Existing Conditions & Assumptions	Program Objectives	Program Activities	Program Outcomes
There is widespread availability of online resources in digital libraries. These resources can promote: • teacher content knowledge • student learning It is seldom the case that teachers/learners will use technologies seamlessly: Limited use by teachers. Lit. review found that bad tech.-focused PD is prevalent • Not relevant • Not sustained • Not tied to incentives • Too much mechanics, not enough pedagogy	Help teachers learn to use NSDL resources in ways that meaningfully affect their practice in STEM content:	Conduct high-quality PBL-informed professional development for rural in-service and pre-service middle & high school math & science teachers of underserved populations. Peer/expert support network to provide follow-up after workshops, both online and face-to-face.	Teachers maximize their existing design capacity in their own local context with high quality resources. The PD model will be improved by our understanding of teacher design practice.
Teachers have ultimate control in the classroom; they act as designers who adapt resources to fit local needs, contexts, and curricular standards. Online resources are catalysts to build locally relevant	Explicate teachers' tacit design capacity and assumptions about online resources. Help teachers increase their design capacity by using NSDL and other online STEM resources as	Phase 1: We conduct research to reveal individual, contextual, and resource factors that affect teacher design capacity. Phase 2: Integrate design curriculum into professional development model	Educators, technology trainers, and resource creators and administrators will: 1) Make better design choices. 2) Understand factors that affect design: resource content, granularity, and

instruction. They have affordances that enable or constrain design. Little is known about how teachers view their roles in terms of design and reuse.	building blocks for teacher-created content and assessments.	(workshop session 2) that utilizes components of PBL.	metadata.
NSDL: over 1 million resources from 480 collections. Teachers have created little of that content despite the fact teachers want other teacher-created content.	Contribute teacher-designed learning activities to NSDL.	Phase 1: Develop a quality assessment and metadata tagging rubric. Phase 2: Review teacher created resources: Review Committee (RC) uses content review rubric.	Teachers produce vetted content relevant to standards that can be shared for reuse through NSDL. As the rubric matures, it will be used to inform prescriptions for resource design.

Research and Evaluation Logic Model

Research and Evaluation Objectives	Research Questions	Methods and Data
Measure workshop impact on teachers' effective technology integration. Title II D: Enhancing Education Through Technology (EETT) of the No Child Left Behind Act (NCLB).	What is effective integration of educational technology, and how does it happen? Are teachers more likely to integrate educational technology in an effective way after going through the workshops?	- Participant pre/post surveys - Classroom observations - Interviews - Webmetrics. - Quasi-experimental study (Utah). - Document/artifact analysis
Measure impact on	How are teachers'	- Participant pre/post

teachers' technology experience, attitudes, and knowledge about online resources and libraries.	knowledge and skills changed by use of these technologies and resources?	surveys - Interviews - Classroom observations. - Webmetrics. - Quasi-experimental study (Utah) - Document/artifact analysis
Improve the IA, the workshop model, and the NSDL.	How can the work of technology trainers (e.g. the workshop model) and resource developers (e.g. NSDL contributors) better serve the needs of educators?	- Participant pre/post surveys. - - Interviews. Document/artifact analysis.
Create a resource quality/usability rubric.	What is the validity (e.g. face and content) and reliability (e.g. inter-rater and intra-rater) of the rubric? How easy is it to apply to the evaluation of teacher projects? What is the quality of the resulting metadata tagging of vetted resources?	- Interviews with RC and digital library vetting team. - Measure number of projects contributed to NSDL. - Literature review.
Research a model of teachers' tacit design capacity sensitive to different resources, teachers, and contexts.	How do teachers view their roles in adapting, designing, and reusing learning objects? What variables (e.g.	- Participant Pre/post surveys - Interviews - Classroom observations. - Webmetrics. - Quasi-experimental study

Measure impact of workshops and support networks on teacher design capacity.	granularity of resources, teacher experience and comfort with STEM content) influence use and perceived utility of the program? How are teachers using online resources? What kinds of artifacts are workshop participants creating? How are the teacher and content development models working (pedagogy and content)?	(Utah). - Document/artifact analysis. - Literature review.
Measure impact on teachers' STEM content knowledge from use of NSDL.	What role do online resources have in supporting increased content knowledge? How are teachers' knowledge and skills changed by use of these technologies and resources?	- Participant pre/post classroom observations and interviews.
Measure impact on students' STEM content knowledge and attitudes from consumption of teacher-designed resources.	How have the self-reported knowledge and skills of students changed? How have the self-reported attitudes of students	-Student pre/post classroom observations and interviews. -Pre/post survey of student self-reported attitudes about and levels of knowledge in relevant content area.

	changed?	-Quasi-experimental design (Utah).