The Faculty Inquiry Network: Inquiry-based professional development as a catalyst for innovative teaching, enhanced student performance, and institutional reform

The Institute for the Study of Knowledge Management in Education (ISKME)

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Abstract

This paper reports the findings from a research study conducted by the Institute for the Study of Knowledge Management in Education (ISKME) in partnership with the Faculty Inquiry Network (FIN), a professional development program designed to engage faculty at 18 colleges across California. Participants were FIN faculty teams involved in iterative data-informed inquiry, with the goal of faculty gaining an improved understanding of pedagogical practices that positively impact student learning. Over the course of two years, the study examined the impact of faculty participation in FIN as a way to examine linkages between inquiry-based faculty professional development, faculty adoption of data-informed pedagogical approaches to basic skills education, and improved student learning. ISKME employed a mixed methodological approach, involving interviews, observations, site visits, artifact analysis, and a survey. The study found faculty adoption of enhanced data use practices, and subsequent implementation of student-centered teaching practices with improved student learning outcomes. In addition, the study found successful faculty advocacy for institutional program and policy reform. This paper also offers recommendations for administering future inquiry-based professional development programs for community college faculty.

Introduction

The Faculty Inquiry Network (FIN) was launched in January 2009 as a professional development program led by the Chabot-Las Positas Community College District. Teams of faculty at 18 colleges across California, which were supported by FIN, were supported and guided in a sustained, iterative process of inquiry-focused assessment toward improved teaching practices. Using data collected by faculty the teams were encouraged to understand how basic skills students learn, informed changes in their own teaching practice and curriculum, with the final goal of assessing the extent to which these implemented changes led to improved student learning. The FIN teams covered multiple academic disciplines in developmental education, including Math, English, English as Second Language (ESL), contextualized teaching and learning, and career and technical education. They investigated a range of inquiry topics—from improving a vocational carpentry program through ESL integration and faculty-student feedback loops, to enhancing student performance in math through iterative assumption testing.

The Institute for the Study of Knowledge Management in Education (ISKME) conducted a research study during a two year period, from 2009 to 2011, to understand the linkages between inquiry-based faculty professional development, faculty adoption of data-informed pedagogical

approaches to basic skills education, and improved student outcomes. Specific goals of the study included: examining and documenting the practice and process of faculty inquiry; understanding how faculty and colleges assess and share learnings from their inquiry practices; and assessing the impact of inquiry work on students, faculty, and colleges. Specific research questions addressed by the study included:

1) How does inquiry-based professional development impact teaching and learning?
2) In what ways does the Faculty Inquiry Network process add value to students and faculty?
3) What are the conditions under which the FIN teams flourish? What hinders their work?
4) What are the institutional and policy implications that emerge from the FIN teams' work?

Guided by these goals and questions, this paper aims to elucidate the impact of the FIN model for inquiry-based faculty professional development, with particular regard to teaching and learning, as well as to institutional programs and policies. FIN project successes and challenges, as well as recommendations based on the findings, are also presented to inform future inquiry-based faculty professional development initiatives.

Background

Funded by the William and Flora Hewlett Foundation, the Walter S. Johnson Foundation, and the San Francisco Foundation, FIN was initiated to support community college faculty professional development by hosting dialogues around student and faculty learning. At the inception of FIN, the leadership team on the project put out a call for inquiry study proposals from teams of faculty at California community colleges. From the pool of applicants, 18 colleges were selected, based on the overall quality and potential impact of the inquiry study proposed. At all selected sites, FIN faculty team members collaboratively identified and investigated a specific inquiry question (or questions) focused on improving the learning experiences of their students. In answering each inquiry, team members designed and implemented an inquiry plan, including collecting and analyzing data, developing strategies and practices to enhance student learning, and conducting follow-up research to understand to what extent implemented changes led to improved student learning.

