Community Informatics Studio: Designing Experiential Learning to Support Teaching, Research, and Practice

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This paper introduces a model of experiential learning to support teaching, research, and practice in library and information science (LIS). The concept we call *Community Informatics (CI) Studio* uses studio-based learning (SBL) to support enculturation into the field of CI. The SBL approach, closely related to John Dewey's inquiry-based learning, is rooted in the apprenticeship model of learning in which students study with master designers or artists to develop their craft. Our paper begins with a review of literature to frame our research before introducing our analysis of the CI Studio course. Using the first three semesters of the course as case studies, the goal of the paper was to present three related investigations that emerged from our over-arching research question: How can the CI Studio be understood as a model of experiential learning to support LIS teaching, research, and practice?

Keywords: community informatics, studio-based learning, experiential learning, community engagement, popular education

Introduction

This paper introduces a model of experiential learning to support teaching, research, and practice in library and information science (LIS). The concept we call *Community Informatics (CI) Studio* uses studio-based learning (SBL) to support enculturation into the field of "Community Informatics" (Campbell & Eubanks, 2004; Gurstein, 2003; Keeble & Loader, 2001; Stoecker, 2005; Williams & Durrance, 2009). The SBL approach is rooted in the apprenticeship model of learning in which students study with master designers or artists to learn their craft. This pedagogical technique is closely related to John Dewey's inquiry-based learning (Lackney, 1999). In this paper, we argue that the CI Studio provides a novel research approach for examining LIS-led community engagement by modeling actual learning environments where future LIS professionals can develop meaningful CI projects.

The paper begins with a review of the "community informatics" and "studio-based learning" literature to provide a foundation for our research. We then briefly consider the research sub-questions, methodological approaches and findings from our three mini-case studies of the CI Studio course offered over three semesters. The study presents and discusses three related investigations that emerged from our overarching research question: *How can the CI Studio be understood as a model of*

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experiential learning to support LIS teaching, research, and practice? The goal of the paper was to provide an instructional model that can prepare future LIS-professionals to lead meaningful community and civic engagement projects.

This study is significant because federal agencies and foundations have recently called for public libraries to address community information needs by leading community engagement efforts. "The Promise of Libraries Transforming Communities" (Institute for Museum and Library Services, 2012), IMLS & The MacArthur Foundation's "Learning Labs" (Institute for Museum and Library Services, 2011), and The Knight Foundation's (2009) "Information Needs of Communities in a Democracy" are three recent examples recognizing the unique abilities that public, academic and school libraries offer to advance local community and civic engagement. In this paper, we argue that the CI Studio can provide LIS teachers, researchers and practitioners with a theoretical and methodological framework for advancing LIS-led community engagement initiatives.

Theoretical Framework

We begin the paper by introducing the CI and SBL literature as the foundation upon which we suggest a model for coupling these practices as a useful approach for advancing LIS teaching, research and practice with community members.

Community Informatics

Community Informatics examines how people in geographic locations interact with information and communication technology (Williams & Durrance, 2009) and its application to enable and empower community processes (Gurstein, 2007). Community Informatics researchers view "informatics" as the digitization of society, particularly as people's lives move online from physical to virtual spaces. O'Neil (2002) argued that "theories for measuring the impacts of CI projects fall into five key areas," including strong democracy, social capital, individual empowerment, sense of community and economic development opportunities (pp. 78–79). Other scholars have argued that CI can help support community organizing projects and social justice goals. For instance, one area of study for CI, which served as a project focus for each of the case studies in this paper, looks at the ways community institutions such as public libraries, community centers, social service agencies and churches can utilize public computing centers (PCCs) and digital media literacy workshops as interventions for addressing the "digital divide," or the gap between the "information haves and have-nots" (National Telecommunications and Information Administration, 1999, p. xiii).

