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Creating Peer-Led Faculty Learning Teams to Promote Social Responsibility in Computing

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This work-in-progress study describes our grant-funded efforts in developing a computer science faculty learning community (FLC) across six California state institutions. With an emphasis on socially responsible computing (SRC), the faculty development effort that prepares faculty for SRC lesson implementation has integrated social scientists with computer science faculty in the rotating leadership team. It works collaboratively to facilitate dialog around experiences of implementing lessons that focus on social justice and ethical decision-making. Our data-driven FLC and course transformation effort was initiated by finding that retention rates in early computing courses at participating institutions were inequitable across demographic groups. The ultimate goal of the Broadening Participation in Computing Alliance for Socially Responsible Computing is to improve the retention rates of LatinX students by increasing their sense of belonging to the field of computer science[1] through deliberate and intentional connections of curriculum to real-world problems and social issues. For this paper, we focused on the faculty experiences of our most recent summer workshop and our reflection on the FLC implementation process. We present our faculty survey data from June 2024 and introduce reflective focus group findings [2], providing conjectures about the effectiveness of our approach. In the discussion, we build recommendations for collaborative professional development of faculty and discuss next steps.

We draw on the literature of professional learning and instructor development, which purports the following tenets of effective practice: a) professional development should continue over time to create change [3], b) professional development should build on the lived experiences of faculty learners [4], and c) professional development should be reflective in nature [5] . Our curriculum design features a spiral introduction of materials [6] described in the literature as reviewing concepts over time with greater depth at each iteration [7]. Our effort of embedding social responsibility in the computing curriculum draws on other work facilitating curricular changes [2], [8], [9], [10], [11]. Specifically, we build from Gelles [2] in ensuring active participation from participants throughout our online and face-to-face workshops, and we promote asset-based language and reflective dialog similar to work discussed in Galvan [9].

In general, we define our FLC as a group of faculty interacting regularly "to engage in discussion, project development, peer support, and reflection around a common issue or opportunity related to teaching and learning." Our faculty development approach involves the iterative design of an FLC built to support faculty engagement with the concept of "social responsibility" in computer science (SRC). We utilize a collective impact approach to governance and facilitation—grant PIs and coPIs lead our FLC from two participating institutions each year, and the roles rotate following the summer workshop with social scientists serving as the constant facilitators throughout the project. PIs and coPIs include department chairs and instructors from all six institutions. PIs and co-PIs regularly attend the monthly online FLCs and the annual 1.5-day summer workshops or review the meeting recordings made available to the group. SRC curriculum is shared via website (https://bpcsrc.org/) and revisions and modifications are encouraged in the FLC, with revised content shared across team members including proper attribution. Initial student evaluation of the SRC-influenced courses indicates the students find the SRC lessons just as effective as other lessons at teaching technical content and find the curriculum engaging [12].

Research Methods:

Design-based research methods (DBR) [12] are employed in our faculty development efforts for socially responsible computing. The guiding questions used in framing this research effort, "What's happening?" and "Why or how is it happening?" [13] lead our data collection and analysis. Our work-in-progress paper centers on faculty perceptions following the two-day in-person summer workshop in 2024, recorded in faculty surveys administered at the end of the summer workshop to understand "what is happening" based on the faculty learning community. In addition, we draw on data collected in a guided reflection discussion (aka a "focus group") with the authors of this paper, faculty leaders of the FLC, across three years of the grant to better understand "why or how this is happening." The results from the reflective focus group serve as conjectures[14] regarding the work of the grant-funded professional development and will be studied iteratively as the program progresses.

The faculty survey addressed critical levels of faculty development evaluation[15]: a) participants' learning, b) reactions, and c) the intended use of new knowledge and skills. The survey included Likert items related to confidence in implementation, intended inclusion of socially responsible computing content in coursework, and depth of reasoning and design thinking included in early computing coursework. The survey was implemented in the final minutes of the summer workshop. Internet difficulties with the survey link led to less-than-optimal participation by participants- 18 of the 31 (58%) attendees completed the survey successfully.

The focus group reflection occurred in late 2024 with FLC leaders from 2023-24, 2024-25, and two leaders who do not rotate and provide continuity year to year. As member leaders from differing perspectives (computer science and social science), the focus group reflection provided an opportunity for data triangulation by participant type, and across time in leadership roles. The conversation was recorded, transcribed, and coded thematically by the first author. Additional authors drafted the thematic descriptions as a method of meaning-making across participant researchers. This process of research reflection relates to the iterative practice of interrogating why or how this faculty change may be happening, and the conjectures produced below will be interrogated in future iterations of the FLC.