FIN participants were encouraged and expected to share out the learnings from their inquiry work widely with colleagues on campus, at conferences, and in their professional communities, through the "Making Visible" component of the project. FIN teams were required to create web pages sharing their work on the site FINCommons.org. FIN team inquiry projects received support from coaches with background in community college administration and leadership, and with expertise in developmental education. FIN coaches helped teams identify and implement changes to teaching practices, and guided teams as they pursued programmatic and institutional reforms. In addition, FIN teams were supported by student co-inquirers who filled multiple roles on teams, from providing input on teaching practices and feedback on the inquiry process, to interviewing student peers to support data collection efforts.

Literature Review

A growing body of literature points toward professional development as an important way to help community college faculty teaching developmental coursework adapt and innovate their

teaching practices to foster academic success (Boylan, 2002; Tinberg et al., 2007; Carnegie, 2008). In recognizing the ongoing need for staff development toward the improvement of student outcomes in developmental education, Boylan (2002) suggests that community colleges enact long-term sustained programs rather than "one-shot" approaches to professional development. More recently, a report released by The Carnegie Foundation, as part of their Strengthening Pre-collegiate Education in Community Colleges (SPECC) project, revealed the importance of providing ongoing professional development tied to the overarching teaching and learning goals for the institution (Huber, 2008).[1]

Focusing on professional development for basic skills educators, assessment of the SPECC project revealed several important aspects of cultivating communities of inquiry around basic skills teaching and learning, including fostering an open environment of communication to support collaboration and knowledge sharing (Huber, 2008). A central component of SPECC, faculty inquiry and Faculty Inquiry Groups (FIGs) were developed to focus on improving teaching and learning in pre-collegiate English and Mathematics. FIGs encouraged the development of local knowledge through teams of faculty engaged in ongoing collaborative inquiry toward improved student learning (Huber, 2008). Through a survey administered to FIG participants at 11 colleges, Huber found that participation in FIGs had a positive impact on teaching and learning, including increased confidence among faculty in responding to student learning challenges (Huber, 2008). In result of that study, The Carnegie Foundation recommended a revised approach to professional development, rendering inquiry and reflection an integral part of work in an educational institution (2008).

The emphasis on inquiry-based professional development has roots in the scholarship of teaching and learning (SoTL), which emerged in response to a greater emphasis on the understanding of student needs and abilities, and the development of new strategies for teaching and resources to support student achievement (Bass, 1999; Schroeder, 2007). SoTL shifts the focus from a view of students as individuals who need remedial intervention, toward one in which scholarship and practice that help teachers and institutions understand student learning, and methods by which students are best supported and guided (Bass, 1999) are utilized. Recent literature in SoTL emphasizes new modes of teacher research, data use, and inquiry, through viewing students as co-creators of knowledge, and through collaborative conversations and classroom practices (Brown, Abell, Demir, and Schmidt; 2006; Schroeder, 2007; Brock et al., 2007; Tinberg et al., 2007; Huber, 2008).

The empowerment of faculty to use data to innovate teaching is central to the emerging institution-wide "culture of evidence" emphasized by SoTL (Brock et al., 2007). In this regard, several studies have revealed that access to data stimulates ongoing questions among faculty, as well as greater demands for data, and more sophisticated analyses of classroom and institutional challenges (Frost, Dalrymple and Wang, 1998; Hallett, 2000; Harmon, 1986; NFES, 2006). Moreover, a few studies have pointed to the importance of instilling of structures and supports within and across institutions for encouraging a culture of information sharing and inquiry (Petrides, 2004; Petrides and Nodine, 2005; Petrides and Mclellan, 2007, Jenkins and Kerrigan, 2008). For example, Petrides and McClelland's (2007) study of data use at a California community college district revealed that increased access to data facilitates data use, and

[1] A precursor to FIN, the SPECC initiative was also funded in part by The William and Flora Hewlett Foundation.

provides the necessary norms for a reflective culture of questioning. However, the study also found that existing structural issues needed to be modified in order to support a culture of inquiry. Interviews with faculty around their data use revealed that historical patterns of data control within the college had been obscuring faculty's ability to use data in innovative ways; in short, they faced resistance to change. Thus, while access to data helped to create the capacity for a culture of inquiry at the college, there were still structures and norms in place that supported a more reactive approach to decision making. Therefore, the importance of in-depth consideration of the social and cultural context within which data use and technology are situated is key (Petrides and McClelland, 2007).