Stoecker (2005) described CI as an effort to use "technology to support community development goals." Stoecker (2013) also explained that scholars often discuss community development within two contexts. The first perspective is defined as a top-down approach where elites determine the goals and manage the implementation of information and communication technology (ICT) development projects often in poor or underserved areas around the world. The second perspective advocates for a more participatory approach. Scholars and activists informed by this perspective argue that those most directly impacted by ICT projects should organize themselves and decide their own terms by which ICTs are used (or not) to advance shared community development goals. Stoecker (2005) described this second perspective as a community organizing approach to community development and argued that it can often be useful as a way to get people involved in and excited about CI projects. Bishop, Bruce, & Jeong (2009) further refine the concept of participation through a "community inquiry" approach to community engagement that recognize students and school as vital parts of the community and collec-

tive knowledge building as something performed of, for and by communities as living social organisms. As they explained, "Knowledge is found in the community as well as the school and is constructed anew by all participants. In this way, the borders between school and community are not accepted as fixed, only to be crossed under special circumstances" (p. 22).

Community informatics has also been described as "a sustainable approach to community enrichment that integrates participatory design of information technology resources, popular education and asset-based development to enhance citizen empowerment and quality of life" (Campbell & Eubanks, 2004). In her work developing "popular technology" workshops with low-income women at a YWCA in upstate New York, Eubanks (2007) detailed how participatory design, popular education and participatory action research can provide "alternative articulations of digital equity" and opportunities to develop "powerful strategies of resistance" in the information age (p. 1). We believe the participatory perspectives described by Stoecker, Bishop *et al.* and Eubanks provide insightful examples of how the lines between CI education, research and practice intersect and provide a way forward for LIS professionals looking for new approaches to leading community engagement projects.

Studio-Based Learning

Studio-based learning is rooted in the apprentice model of learning in which students study with master designers or artists to develop their craft. It emphasizes learning by doing, often through community-based design problems and is an integral pedagogy in architecture, urban planning and fine and applied arts. Lackney (1999) described SBL as being focused on helping students learn to be a professional using the apprenticeship model as opposed to learning the knowledge needed to be a professional through lectures. The iterative design process, as described by Brocato (2009), relies heavily on desk critiques and feedback from instructors and outside experts to provide students with guidance and support.

Studio-based learning reflects Dewey's approach in 1938 to experiential learning (Lackney, 1999). For instance, Dewey emphasized the importance of helping students shape their purpose for a given activity by constructing a plan based on their impulses, past experiences and community knowledge to maximally shape the current learning environment. In this way, teachers act more like "guides" to assist students in developing and implementing their design choices. Students and instructors work together within a studio space that serves as a model of professional practice, incorporating field visits to inform work. Regular student reflections also help students think more deeply about the paths that lead them to their final project designs. The community-based studio in particular provides an opportunity for students to participate in real-world design projects through engagement with community partners (Lawson, *et al.*, 2011; National Endowment for the Arts, 2002). Community-based studios not only teach critical knowledge regarding how to be a professional, they also provide pre-professional students with confidence that they can accomplish outputs promised to a partner (Lawson, *et al.*, 2011). Further, when explicitly considered in course design, community-based studios provide opportunities to advance multicultural learning (Lawson, *et al.*, 2011).

Community Informatics Studio Pedagogy

In this section, we briefly introduce our *Community Informatics Studio Pedagogy* and describe how it builds on previous studies of CI and SBL. The purpose is to construct the framework for viewing our three mini-case studies that follow in the next section.

Simpson *et al.*'s (2004) model of SBL in CI was described in their study of community journalism platforms. They showed how the studio pedagogy helped to "move the classroom focus from the teacher to the learner and to create a more active and engaging climate for the learners" (p. 256). CI Studio builds on this social constructivist approach by drawing from pragmatist, progressive and popular educational philosophies that begin with Addams (1902) and Dewey (1938) and continue with works by Freire (1970), Eubanks (2011) and Stoecker (2013). These philosophies lead us to prioritize the following CI values mentioned above within our SBL classes: (1) developing a sustainable approach to community enrichment, (2) approaching community engagement with an asset-based perspective, (3) embracing difference as a resource, (4) teaching, researching and practicing with community members, (5) focusing on community-defined goals for building healthy communities. The CI Studio builds upon perspectives of SBL, participatory action research/community based research (Stoecker, 2013) and community engagement (The Carnegie Foundation for the Advancement of Teaching, 2013) as applied in fine and applied arts through the East St. Louis Action Research Project, or ESLARP (Lawson, *et al.*, 2011; Sorensen and Lawson, 2012) and its integration into LIS through a 12-year collaboration with ESLARP (Wolske, 2012). Our engagement with our students especially calls attention to the iterative aspects of the studio-design process and seeks to model the studio space as a key foundation of our CI Studio pedagogy. Real-world cases arise from ongoing conversations with community partners as a natural part of the boundary-spanning role of the lead author. Specific partnerships are highlighted each semester to emphasize specific community informatics themes.