Results:

The results of our joint work include changes in faculty attitude and in course content for early computing courses. The faculty surveys after our two-day in-person gathering (including faculty who had participated in the online meetings throughout the year), showed increased confidence in all participating faculty concerning implementing socially responsible computing assignments in their courses. Of the participants, more than half reported the experience made them “much more confident” (53%), while over a third stated it made them “more confident” (35%), and a small portion stated the workshop made them “a little more confident,” (12%).

Participants reported changes to curricular content of their courses and in their pedagogical decision-making. Two Likert scale matrices appear in the survey focusing on these two intended changes to computing coursework, changes peers modeled in showcase lessons during the two-day summer institute. In terms of curricular changes, the proportion of survey participants who imagined adding “a little more,” more,” or “a lot more” ranged from 33% to 100%, with a median of 56.5%. The content areas with the most intended implementation in FLC faculty /instructor courses were social and environmental impacts (100% of faculty who responded to the survey), civic responsibility and/or misinformation (94%), inequality/justice (83%), professional ethics (73%), and ethical design (66%). Additional changes to courses that respondents expressed an intention to incorporate include student learning opportunities to “create solutions to social problems” (100%). Nearly all (94%) intend to ask students to “look for bias in design assumptions” and “gather and analyze data from multiple viewpoints.” Nearly all

will require students to "consider consequences of the developed solution" (88%), "learn about the context of the problem to be solved" (82%), and critique technical aspects of design" (81%).

A considerable challenge for faculty at primarily undergraduate institutions is the lack of time allocated toward instructional improvement. Hence, an essential measure of the success of our faculty learning community is that workshop attendees report sessions meet their expectations and they recommend the workshop to others. With regard to this aspect of the survey, all of the participants who had expectations replied that their expectations were met (12%), exceeded (53%), or greatly exceeded (29%). Ninety-four percent of survey respondents said they would recommend the workshop to a colleague (with 6% replying "maybe" they would recommend it).

Three themes emerged from the reflective focus group. The first theme relates to how *the FLC design and implementation is structured with a social science/computer science collaboration supportive of faculty growth.* Faculty bring their own disciplinary framework to their curriculum and professional development activities. For those in computing and engineering, this disciplinary perspective can be dismissive of 'softer' fields such as liberal arts and social science. This kind of disciplinary bias can negatively impact cross-disciplinary work and cause a devaluing of reflection on the computing curriculum itself [16]. A notable and key success of this faculty development work is the integration of cross-disciplinary FLC leaders with the inclusion of social scientists who provide continuity and structure for co-design of FLC sessions. The FLC is evolving with additional opportunities to meet up in consulting capacities—for example, in the summer 2024 face to face session, pairs of social scientists and returning computing faculty offered office hours before the main content of the professional development to jointly provide feedback on instructors' designing new lessons regarding social responsibility in computing. This collaborative structure has led to a valuing of integrating socially responsible computing into computing courses. We posit that the strong integration of social science leadership and valuing of the social disciplines has ultimately empowered the computing faculty to value and teach social/technical content.

Another theme from our reflective discussion on FLC effectiveness was the conjecture that the s*piral curriculum makes space for newcomers and returners to participate authentically*. With the adaptation to a guided-learning pedagogy through socially responsible computing activities in computer science classrooms, the FLC group focuses on enhancing the faculty learning experience through spiral curriculum. The spiral instruction style delivers a concept by revisiting the topic one or more times. Multiple visitations with a differing approach to the content provide a deeper understanding with each revisit, and in the case of this FLC, creates an opportunity for reflection on understanding of the content following additional experience with implementation. As faculty connect to different elements of the content, such as making a pedagogical selection for a strong pairing of technical and cultural content, they can revisit that element of the FLC learning content before and after the implementation of a lesson.

Our final theme is the conjecture that *shared leadership distributes workload and ownership of the FLC*. As computer science instructors rotate into FLC professional developer roles, they revisit SRC learning concepts as leaders with more experience in implementing SRC and as insiders from within the FLC. Taking up rotating leadership roles while guided by the social science team can serve as a learning opportunity for returners now serving as leaders. It can help develop ownership of the SRC values. As new leaders are taking responsibility each academic year, FLC leads model apprehension and vulnerability with decision-making and course implementation to further build trust and manage hierarchies that can sometimes develop in professional development learning spaces. Managing trust is particularly vital to programs with shared leadership, such as our FLC. In effect, FLC leaders are responsible for promoting the work of the FLC locally, which can expand participation and can deepen faculty involvement, improving the ownership of the SRC approach at each site, while simultaneously sharing the workload of developing and facilitating FLC lesson plans and sessions.

Discussion

Overall, as the FLC group expands and includes more faculty in its leadership and learning roles, expansions and adaptations become more refined across multiple institutional and departmental contexts, and student response remains strongly positive regarding SRC curricular changes. The conjectures about the success of our approach can serve as practical recommendations to other faculty developers intending to develop community regarding teaching excellence.

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