A more recent, nationwide study examined data use among community college faculty and administrators participating in the Achieving the Dream initiative, a national network of community colleges committed to improving degree attainment rates, especially among low-income students and students of color, and with particular regard for developmental education (Jenkins and Kerrigan, 2008). Through surveys and interviews with Achieving the Dream participants, Jenkins and Kerrigan found that the majority of faculty at the Achieving the Dream colleges used data to some extent in decisions related to teaching. However, the extent to which faculty used data varied considerably (Jenkins and Kerrigan, 2008). Moreover, they found that, amid general assent to inquiry, evidence, and accountability, as key aspects of the Achieving the Dream initiative, many faculty and administrators reported that they lacked the skills to collect and analyze data in meaningful ways (Jenkins and Kerrigan, 2008). Thus, as Jenkins and Kerrigan point to the need for professional development to support the acquisition of data use skills among faculty and administrators, it also suggests that engaging faculty and staff within a culture of evidence is a complicated endeavor that requires concerted, long-term effort.

While extant literature demonstrates general accord regarding the need for ongoing, collaborative, inquiry-based professional development for faculty involved in teaching basic skills, there has been as yet little research on the linkages between faculty professional development, faculty adoption of new pedagogical approaches to basic skills education, and improved student learning. In presenting the findings from the FIN project, the present paper aims to provide further insight into these areas.

Methodology

ISKME's study employed a mixed methodological approach, including participant observation of project meetings and workshops (N=10), formative interviews with faculty (N=34), student co-inquirer participants (N=14), and the FIN coaches (N=5) who assisted teams in their inquiry work. This also included artifact analysis, and a survey of faculty participants at the close of the project (N=36). ISKME also participated in FIN team meetings and group discussions (N=6) in order to understand FIN team dynamics in terms of how they worked together and approached their inquiry work. In addition, six participating colleges were selected for in-depth site visits based upon a set of criteria to ensure that the sample represented dimensions of the inquiry work, including exemplars, approaches to inquiry work, and institutional contexts. In addition, ISKME conducted classroom observations (N=6) to learn how faculty involved with FIN approached their teaching and interactions with students. Individual data collection efforts are discussed in detail below.

Site Visits

Six participating colleges were selected for in-depth site visits by the FIN project leaders and ISKME's evaluation team. These included: Berkeley City College, Laney College, Las Positas College, Los Angeles Trade Tech College, Los Medanos College, and Mt. San Antonio College. The sites were selected based upon a set of criteria to ensure that the sample represented dimensions of the inquiry work, including exemplars, approach to inquiry work and institutional context. The specific selection criteria included the teaching quality of the participants, level of administrative support the teams had received, and other resource support, including participation in pre-existing networks of basic skills initiatives. Additional criteria for the selection process were subject areas taught by FIN teams, including the inclusion of projects focused on career and technical education. The level of engagement of student co-inquirers, geography (aiming for a mix of southern and northern California locations), representation of both part time and full time faculty, team dynamics, and the quality of the inquiry project itself also served as criteria.

The six site visits incorporated several data collection activities for the purpose of gathering information on the college's inquiry project in context. At each of the site visits, ISKME conducted interviews with faculty participants, student co-inquirers, and administrators to gain insight into ongoing inquiry work from a variety of perspectives. To understand FIN teams dynamics in terms of how they work together and approach their inquiry work, ISKME also participated in FIN team meetings and group discussions. In addition, ISKME conducted classroom observations to learn how faculty involved with FIN approach their teaching and interactions with students. Table 1 below provides a breakdown of the site visit data collection activities by site, and the number for each.