Figure 1 is an adaptation from Brocato's (2009) SBL design path proposal, highlighting the role that readings, discussion and community engagement play in our studio design process. The author described the "propose-critique-iterate" as part of a pedagogical approach that asks

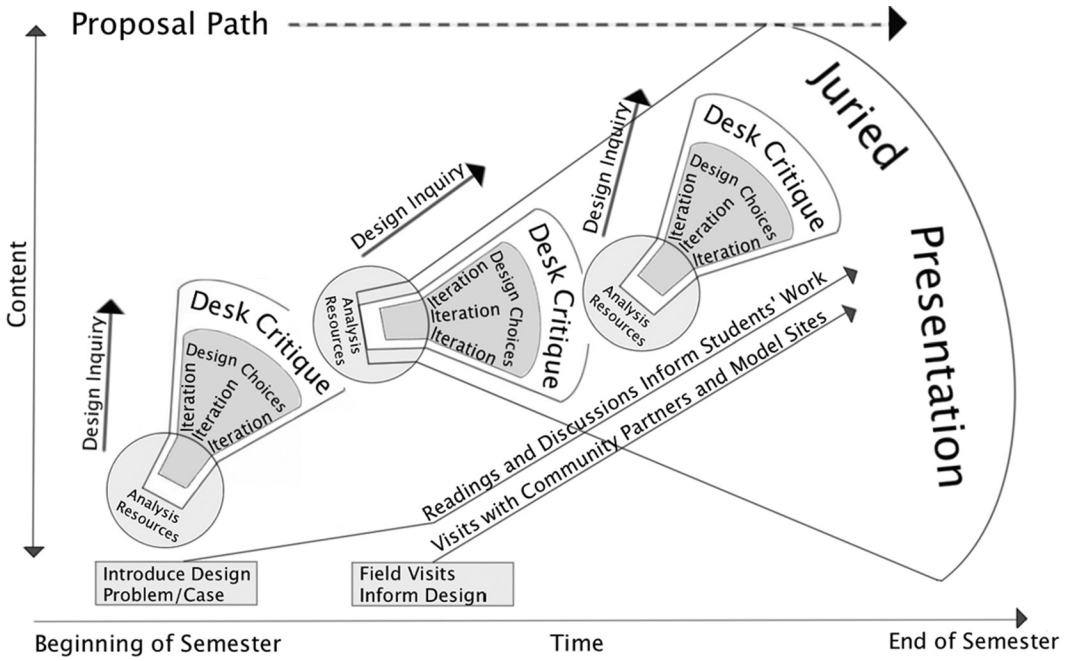

Figure 1. Community Informatics Studio Proposal Path.

students to develop their designs with *instructors as guides* using pin-ups, desk critiques and formal juries (p. 142). We closely model our CI Studio pedagogy on Brocato's framework.

On Day One of the semester, instructors introduce the design problem or case, to students. The individual, team, community and project-level learning outcomes are listed in the course syllabus and revised as needed, based on a collaboratively developed shared understanding of purpose within the current learning environment.[1] Early classes rely heavily on readings and discussion to ground students and prepare them to work in field. Field visits with community partners and model sites inform the studio designs. Instructors and outside experts ask students to defend their design choices at desk critiques during scheduled sessions and informal conversations. At the end of the semester, students present their design projects to a juried panel of instructors and invited guests as part of a final critique.

