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Faculty Learning Communities: A Professional Development Model that Fosters Individual, Departmental, and Institutional Impact

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Student-centered, active-learning strategies (e.g., engagement with subject matter, problem solving, critical thinking) far surpass traditional, teacher-centered approaches (e.g., listening, reading, rote memorization) in motivating students, supporting deep understanding, and preparing students for future academic and career success (Handelsman et al., 2004; Hurtado et al., 2010; Arum & Roksa, 2011; Derting & Ebert-May, 2011; Freeman et al., 2014; Franklin, Sayre, & Clark, 2014). However, university faculty have been slow to embrace these more effective approaches due to lack of formal training in teaching, minimal interaction with science education experts, time constraints, and weak institutional support (Wieman, Perkins, & Gilbert, 2010).

STEM teaching reform efforts, such as teaching institutes and disseminating evidence of effective practices, have primarily been aimed at the level of the individual and have largely fallen short of expectations (Finelli, Pinder-Grover & Wright, 2014; Ebert-May et al., 2011; Austin, 2011; Fairweather, 2006). This lack of success is not surprising, since teaching reform is not simply a matter of increasing faculty awareness of recommended practices, but of engaging them in an ongoing process of evaluation and reflection that enables them to implement those practices thoughtfully and effectively (Smith & Marbach-Ad, 2010; Marbach-Ad et al., 2010). Faculty members typically work in isolation, rather than approaching teaching as a shared responsibility, which compounds the problem by slowing the propagation of innovative and effective teaching practices. The most promising approaches for catalyzing change are those with an institutional focus that is rooted in disciplinary cultures and that recognizes the essential role of ongoing peer support, such as that provided by faculty learning communities (Fairweather, 2008; Austin, 2011; Henderson, Beach, & Finkelstein, 2011).

Faculty learning communities (FLCs), in which groups of faculty meet regularly around shared interests and goals, have been touted as an efficient,

sustainable means of overcoming the isolation and lack of pedagogical expertise that constitute barriers to educational reform (Yoder, 2013). The collaborative approach to improving teaching that is embodied by FLCs has a long history that can be traced back to Dewey (1916). FLCs are a form of community of practice (Wenger, 1998) that provide a supportive structure for faculty to rethink and transform their teaching practices (Cox, 2004; Layne et al., 2002). FLCs are thought to help instructors implement changes to teaching, curriculum, and assessment (Demir & Abell, 2010; Lakshamanan et al., 2011; Vescio, Ross, & Adams, 2008), leading to deeper and more durable student learning (Cox, 2004; Dawkins, 2006; Silverthorn, Thorn, & Svinicki, 2006).

Cox (2004) strongly advocated the use of communities for improving teaching and provided a formal definition for FLCs based on their implementation at his institution, Miami University. He described FLCs as "a cross-disciplinary faculty and staff group of six to fifteen members (eight to twelve members is the recommended size) who engage in an active, collaborative, yearlong program with a curriculum about enhancing teaching and learning and with frequent seminars and activities that provide learning, development, the scholarship of teaching, and community building" (Cox, 2004, p. 8). He further characterized FLCs as being either cohort-based or theme-based. Cohort-based FLCs involved individuals with similar educational ranks, roles, or experiences (e.g., junior faculty or graduate students). Topic-based FLCs involved individuals of differing ranks or roles who gathered around a specific educational issue or goal (e.g., teaching with technology, or enhancing the first-year student experience). In this essay, we take a more expansive view and consider FLCs as any regular gathering of multiple university educators with shared objectives related to enhancing student learning and/or educator teaching expertise. While the explicit goal of a given FLC may relate to one of these objectives, they are so tightly interlinked that, in practice, improving one will almost certainly have a positive impact on the other.

FACULTY LEARNING COMMUNITIES AS AN INSTITUTIONAL CHANGE STRATEGY

The University of Maryland (UMD) has been establishing FLCs for over two decades to enhance faculty teaching expertise and support a range of campus-wide educational initiatives (Benson et al., 2013). The earliest FLCs were a collaborative effort of the UMD Office of Undergraduate Studies and Center for Teaching Excellence, and their membership was drawn from all campus units. The first FLC consisted of a group of about a dozen faculty selected through a competitive application process who met weekly for an academic year for

discussion and to carry out a group project related to teaching and learning. This group was responsible for launching several enduring campus-wide initiatives, including the annual Undergraduate Research Day, a campus-wide system for student evaluation of courses, and an annual departmental award for excellence in undergraduate education. Subsequent FLCs have been organized around specific themes that are institutional priorities, for example shifting courses from traditional lecture to a technologically enhanced mode and developing courses that fulfill the requirements of our new General Education framework.

