEC program fosters a collaborative learning environment that develops leadership skills alongside STEM learning. As leaders, the graduates will become program facilitators for their peers and classmates. We will support their career readiness even further through a paid internship program. Interns will travel to nearby library systems, such as The Seattle Public Library, to lead programs. They will inspire and engage libraries by sharing their personal stories, such as at conferences, in library visits, and online.

Once we have established robust successes locally and regionally, we will disseminate what we have learned nationally. KRL will continue presenting at and attending conferences and in-person and online trainings at the state and national levels. To achieve broad reach and demonstrate buy-in, we will collaborate with a variety of partner organizations with similar goals. Possibilities include creating blog posts for Star_NET and sharing our toolkit with the National Girls Collaborative Project.

The Young Adult Library Services Association (YALSA) has already pledged to support wide dissemination of our project. YALSA will share our results through their own communication channels, including articles and blog posts for their members. YALSA will also work with its parent organization, the American Library Association, to champion our toolkit broadly to ALA members.

7. **Sustainability**

KRL has identified STEM education as a key focus for youth services in our forthcoming 2020 Strategic Plan. Even after the end of the grant cycle, we will commit staff, resources, and funds to expanding the impact of BiblioTEC and bringing interest-driven, peer-led, project-based connected STEM learning to all youth.

We commit to sustaining budgets for replacing and updating essential technology, staff professional development and participation, and STEM programming. We will continue to hire BiblioTEC graduates as peer leader interns. We will sustain the partnerships we develop during the grant cycle, including school districts, nonprofits like The Coffee Oasis and the West Sound STEM Network, and businesses such as ATS. We will maintain the web platform, which will keep all our deliverables freely and widely available online.

The staff training we develop and implement during the grant cycle will allow us to continue to grow our capacity to support STEM learning in our library and throughout the field. Each youth librarian at KRL will be trained not only to implement STEM programs, but to create and sustain a supportive community that will allow new programs to thrive regardless of the librarian's level of STEM expertise. This will empower

all branches to continue to design, implement, and share STEM programs within our organization and nationally.

KRL is in an excellent position to build buy-in across the field because of our established reputation for STEM innovation. We have garnered national credibility by sharing what we learned from BiblioTEC, and are excited to use this platform to help expand STEM capacity in libraries nationwide. The teen leaders themselves will inspire and engage librarians by sharing their personal success stories of library-led STEM education. BiblioTEC graduates will present at local and national library and technology conferences. They will travel to nearby libraries, such as The Seattle Public Library, to demonstrate peer-led STEM learning.

This project will lead to systematic change and collective impact, both within KRL and across the field. We envision a future where STEM learning is seamlessly integrated as a crucial component of our spaces, services, and programs, where librarians are champions of inquiry-based learning, and where the library is one piece of a supportive community-wide connected learning system. This project is an important step towards providing libraries and librarians with the confidence and capacity to make that future a reality.

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KITSAP REGIONAL LIBRARY										
Year 1: Make	**March**	**April**	**May**	**June**	**July**	**August**	**September**	**October**	**November**	**December**
Build STEM Community with Summit and Advisory Board. (Key activities 1-4)										
Curriculum Development and Testing (Key activity 7)										
Training, Development, and Implementation of Evaluation and Assessment Tools (Key Activities 5, 8, 9)										
Activity 1: Host a summit with community education and technology leaders										
Identify and invite stakeholders										
Establish goals and create agenda										
Summit										
Compile and share findings										
Activity 2: Appoint Advisory Board										
Monthly meetings										
Activity 3: Create Core Competencies										
Research and development										
Activity 4: Create Badging System										
Research and development										
Link curriculum to badges										
Intitial badge testing										
Activity 5: Develop Librarian, mentor and teen leader trainings										
Develop										
Test and revise										
Train Librarians, mentors and teen leaders										
Activity 6: Develop public website for youth										
Define content										
Technical support										
Implement content										
Test and revise										
Activity 7: Develop Lesson Plans										
Hire consultant										
Align lesson plans to common core and connected learning										
Test and revise at after school program										
Train Librarians										
Activity 8: Engage Librarians										
Community connector										
Facilitator of inquiry based learning										
Activity 9: Recruit and Train Community Mentors										
Recruit and train										
Activity 10: Provide programs										
Implement core and community driven programs										
Measure, evaluate and discuss										
Activity 11: Create cadre of teen leaders										
Recruit and train										
Activity 12: Trial launch web platform to libray partners										
Meet with partnering library systems										