Community Informatics Studio: Three Mini-Case Studies

In this section, we introduce three semesters of the CI Studio course. The course is an elective offered at the Graduate School of Library and Information Science with enrollments between four and the cap of 15. It has attracted students from departments outside the school, including Journalism and Education, who are particularly interested in the role of technology in supporting community engagement. For each semester, we present the design case and the theoretical perspectives guiding the student projects, along with the research sub-questions, methodological approaches, findings and recommendations from the case evaluations. For all three case studies, the data were collected using qualitative methods, including face-to-face interviews with students, instructors and community members. We hope the three studies can be considered together in order to respond to our study's overarching research question: *How can the CI Studio be understood as a model of experiential learning to support LIS teaching, research and practice?*

Case Study I: [Re]Designing Public Computing Centers

The case for the Summer 2010 CI Studio was informed by research surrounding PCCs as social centers serving a range of important learning, collaboration, creative and civic functions (Baker, 2008; Becker *et al.* 2010; Ceballos *et al.*, 2006; Fuchs, 1998; Gurstein, 2003; Viseu *et al.* 2006). After in-class presentations to introduce core frameworks and the design case, students from Library and Information Science, Architecture and Education used field trips to local and regional PCCs and collaborative spaces to research the intersection of community and technology. Students also performed a literature review of environmental psychology and evidence-based design to consider how principles previously applied to health, school and work settings might be applied to PCCs. The students then worked collaboratively with the staff and students of a community center to create a design proposal for their PCC. The 4-week summer session did not allow time to implement the final design proposal, but several students volunteered into the fall to help implement the redesign (Wolske *et al.*, 2013a)

The research question directing the evaluation of the semester was *How does SBL compare to other forms of classroom learning?* The mixed-methods research on the class pedagogy, conducted by Beth Kumar, third author on this paper, included pre- & post-surveys of the students, class observations both in the studio and in the field, informal discussions with the student

[1]Syllabi are available online:
summer 2010 - http://go.illinois.edu/cistudio_su10;
summer 2011 - http://go.illinois.edu/cistudio_su11;
fall 2012 - http://go.illinois.edu/cistudio_fa12

groups, interviews with the instructor and teaching assistant and the formal written course evaluations.

The evaluator found that the first few sessions of the course consisted of background lectures to ground the students on related ongoing CI-related projects as well as on the CI studio pedagogy course objectives. However, the lecture format of the classroom soon switched to active studio learning. The students became the apprentices, each group finding solutions to the lab space at the community center by visiting existing labs and researching possible solutions. The instructor, in his role as the master, was on hand for the student's decision-making process, guiding them when questions came up, but primarily letting them use trial and error to find a solution. The student teams worked as partners with the staff of the center and the course instructor, jointly owning the project. The studio pedagogy removed the pressure and emphasis on tests and grades, instead shifting the focus and effort to the end result. Overall, it was found that students unknowingly repeated Kolb's (1984) cycle of experiential learning (Figure 2) many times.

The 2010 CI Studio final project documents, which have served to inform the design of numerous subsequent public computing centers, are online at: http://www.prairienet.org/op/labdesign/

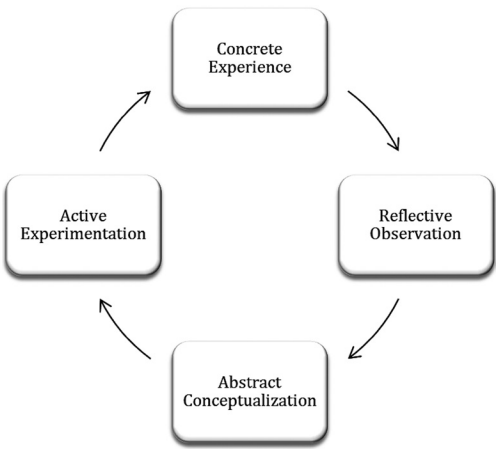

Figure 2. Kolb's Cycle of Experiential Learning.