At the level of the College of Computer, Mathematical, and Natural Sciences (CMNS), curricular and professional development initiatives are supported by our discipline-based Teaching and Learning Center (TLC) (Marbach-Ad, Schaefer, & Thompson, 2012; Marbach-Ad, Egan, & Thompson, 2015). The TLC seeks to increase faculty buy-in and participation by focusing specifically on university science teaching and supporting the development of disciplinary instructional expertise (Pedagogical Content Knowledge, Shulman 1986a,b). In addition to hosting workshops and offering individual consultation, the TLC supports a variety of FLCs that promote curriculum redesign, help faculty develop innovative teaching approaches, and gather evidence of the impact of these reforms. Many of these FLCs were established in support of biological sciences curriculum initiatives funded by a succession of grants from the Howard Hughes Medical Institute.

TLC involvement in CMNS-centered FLCs has fostered opportunities for faculty members to have ongoing interactions with discipline-based education researchers and science education specialists. The main roles of TLC staff are to (1) increase faculty awareness of relevant science education literature; (2) assist with the development and adoption of new pedagogies; (3) provide guidance on the selection, development, and validation of instruments to assess student learning and attitudes; and (4) document the science education reform initiatives and disseminate their outcomes via scholarly conferences and journals. FLC members are encouraged to take a leading role in these dissemination efforts, as a way of further integrating them into the national science education community. This has resulted in over 100 presentations at science education conferences and 28 papers in peer-reviewed journals.

FLCs have resulted in tangible changes in the UMD undergraduate curriculum, including the development of new courses (Calculus for the Life Sciences: Thompson et al., 2013b; NEXUS/Physics for the Life Sciences: Redish et al., 2014; Principles of Microbiology: Marbach et al., 2010; Marquee Courses in Science and Technology and I-Series courses, www.gened.umd.edu). In addition, community efforts have garnered over $2.7 million in grant funding

to support their efforts, including grants from the National Science Foundation, the University System of Maryland, and the UMD Teaching and Learning Transformation Center.

Our experience has shown that education reform initiatives that originate in communities of faculty have greater impact and sustainability than those that are the province of a single faculty member. Social networks analysis of UMD's 10-year effort to strengthen quantitative reasoning in the biological science curriculum revealed two characteristics that contributed to the success of broad curricular reforms. First, the communities were characterized by ongoing interactions between faculty members from different, but interlinked, disciplines. Second, several key individuals participated in multiple communities over successive years, which facilitated the spread of teaching innovations across the curriculum (Thompson et al., 2013b).

POTENTIAL BENEFITS OF FACULTY LEARNING COMMUNITIES

While individual FLCs may have been established to achieve a specific individual, course, academic program, or institutional goal, it is likely that benefits accrue at multiple levels since these various levels of the institutional organization form a nested series (Fig. 1). For example, FLCs that are convened to advance institutional agendas often simultaneously provide participants with individual benefits comparable to that which they would have acquired in an individually-focused FLC. Below we discuss the types of benefits that might be expected to accrue as a result of faculty participation in FLCs and provide examples from our experience at UMD.

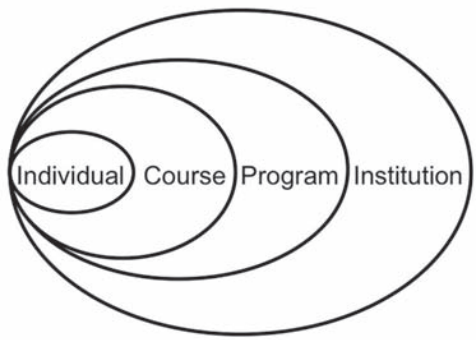

FIGURE 1. Faculty Learning Communities are likely to have benefits at multiple levels of institutional organization, since these form a nested series.

FLCs can provide a variety of benefits to individual faculty members, and many are convened specifically with these goals in mind (Marbach-Ad et al., 2007). Benefits include the opportunity for exchanging of ideas and experiences related to teaching and having near-peer role models for effective teaching. This provides members with moral support for trying out new approaches, as well as the opportunity to troubleshoot and gather feedback on the success of those efforts. Experienced FLC members can serve as mentors for new faculty members, facilitating their transition into teaching. Our research shows that individuals in FLCs place a higher value on and are more likely to use student-centered teaching practices (Marbach et al., 2014), although we could not distinguish whether FLC participation caused changes in beliefs and practices, or whether student-centered faculty were simply more likely to join FLCs. While these FLCs may be established primarily to assist individuals in their development as effective teachers, the interactions that occur within the FLC help establish departmental and institutional expectations related to teaching. Moreover, the very existence of institutionally supported FLCs sends a clear message that teaching is valued.