Table 1. Breakdown of site visit data collection activities by site, number (n)

Site	Faculty interviews	Admin-istrator interviews	Student co-inquirer interviews	Team meeting observations	Classroom observations
Berkeley City College	4	1	2	1	1
Las Positas College	5	1	2	1	1
Los Angeles Trade Technical College	2	1	N/A	1	1
Laney College	5	1	2	N/A	1
Los Medanos College	1	1	2	N/A	1
Mt. San Antonio College	3	N/A	5	N/A	2

Coaches – Interviews and Observations

ISKME interviewed each of the five FIN coaches assisting teams with the facilitation of their inquiry work. The purpose of the interviews was to understand how the coaching role developed over the course of the project, how coaches interacted with teams, specific instances where coaching impacted the direction of a project, the successes and challenges of the inquiry model, and the perceptions of coaches in terms of the impact of inquiry in the community college context. In addition, at FIN workshops and other conferences ISKME conducted participant observation of several informal and formal "coaching moments." These observations were conducted in order to understand how coaches interacted with the teams and their approaches to guiding the teams in their inquiry work.

Video Analysis

ISKME conducted a qualitative analysis of all of the videos produced by FIN teams, from January 2009 to March 2011, which were collected either on the FIN Commons website or on the FIN team's Vimeo site. The videos were first coded by the type of activity that was recorded, ranging from recordings of classroom observations, to faculty participant interviews, to team meetings, to interviews with students. The videos were also coded in terms of their relationship to the team's inquiry question and its relevance to the team's inquiry work.

Faculty Survey

At the close of the research project in March 2011, a survey was administered to all faculty participants through web-based survey software. The purpose of the survey was to assess how faculty participation in FIN program impacted pedagogical practice and student learning, the impact of FIN participation on institutional policy and reform, the types of support needed for implementing inquiry-based professional development, and the challenges they faced. The survey was comprised of 23 items, including Likert-scale, multiple choice and open-ended questions. As two of the colleges opted out of the FIN project after the first year, the 70 faculty participants from the remaining 16 colleges were invited to respond to the final survey. At least one faculty member from 13 of these colleges completed the survey, with 36 faculty members responding in total— for a participant response rate of 51 percent, and a college response rate of 81 percent.

Findings

The findings demonstrated ways in which participation in FIN impacted teaching practice, student learning, and institutional policy. In addition, the findings revealed successes and challenges encountered through participation in FIN. This section presents a summary of the findings in each area.

Impact of FIN on teaching practice

The goal of inquiry-based professional development is to support faculty in incorporating the inquiry process into their daily teaching practice, so that faculty learn to consistently ask iterative research questions and form hypotheses, collect data to inform their teaching practice, and make changes to their teaching based on new information collected through inquiry. In this regard, FIN encouraged faculty to adopt data collection practices that were broader and more relevant or

meaningful than they may have theretofore adopted. FIN also encouraged faculty to use data to inform pedagogy and assessment of student learning, and inspire critical thinking and assumption testing around student needs. Subsequent data-informed revisions to teaching practices often resulted in the implementation of student-centered teaching practices.

Adoption of broadened, more "meaningful" data collection practices

Analysis of the survey data revealed that 82 percent (27) of respondents collected data about students as part of their FIN projects, and that both primary and secondary data were collected. When asked on an open-ended question what was unique about the FIN model in comparison to other professional development models, several respondents pointed to the important role that primary data collection to inform teacher assessment of student learning—as an alternative to focusing only on institutional data—played in their practice. As one survey respondent reported: "FIN got me involved in meaningful data collection and interpretation that was different from the typical data points that seem removed from the day-to-day experience in the classroom."

Regarding the specific types of data collected (Table 2 below), 50 percent (12) of respondents collected student performance data, including grades and data from coding and analysis of writing samples. Fifty percent (12) of respondents indicated that they collected student interview data, including interview data from faculty interviews with students in developmental English courses to assess student experiences with reading and writing, data from faculty interviews that sought to understand how students prepare for assessment tests, and data from interviews conducted by student co-inquirers to assess how classroom experiences could be improved to meet student needs. The third largest group of respondents, 38 percent (9), indicated they had collected student survey data. For example, one team conducted a survey to assess students' baseline academic skills related to a specific course.