Case Study II: Equipping Community Media Newsrooms

The case for the summer 2011 CI Studio responded to various calls, such as those by the Knight Commission Report on the Information Needs of Communities in a Democracy (2009) and Schaffer (2010), for informed communities and hyperlocal news startups to develop informed, engaged and healthy communities. Wolske, the first author on this paper, had recently received funding to lead the "Equipping Citizen Journalists" project, which sought to bring together key ongoing and recent projects to address the disparity in effective use of technologies for information gathering, reporting and information and news presentation existing in the local community. For this semester's project, co-instructors Wolske, Brant Houston, the University of Illinois College of Media John S. and James L. Knight Foundation Chair in Investigative and Enterprise Reporting, and Pam Dempsey, reporter with CU-CitizenAccess, identified four PCC pilot sites to serve as community media newsrooms. After several class sessions reviewing related literature (Gillmor, 2006; Howley, 2010; Lundby, 2009; The Knight Commission, 2009), students worked with pilot sites and professionals to adapt community media and citizen journalism programming to the current needs of residents.

Grant funding also included funding for a researcher, Rhinesmith, the second author on this paper, to evaluate the effectiveness of the CI Studio projects. The main research questions were: *How important is the goal of equipping a community media newsroom to foster citizen journalism?* And how successful was the project in achieving this goal? The research sample included students, instructors and community partners (Rhinesmith *et al.*, 2011).

The findings indicated that the course was successful in beginning to help equip citizen journalists by providing residents

with the training needed to produce and distribute their own stories. University and community were able to collaborate through the CI Studio to work towards advancing community development goals using community media and citizen journalism. However, limited time and resources meant that the CI Studio course had to be flexible in what, where and how the work was executed. By the end of the summer semester, the instructors decided that the goal for future semesters would be to have students develop digital and media literacy workshops with residents in low-income communities to develop the skills needed to improve the image of their communities and to help promote their community development goals. Students, instructors and community partners also agreed that the course was too short and recommended that future semesters spend more time working with partners in the community.

The descriptions of the final projects and lessons learned by the 2011 CI Studio students are documented online at: http://www.prairienet.org/op/journalism/.

Case Study III: Creating Popular Technology Workshops

In reviewing student evaluations and findings from the previous two semesters, the authors decided that a 16-week semester CI Studio offering during Fall 2012 would respond to students' feedback by providing new students with an opportunity to engage more deeply with SBL to develop meaningful community engagement strategies. The grant-funded case for Fall 2012 was to develop popular technology (Eubanks, 2011) approaches to digital and media literacy workshops. The course considered frameworks of popular education, participatory design and participatory action research—the three legs of Eubanks' popular technology approach—through works such as Addams (1920), Dewey (1938), Freire (1970/1993), Reardon (2000) and Stoecker (2013) to ground workshop development. These works also provided key theoretical concepts and specific examples of participatory action research that we used as a guide for our approach to studio-based learning in community informatics.

The co-instructors, Wolske and Rhinesmith, along with students used SBL to model educational spaces working with community members to design workshops rooted in people's everyday experiences with technology. Opportunities during the full-length semester allowed for greater in-class participation by outside experts including Virginia Eubanks and Diana Nucera of the Detroit Digital Justice Coalition.[2] However, delays in the start of the funded project meant that not all students were able to work directly with community partners on workshop development during the semester, although all were able to capitalize on their other community partnerships to inform their work. Students used studio time during class to work on their projects and to receive feedback from instructors and fellow students. In addition, students wrote weekly reflections in an online course forum. These contributions provided students with an opportunity to think about workshop design choices and to receive additional feedback from instructors and peers. The four students' final workshop designs are presented in Table 1.

The findings reported in this third mini-case study are drawn from recently completed research published by Wolske *et al.* (2013b) that help us to consider the following research question: *How can studio-based learning—informed by perspectives from community informatics—prepare students to advance LIS-led community engagement?*

Students used data from group critiques, individual critiques, weekly journals and workshop dress rehearsals to analyze the use of SBL to advance LIS-led community

[2]http://detroitdjc.org/

engagement. In authoring their reflections for the case study (Wolske *et al.*, 2013b) students described how the desk critiques promoted a deeper understanding of theories and popular education-style workshops by identifying their misconceptions and by having the instructors encourage workshop revisions. In addition, guest speakers also modeled for students how to plan and facilitate workshops. Students found that outside experts helped to concretely connect theories to practices from a CI perspective. Students also discovered that the class culture was an important aspect of the course. They reported that the modeled studio space encouraged open and honest communication and feedback from teachers and other students in the class. The CI Studio also demonstrated popular education in action and modeled how students should facilitate their workshops.