The most basic form of individually focused FLC at UMD is a loosely structured gathering of individuals with a shared interest in discussing topics related to teaching and learning. This is exemplified by the College of CMNS lecturers' luncheons. The luncheons are organized by the administrative staff of the CMNS dean's office and usually have a specific theme that is salient to the faculty with primarily teaching responsibilities (e.g., teaching approaches for the large lecture class, discouraging plagiarism). These loosely knit gatherings typically attract 15–20 individuals from among the approximately 80 professional-track faculty within the college's 10 departments.

FLCs can also be established to coordinate teaching efforts at the level of a particular course. These course-focused FLCs facilitate effective teaching in large-enrollment courses and maintain consistency of instructional approaches when there are multiple instructors. For example, the UMD General Microbiology course has a well-defined structure that incorporates a variety of collaborative and active learning approaches (e.g., case studies, online discussions, group projects). This curriculum was created by a multi-level teaching team that included instructors, laboratory coordinators, graduate teaching assistants, and undergraduate assistants who engaged in iterative cycles of course assessment and revision (Smith et al., 2005).

Course-focused FLCs can also enable collaborative curriculum development, especially when the FLC is composed of individuals with complementary expertise. This is exemplified by the NEXUS/Physics FLC, which brought

together physicists, biophysicists, biologists, and science education specialists to create an innovative, fundamentally multidisciplinary introductory physics for life sciences course (Thompson et al., 2013a, Redish et al., 2014). Since its inception five years ago, this FLC has created new lecture and lab curricula; written a wikitext to replace conventional, disciplinary textbooks; collected assessment data on the effectiveness of the new curriculum; and provided support to new faculty who join the teaching rotation for this course.

FLCs can also provide multiple benefits at the level of the department or academic program, which has been recognized as the critical unit of change within the university (Quardokus & Henderson, 2014; Wieman et al., 2010; Marbach et al., 2015). They can ensure comprehensive content coverage across multiple courses in the curriculum and help minimize redundancy within a degree program. For example, a curriculum mapping project conducted by the UMD's Host-Pathogen Interactions FLC revealed that none of the courses in the microbiology degree program covered a key learning objective set by the group (Marbach-Ad et al., 2009, 2010). FLCs can foster consistency in pedagogical approaches within an academic program. This unified front can help overcome the oft-reported student resistance to instructional approaches that require increased student engagement and effort (Shimazoe & Aldrich, 2010; Henderson & Dancy, 2011; Finelli, Daly, & Richardson, 2014). FLCs allow faculty to build consensus around programmatic learning goals and collect data to evaluate whether these goals have been met, as now required by many higher education accrediting bodies (Beno, 2004; Provezis, 2010). Finally, FLCs built around program-level objectives are particularly well positioned to capitalize on large scale funding opportunities offered by foundations and federal agencies.

One of the longest standing uses of FLCs is to advance institutional educational agendas. These communities often consist of highly accomplished and respected faculty members who can serve as change agents in their respective departments. These FLCs are characterized by a high degree of disciplinary diversity, and as such, are ideal venues for facilitating interdisciplinary collaborations and developing multidisciplinary academic programs. When UMD launched its new General Education framework, FLCs were a critical element of the implementation plan (Benson et al., 2013). The signature element of the new General Education framework is the "I-Series" introductory-level course. Rather than being broad, shallow surveys of a particular discipline, I-Series courses instead focus on how disciplinary experts approach current, complex questions of importance to society. Faculty seeking to develop an I-Series course are expected to participate in an FLC that provides enrichment and

opportunities to share their experiences implementing the new courses. This approach has made the creation and continual improvement of these unique courses less onerous for faculty and has ensured that the General Education framework is translated into practice with fidelity to the original vision.

A MODEL FOR FACULTY LEARNING COMMUNITY IMPACT

While there is widespread consensus that FLCs enhance undergraduate education, empirical support for this contention is sparse. In addition, FLCs can vary widely in their goals, format, membership, and longevity, even within a given institution. There is a need for a better understanding of the attributes that contribute to the success of communities and the mechanisms by which these successes are achieved, to provide guidance to academic leaders who seek to use FLCs to facilitate institutional change. We describe a conceptual model for investigating the effect of FLC participation on undergraduate instruction at multiple levels of institutional organization.