Table 2. Types of data collected by faculty (N=24)

Category *(Open-ended question; Some responses fell into more than one category)*	**Percent (n)**
Student performance data	50% (12)
Student interview data from faculty or student interviews	50% (12)
Student survey data from faculty administered surveys	38% (9)
Video footage of students and classes taken by faculty	25% (6)
Student demographic data	25% (6)
Faculty observations and reflections on teaching and learning in the classroom	13% (3)

In addition to student performance, student interview and survey data, video data were reported as particularly valuable to many FIN faculty participants, because that data yielded insightful information about teaching and learning to which they had not previously had access. One respondent reported how, in the course of inquiry aimed at improving student ability to apply geology concepts to fieldwork, FIN faculty recorded video data of students talking through their thought processes during their fieldwork. The data allowed the FIN team to observe how the instructor's frequent questioning interfered with students' independent arrival at a correct response. As a result, team members altered their teaching behaviors to allow students more time to think and reflect as they conducted their fieldwork. The team members then collected

additional video data to assess how the adoption of these practices changed student retention of information learned in the classroom and their ability to apply that information in the field.

Use of data to inform pedagogy and assessment of student learning

On a survey item that sought to assess the ways that student data collected by faculty impacted their teaching, the largest percentage of respondents, 36 percent (8), reported that data collection created greater awareness of their own pedagogical strengths and challenges. Twenty-seven percent (6) of respondents reported that data collection allowed for increased consideration of student needs and experiences, and 23 percent (5) that it increased the visibility of the impact of teaching practices on student learning. Table 3 lists these findings.

Table 3. Ways in which data collection impacted teaching (N=22)

Category *(Open-ended question; Some responses fell into more than one category)*	Percent (n)
Created greater awareness of pedagogical strengths and challenges	36% (8)
Allowed for increased consideration of student needs, experiences	27% (6)
Increased visibility of the impact of teaching practices on student learning	23% (5)
Validated the teaching methods or practices used	18% (4)
Informed teams' FIN project and approach overall	18% (4)
Other	14% (3)

The interviews with faculty participants further revealed how the data collection and analysis activities embedded in FIN inspired critical thinking and assumption testing around student needs and pedagogy. In this regard, FIN faculty indicated that collecting classroom data enabled them to identify successful and unsuccessful aspects of their teaching practices and develop strategies for revising them. As one respondent reported:

> I pay attention more to my assumptions now and assess them. […] These can be assumptions about what I'm doing and how it affects the students, what is happening in the classroom, whether my questions are valid. One of my biggest assumptions in beginning was about [student] confidence. Lots of students come to me with very low confidence in math. And I assumed that if I help build their confidence they will do better. In my inquiry work, we gave them a survey [about] their confidence, and they assessed themselves as having high confidence. So they had higher self-efficacy than I thought they would. And increasing their efficacy didn't necessarily increase their performance. So it's more than just increasing their confidence. So […] I focus less on the confidence piece. I focus more now on looking for other things that affect their performance.

As the above example begins to illustrate, the collection and analysis of data through inquiry informed pedagogy and assessment of student learning for FIN participants. The next section provides further evidence of ways in which FIN teams implemented student-centered teaching practices in response to data-informed assessment of pedagogy and student learning.

Implementation of student-centered teaching practices

The study revealed that participation in FIN resulted in revised teaching practices for a majority of faculty participants. On a closed-ended question asking whether teaching practices had changed due to participation in FIN, 88 percent (30) of survey respondents reported that their teaching practices had changed since the beginning of their FIN project. On a follow up survey item, respondents reported on the concrete ways that their teaching practices had changed. As revealed in Table 4 below, the largest percentage, 45 percent (9), of participants reported changes in terms of using more interactive and engaging teaching approaches, including using more hands on activities and discussion sessions. Thirty-five percent (7) reported that they integrated the inquiry process into their daily teaching practice as a result of FIN, and 30 percent (6) reported mechanisms to capture and solicit student input on course content and on their own learning. Other responses included that FIN resulted in implementation of peer led learning approaches and techniques for community building in the classroom, or structural changes to courses such as "scaffolding assignments", which reduced lecture time.