The 2012 CI Studio workshops outlines, which are freely available to be adapted and used by the public, are online at: http://www.prairienet.org/op/dmliteracy/.

Limitations of Research

The case studies above highlighted the development of a SBL course to advance LIS teaching, research and practice. In this section, we share some of the challenges and overall limitations of this research project.

The case studies described above weren't originally planned as part of a larger study when the first case study was developed. Therefore, the authors found it challenging to consider three different semesters of the course—each with separate research questions, theoretical frameworks and methodologies—for this paper, while attempting to design and respond to a single overarching research question. In addition, the evaluation conducted for each case study was led by different sets of researchers. The authors also discovered the core research question over time. It was not until the last semester (i.e. case study III) that the following research question was articulated based on findings from studies of the first two semesters: *How can*

Table 1. Community Informatics Studio Workshops.

Student	Workshop Title	Description
Jennie Archer	Preserving Local History One Voice at a Time: A Popular Technology Workshop for Teens	This workshop aims to raise teenagers' awareness of their positions within their communities and to remind them that their voices and experiences matter.
Emily Bayci	Seniors Step Forward: Increasing Technology Awareness and Sharing it with Your Peers	This workshop was aimed towards senior citizen African-American women. The goal was to help them learn that they are not alone in their quest to learn technology and to help them reach an understanding about why they feel it is necessary to learn technology.
Ryne Leuzinger	Uncovering Art in C-U: Forming partnerships to share and promote artwork and address issues of concern to artists in Champaign-Urbana	This workshop seeks to bring together members of a local arts community to engage in a discussion related to forming new partnerships and addressing common obstacles.
Lucas McKeever	Queering the C-U Wiki	Due to the nature of wiki sites, the goal of "Queering the C-U Wiki" was to equip LGBT members of the community with the skills required to ensure their past and present do not go undocumented.

studio-based learning informed by community informatics perspectives prepare students to advance LIS-led community engagement?

Additional challenges to both the course offerings and this study included the limits of our university, as an institutional system, to support, particularly through funding, this type of community-based research. Lastly, because the CI Studio is meant to model the actual environment where future LIS professionals might find themselves designing community engagement projects, the lines between teaching, research and practice often blurred, which created challenges for researchers interested in developing evaluative frameworks for this study.

Discussion

The findings represent a progression in research related to our guiding question: *How can the CI Studio be understood as a model of experiential learning to support LIS teaching, research and practice?* We consider three key findings that emerged across the case studies: (1) the value of the experiential learning opportunity; (2) the benefit of the iterative design process; and (3) the importance of CI Studio Values for informing future LIS-led community engagement.

Experiential Learning

The CI Studio pedagogy resonated with students because of its grounding in experiential learning. As one Summer 2010 student mentioned: "I would love to take another studio course because it gave the opportunity to not only learn from real world observations but it also gave me the opportunity to apply the concepts to real world situations." A Summer 2011 student emphasized the importance of the experiential learning aspect of the course more strongly:

> Most classes here are not like that. They are quite the opposite. It's a lot of feeding you facts and figures and processes and assignments that require regurgitation of those things, which is like a very traditional way of teaching. But I think [instructor's] was the most experiential of any approach that I had while I was here. I mean you learn way too much from it—which is almost a problem [laughing].

Indeed, students from Fall 2012 recommended that clear opportunities be provided to allow students to continue the experiential learning of their studio work through a second iteration of the course, a practicum, or an independent study. (Wolske *et al.*, 2013b)

Further, the experiential learning provided a valuable way to engage in research on current topics in LIS through the design problem. For instance, a Summer 2010 student remarked: "I couldn't imagine taking a CI class that wasn't in the studio format. How would you learn anything? This one class has shaped my entire outlook on CI. CI requires hands-on experience, with trial and error and lots and lots of brainstorming; the studio format is ideal for these activities." Students from the first and third offerings of the class have gone on to co-author works based on their participation in the studio course (Wolske *et al.*, 2013a, b)