We posit that the impact of FLCs on faculty teaching beliefs and practices is mediated by the psychological sense of community, defined by McMillan and Chavis (1986, p. 9) as "a feeling that members have of belonging, a feeling that members matter to one another and to the group, and a shared faith that members' needs will be met through their commitment to be together." Sense of community is a central concept of social psychology and has served as a framework for investigating the dynamics and impacts of a variety of different types of communities, ranging from urban neighborhoods to workplaces to university living-learning programs (Hanley, 2011).

We propose a multi-faceted conceptual model (Fig. 2) for characterizing the effect of FLCs on undergraduate instruction. Briefly, we recognize that there exists considerable variability in **community attributes,** as well as variability in **personal attributes** of the individuals who comprise communities. These individual and community attributes collectively influence the experience of individuals within that community, and are likely to result in affective and attitudinal changes in the participating faculty (i.e., an enhanced **psychological sense of community**).

We posit that individuals with a strong sense of community will show greater involvement in the work of their community (e.g., by regularly attending community meetings and participating in the community over an extended time period). These positive experiences may also motivate them to join additional communities. This essentially creates a positive feedback loop in which faculty members with a growing sense of community increase their level of

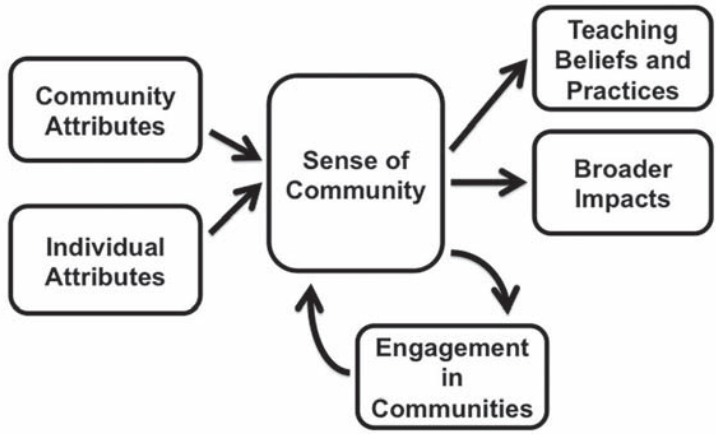

FIGURE 2. A conceptual model for how individual, departmental, and institutional teaching reform might be mediated by the psychological sense of community within faculty learning communities.

engagement and commitment in communities, which, in turn, would further intensify their sense of community.

In addition, we hypothesize that sense of community affects **teaching beliefs and practices**, particularly the degree to which faculty value and use student-centered teaching approaches. We think that it is important to measure beliefs and practices separately, because valuing an approach is a necessary, but not sufficient, step to adopting that approach, and it is possible that FLC participation affects one but not the other. This positive influence of communities on faculty affect and attitudes could ultimately have **broader impacts** beyond individual teaching beliefs and practices. These might include influencing the teaching practices of colleagues who are not themselves FLC members, and catalyzing changes in the culture of teaching at the departmental and institutional levels.

FUTURE DIRECTIONS

Faculty learning communities hold great promise for catalyzing change at multiple levels of institutional organization, but empirical evidence of their impact is scarce. Furthermore, the mechanisms by which these effects are produced are unclear. We propose a conceptual model that can be used to elucidate each of these effects and their mechanisms. The resultant data will provide a roadmap for creating and supporting FLCs as a means of transforming institutions.

TABLE1. Examples of Dimensions that Could be Used to Characterize Faculty Learning Communities and the Individuals who Participate in Them

Individual attributes	Community attributes
• Gender • Ethnicity • Scholarly discipline • Position within the university (e.g., tenured faculty member, non-tenure-track faculty, graduate assistant) • Level of teaching expertise (e.g., expert, novice) • Length of time at the university	• Number of participants • Frequency of meetings (e.g., weekly, biweekly, or monthly) • Duration (e.g., one semester, one year, or ongoing) • Type of leadership (e.g., one leader or distributed leadership) • Directionality of communication within the group (e.g., unidirectional or multidirectional) • Degree to which participation is voluntary • Source of community mission (e.g., communally decided or externally imposed) • Diversity of membership in terms of position within the university (e.g., similar or diverse faculty ranks) • Diversity of membership in terms of scholarly discipline (e.g., disciplinary or multidisciplinary) • Whether food is used as an incentive for participation • Whether monetary compensation (e.g., stipend) is used as an incentive for participation

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