OMB No. 3137-0071, Exp. Date: 09/30/2015

DIGITAL STEWARDSHIP SUPPLEMENTARY INFORMATION FORM

Introduction:
IMLS is committed to expanding public access to IMLS-funded research, data and other digital products: the assets you create with IMLS funding require careful stewardship to protect and enhance their value. They should be freely and readily available for use and re-use by libraries, archives, museums and the public. Applying these principles to the development of digital products is not straightforward; because technology is dynamic and because we do not want to inhibit innovation, IMLS does not want to prescribe set standards and best practices that would certainly become quickly outdated. Instead, IMLS defines the outcomes your projects should achieve in a series of questions; your answers are used by IMLS staff and by expert peer reviewers to evaluate your proposal; and they will play a critical role in determining whether your grant will be funded. Together, your answers will comprise the basis for a work plan for your project, as they will address all the major components of the development process.

Instructions:
If you propose to create any type of digital product as part of your proposal, you must complete this form. IMLS defines digital products very broadly. If you are developing anything through the use of information technology – e.g., digital collections, web resources, metadata, software, data– you should assume that you need to complete this form.

Please indicate which of the following digital products you will create or collect during your project.
Check all that apply:

	Every proposal creating a digital product should complete …	Part I
	If your project will create or collect …	**Then you should complete …**
☐	Digital content	Part II
☐	New software tools or applications	Part III
☐	A digital research dataset	Part IV

PART I.

A. Copyright and Intellectual Property Rights

We expect applicants to make federally funded work products widely available and usable through strategies such as publishing in open-access journals, depositing works in institutional or discipline-based repositories, and using non-restrictive licenses such as a Creative Commons license.

A.1 What will be the copyright or intellectual property status of the content you intend to create? Will you assign a Creative Commons license to the content? If so, which license will it be? http://us.creativecommons.org/

The digital product we create will be assigned to the Creative Commons Attribution-NonCommercial license. Under this license, our product will allow others to remix, tweak, and build upon our work non-commercially. If

someone remixes, transforms, or builds upon the material, they must acknowledge our original work and use it for non-commercial use, but they don't have to license their derivative works on the same terms.

A.2 What ownership rights will your organization assert over the new digital content, and what conditions will you impose on access and use? Explain any terms of access and conditions of use, why they are justifiable, and how you will notify potential users of the digital resources.

The digital product we create is intended to be freely available with attributes. We accept no liability for its use or misuse.

A.3 Will you create any content or products which may involve privacy concerns, require obtaining permissions or rights, or raise any cultural sensitivities? If so, please describe the issues and how you plan to address them.

We look to share hyperlinks to useful resources and information we have found through facilitating our STEM programs. We intend to obtain rights from authors of such materials when required.

ORIGINAL PRELIMINARY PROPOSAL

A National Curriculum for Life-Changing STEM Education in Libraries

Project Summary: Kitsap Regional Library (KRL) will develop, test, and deliver curricula for all ages that any library and its partners can implement to increase STEM capacity in their communities. This set of participatory, hands-on programs will be driven by interest-based projects and peer-to-peer learning and focused on creating meaningful real-world outcomes.

Proven Success. In 2013, KRL pioneered BiblioTEC, a highly successful, transformative STEM learning initiative with the support of community partners, and with initial funding by the Paul G. Allen Family Foundation. Our 9-branch public library system serves a diverse rural, urban, and suburban population of approximately 250,000 in Kitsap County (WA), including areas where over half of schoolchildren receive free or reduced lunches. As a direct result of BiblioTEC, at-risk youth have secured housing, found jobs, pursued GEDs, and enrolled in college.

