Maker Immersion: Developing Curriculum Design and Assessment Skills for Academic Makerspace Course Integration

University of Texas at Arlington Libraries (UTA) requests $249,929 for a three-year National Leadership Project Grant to build upon work from the 2017 IMLS National Leadership Planning Grant: Maker Competencies and the Undergraduate Curriculum. The planning grant successfully resulted in a tested and revised set of maker competencies for university courses (http://bit.ly/UTAMakerComp), tested student self-assessment surveys, and a maker literacies web site that openly shares these competencies, curricula, and assessments (https://library.uta.edu/makerliteracies). These maker activities reinforce the transferable skills that employers value and need in the new graduates they hire.

For the project grant, UTA, University of Nevada at Reno Library (UNR), UMass Amherst Libraries (UMass), and Boise State University Library (BSU) seek to expand the Maker Literacies program by 1) implementing changes to the program based on findings from the planning grant; 2) adding a professional development component for librarians and makerspace staff to become curriculum design and assessment leaders within the academic library makerspace community; and 3) establishing standardized assessment tools for measuring the impact of academic library makerspaces on student learning outcomes.

Statement of National Need

Hands-on experiential learning opportunities in academic library makerspaces can be scaffolded into university curriculum to cultivate innovation, collaboration, critical thinking, and research skills. While several such makerspace-course integration programs have emerged since our work began in 2016, none are as comprehensive (covering curriculum design and integration through planning, delivery, and assessment) or as large (over 350 students enrolled in 17 different courses spread across five campuses, representing 13 distinct disciplines) as what UTA and UNR achieved through the 2017 pilot program. As makerspace-course integration programs continue to appear, it is clear that methods for evaluating how makerspaces impact student learning remain under-developed (Rosenbaum & Hartmann, 2017). Our project will address the Lifelong Learning category by scaling up work done in the pilot project; giving librarians competency-building opportunities; helping librarians develop, implement, and evaluate replicable library programming; and evaluating how makerspace services impact learning.

Project Design

A key takeaway from the 2017 IMLS-funded pilot program was that librarians didn't feel comfortable or knowledgeable enough to lead faculty through the course integration process. Additionally, although faculty universally felt that their students greatly benefitted from the integration of making into their courses, several of them wanted tools that would assist them to better evaluate what students had specifically learned. To address these needs and increase the impact of academic library makerspaces on curriculum, our focus will be on professional development surrounding librarian and faculty collaboration for curriculum design and makerspace integration.

In year one, grant personnel will identify 20 faculty members at 10 universities (including UTA, UNR, UMass and BSU) to serve as case studies. Faculty and librarians at these universities will use the revised maker competencies to develop curricula and assignments. Participants will test revised student self-assessment surveys (indirect assessment of student learning) and newly created rubrics based on the revised competencies, values, and dispositions document (direct assessments of student learning), to develop refined assessment tools and additional curricula for inclusion on the maker literacies web site. While the planning grant focused on assessing and revising the maker competencies, these case studies will evaluate the assessment methods for those revised competencies. The feedback gathered from this process will greatly impact the content that is ultimately delivered during the immersion program stage (detailed below). First year work will also include building a sustainable platform that will function as a backend repository feeding content to the maker literacies web site.

Simultaneously, librarians and makerspace staff from the four partner institutions will begin creating curricula for a five-day immersion program intended for academic librarians and makerspace staff.

In year two, librarians and makerspace staff from UTA, UNR, UMass, and BSU will complete the curricula for the immersion program, plan and coordinate the event, recruit and register 75 attendees from diverse institutions, and, in summer 2020, host the first five-day in-person professional development immersion program. Participants will learn about 1) developing maker-based learning outcomes that map to subject-based learning goals; 2) creating maker-based assignments; 3) managing instructional experiences in makerspaces; 4) integrating reflection into making (an essential element of experiential learning); and, 5) assessing student learning.

In year three, after completion of the immersion program, grant partners will revise the curricula and create a digital version of the program using online learning modules that will be openly and freely available. The partner institutions will plan, coordinate, recruit and register attendees for a second in-person immersion program held in summer 2021. Project personnel will create a sustainable model for continuation of both the online and in-person immersion programs.

- Spring 2019 – Begin to identify case studies sites and faculty.
- Fall 2019 – Case studies/test assessments. Create outline and marketing for immersion program.
- Early spring 2020 - Begin recruiting attendees for program. Analyze case studies feedback.
- Spring 2020 - Create immersion curriculum.
- Late summer 2020 - Host immersion.
- Fall 2020 - Revise immersion curricula. Begin creating online platform. Develop marketing for second immersion.
- Spring 2021 - Begin recruiting attendees for second immersion. Begin populating online platform with curriculum.
- Late summer 2021 - Host immersion.
- Fall 2021 - Finish online immersion modules and market them. Identify plan to sustain web site and both immersion programs.
- Spring 2022 - Finalize sustainability plan for immersions. Enable ability for users to add curricula to the maker literacies web site.
- Early summer 2022 - Grant report.

National Impact

First, we will develop assessment tools for maker competencies that can be adapted by academic institutions and applied to student outputs to assess learning. Second, we will continue to grow the amount of curricula available via the maker literacies web site. Submissions will be solicited from the case studies and those who attend the in-person immersion program or use the online immersion modules. This curricula will be available with creative commons licenses that allow for revision and reuse. Third, this grant will fund the creation of a national professional development program for those who work with academic library makerspaces, including a plan for sustaining both online and in-person versions of the immersion program. Fourth, we plan to share what we have learned by presenting a white paper at the International Symposium on Academic Makerspaces.

Estimated Budget

Year One		**Year Two**		**Year Three**	
18 Non-UTA Faculty Stipends	$25,200	2 GRA student workers	$35,750	GRA student worker	$17,875
2 UTA faculty	$2,990	2 UTA personnel	$4,114	2 UTA personnel	$4,114
Maker materials	$6,000	2 Instructor travel, hotel	$3,800	2 Instructor travel, hotel	$3,800
GRA student worker	$17,875	2 Instructor stipends	$4,000	2 Instructor stipends	$4,000
		Maker materials	$7,500	Maker materials	$7,500
		Program expenses-food	$20,625	Program expenses-food	$20,625
		Participant travel	$500	Participant travel	$500
Total	$52,065		$76,289		$58,414

$52,065 + $76,289 + $58,414 = $186,578 + $63,161 (IDC) = **$249,929**