Iterative Design

As pointed out in the last quote, the iterative aspect of the studio design process combining trial and error with brainstorming was an important part of the studio. Indeed, in response to the delayed start of formal critiques until mid-semester because of extenuating circumstances, students from the Fall 2011 course recommended desk critiques start earlier in the semester (Wolske *et al.*, 2013b). In the evaluation of the Summer 2010 course, Kumar, the third author on the paper, found the iterative aspect as applied in the CI Studio reflected Kolb's (1984) experiential

learning cycle. The role of the instructor as guide during the formal and informal desk critiques was central, as described by a Summer 2010 student: "making sure we were doing something in the right general direction, but letting us wander otherwise. Devil's Advocate may not be the right term, but he served as a voice of challenge, testing our ideas and showing us possibilities we might have otherwise ignored." By the third case study, the incorporation into the CI Studio pedagogy of Dewey's (1938) framing of instructor as guide, along with the importance of purpose and past experience to shape the current learning environment, served as a model for students' own project work developing alternative models for digital media literacy workshops.

CI Studio Values

Our framing of CI draws heavily from the work of Bishop *et al.* (2010), Eubanks (2011) and Stoecker (2005/2013). These in turn build upon the philosophies of Addams (1908), Dewey (1938) and Freire (1970) among others. From these philosophies we have prioritized the following, what we call, *CI Studio Values* within our SBL classes: (1) developing a sustainable approach to community enrichment; (2) approaching community engagement with an asset-based perspective; (3) embracing difference as a resource; (4) teaching, researching and practicing *with* community members; (5) focusing on community-defined goals for building healthy communities. As federal agencies and foundations call for public libraries to address community information needs by leading "community engagement" efforts (Institute of Museum and Library Services, 2011/2012; Knight Commission, 2009) we argue that the CI Studio can provide LIS teachers, researchers and practitioners with a framework for advancing LIS-led community engagement initiatives.

Students in the Summer 2010 CI Studio used participatory, evidence-based design that emphasized an asset-based approach with community members. It centered on community-defined goals for building healthy communities as implemented through the programs of the social service agency that served as host to the redesigned computing center. The result was a transformed physical space that

> re-shaped social expectations from the space, revitalized administrators and staff members in pursuing more sophisticated programming, improved the mood of the users and resulted in better maintenance of computers through more immediate reporting of problems and collaborative problem solving. (Wolske et al., 2012)

In their online project documentation of citizen journalism workshops,[3] students from Summer 2011 reported as key take-away lessons the importance of actively planning curricula with collaborators and fostering empowerment and agency in community using participatory principles to explore technologies, interests and content creation. In an interview following the semester, a Summer 2011 instructor stated, "I learned a whole lot from this. I had a lot of personal growth, you know when you're dealing with the community, community media and just listening to their conversations." The workshops developed by Fall 2011 CI Studio students reshaped digital media literacy workshops based on their understandings of these theoretical frameworks (Wolske *et al.*, 2013b)[4]. Research is ongoing to assess the community impact of the Fall 2011 studio. Assessing the full impact on LIS-led community engagement of the CI Studio approach outlined above will require a longitudinal study following students as they progress through their professional careers.

[3]http://www.prairienet.org/op/journalism/workshop-structure-and-strategies/

[4]See fall 2012 workshop justifications at: http://www.prairienet.org/op/dmliteracy/

Conclusion

In this paper, we introduced a model of experiential learning to support teaching, research and practice in LIS. The authors attempted to show through the research how the CI Studio can be an effective pedagogical approach to using SBL to help future LIS professionals design meaningful LIS-led community engagement projects. The paper wove pragmatic and progressive epistemological traditions together into a framework through which to view what we believe is a unique approach to CI. Three mini-case studies of the CI Studio course were presented, along with the guiding theoretical frameworks, research questions, methodological approaches, findings for each semester. The goal of this educational research project sought to respond to the paper's overarching research question: *How can the CI Studio be understood as a model of experiential learning to support LIS teaching, research and practice?*

The study found that the CI Studio provided a unique opportunity to prepare future LIS-professionals to lead meaningful community engagement projects by advancing student's skills to bring theory and praxis into dialectic. In particular the authors found that key values from CI literature played a key role in shaping students' experiences and their thinking about design choices that encourage ways to engage with, rather than for, communities.

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