BiblioTEC engages learners of all ages with the "excitement, interest, and motivation" that may be missing in schools.[1] First, the program changes the lives of at-risk teens and young adults through a hands-on, participatory exploration of their personal passions through technology. Graduates ages 16-25 then become peer "mentors and facilitators," sharing their knowledge and enthusiasm.[2] Each peer educator builds the library's capacity to sustainably provide STEM programs. Young people discover and then share their confidence and love of learning, creating a continuously expanding cycle of community-wide STEM learning with the library at its core.

National Impact. With the support of this grant, KRL will expand BiblioTEC into a set of shareable, replicable STEM curricula that can be implemented by public libraries anywhere in the country. Its focus on personal interests and creativity will engage learners of all ages, especially those who may not think of themselves as people who "do science or are good at science."[3] The set will include both intensive courses and individual classes, all based on free open-source software and aligned with Common Core and businesses standards. Libraries can implement programs in combination or individually, based on local needs and resources. To build capacity, each curriculum will identify instances when and how working with a partner can be most impactful. With this tool, any library or "accidental STEM librarian" can be empowered, without anxiety or high expense, to apply STEM learning to change lives in their community.[4]

As the project lead, KRL will work with partners to develop the following curricula:

<u>An Intensive and Life-Changing Course</u>

- *Target audience:* Older teens and younger adults
- *Partner:* Coffee Oasis, a multi-location local refuge for homeless and at-risk youth

This is an in-depth, multi-week course that includes instruction in programming, robotics, 3D printing and modeling, and game design, followed by collaboration on self-directed, interest-driven, real-world projects. This structure, already in use by BiblioTEC, was co-created by the teen and young adult participants themselves. The curriculum will be designed for any library to implement in collaboration with a social service or community agency serving at-risk youth.

<u>An Engaging Common Core-Aligned After-School Program</u>

- *Target audience:* Middle school students
- *Partner:* Bremerton (WA) School District

This is an after-school program for middle schools, led by a librarian with the support of a peer education mentor. It will teach coding basics through hands-on STEM projects that encourage students to explore technology in ways that engage their personal interests and help them solve "complex problems that they care deeply about."[5] Because this embeds the librarian in the school building, the curriculum will include ways to connect students back to the library. To facilitate library to school partnerships, it will align with the language of Common Core.

A Suite of Inspiring Youth-Led Classes

- *Target Audience:* Adults, teens, and children (all ages)
- *Partner:* Applied Technical Systems, Inc. (ATS), a national company with local offices

This set will include a variety of 1-4 hour stand-alone programs for each age group. Examples include circuit-building for children, 3D game design for teens, and coding a website for adults. To build capacity for classes of this type, youth who complete the in-depth or after-school courses will be eligible to teach. These courses will be designed with the input of the peer teachers themselves, assisted by access to ATS subject experts and mentors. The library-directed programs can travel easily, encouraging libraries to partner with local organizations.

Outcomes. Implementing these programs will result in measurable outcomes derived from BiblioTEC's proven transformative impacts. Through STEM-based, interest-driven, peer-to-peer learning:

1. Participants will build digital literacy skills through a continuous connected learning framework.
2. Youth mentors will develop both technology and leadership skills which will prepare them for the 21st century career landscape.
3. Libraries will build capacity to offer impactful STEM programming through community driven input and mentor expertise.
4. Librarians will be empowered to plan, facilitate, and participate in STEM programming.
5. Libraries will build collective community impact with schools and community partners to enrich STEM learning and career readiness.

Outcomes will be measured and tracked through online badges. KRL will work with a developer to create a freely-shared set of badges for each piece of curriculum. Badges will be aligned with measurable accomplishments that indicate achievement of the desired outcomes. Thus, libraries that implement a program will have a built-in way to evaluate and communicate its impact.

Budget. Our proposed 3-year budget of $325,000 will support program salaries (BiblioTEC librarian and interns), curriculum and badging development, technology, and program materials. KRL and community partners will provide required matching. A fully funded program will maximize our capacity to share our proven model for participatory, hands-on education to impact STEM learning in libraries across the nation.

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[5] Connie Yowell, panelist, *IMLS Convening on STEM Learning in Libraries,* Chicago, IL , June 5, 2014.