Table 4. Changes to faculty teaching practices since the beginning of FIN (N=20)

Category *(Open-ended question; Some responses fell into more than one category)*	Percent (n)
Use of more interactive and engaging teaching approaches	45% (9)
General integration of the inquiry process into teaching practice	35% (7)
Development of ways to solicit and capture student input and data	30% (6)
Implementation of peer-led or team-based learning approaches	25% (5)
Implementation of techniques for community building in the classroom	15% (3)
Structural changes to the course	15% (3)

Interviews with faculty provided further insight into the ways in which teaching practices had changed as a result of FIN. One FIN participant, for example, reported a shift toward a student-centered teaching strategy and a consequent increase in student engagement as a result of FIN:

> Really, more than anything I've done, [FIN] has helped me be more student-centered and find ways to relate to students and have students do things more than I do things. We've cut down on lecture, but engage students more. I don't do more, I do different work now. And students get a better class.

This instructor also reported that revised teaching practices—such as reduced lecture time, allowing students time to think and work through problems, and empowering students to lead classroom activities—resulted in improved student comprehension and retention of classroom material.

On the whole, as faculty engaged in iterative question posing, data collection and data analysis to identify the learning needs of their students and assess the impact of teaching practices on student learning, they tended to implement more student-centered teaching practices. The incorporation of inquiry into daily teaching practice and the subsequent implementation of student-centered inquiry and teaching practices had a positive impact on student learning, as detailed in the following section.

Impact of FIN on student learning

The primary focus of FIN was to enable faculty to improve their teaching to benefit student learning and engagement. In this regard, students benefited from the incorporation of the inquiry process in the classroom, which reportedly resulted in improvements in their overall performance.

The survey data revealed that 94 percent (32) of survey respondents found inquiry an effective approach to positively impacting student learning. Interviews with faculty and coaches confirmed and elaborated this survey finding. As reported by faculty and coaches, FIN impact on student learning resulted in improved overall student performance, including increased retention of course concepts, augmented engagement in class, increased demonstration of critical thought, improved retention of concepts learned, and better test scores. For example, in the geology course discussed above, FIN faculty found evidence of improvements in their students' ability to apply classroom concepts to their work in the field, and an increase in overall student retention of the concepts learned, following adjustments made to teaching practices. In another instance, when a FIN faculty participant found evidence that a low pass rate for a particular course was linked to textbook difficulty, and as a result provided alternative course materials, the students reportedly became more engaged in the course topics and their test scores increased dramatically. Increased engagement and demonstration of critical thought were remarked by another FIN team that found reflective learning methods such as storytelling and self-disclosure helped students see themselves in the subject matter, which reportedly enabled them better engage and think critically.

In sum, faculty and student participation in FIN reportedly impacted student learning in a variety of directly measurable, positive ways. The following section provides evidence for the impact of faculty FIN participation on institutional programs and policies.

Impact of FIN on institutional programs and policies

Although the primary focus of the FIN project was to enable faculty to improve their teaching to benefit student learning and engagement, some respondents reported that they had been able to apply the results of their inquiry projects to transform programs and policies at their own institutions. Forty-nine percent (16) of survey respondents indicated that participation in FIN affected policies or programs at their institution.[2] In response to a follow-up, open-ended survey question about the specific ways that policies or programs were affected, 47 percent (9), of respondents indicated that participation in FIN led to curriculum or program changes at their institutions; three of these respondents specifically reported on the development of accelerated curricula for basic skills students. Forty-seven percent (9) also reported that FIN affected professional development programs at their institutions, through, for example, expansion of the inquiry model. A summary of all categories of responses to this survey item is provided in Table 5, below.

Table 5. How participation in FIN affected policies or programs at institutions (N=19)

Category *(Open-ended question; Some responses fell into more than one*	**Percent (n)**

[2] The remainder of respondents to this survey item reported that their participation had not affected programs or policies (27 percent), or that they were not certain (24 percent).

category)	
Curriculum or program changes	47% (9)
Changes to professional development at the institution	47% (9)
Development of accelerated curriculum	16% (3)
Increased emphasis on student-centered curriculum	16% (3)
New information provided to students to support their learning needs	11% (2)
Other	16% (3)

Interviews with FIN coaches provided further insight into the impact of FIN on institutional programs and policies. Coaches observed that the data collected through inquiry processes served as new evidence for necessary changes to college programs and policies, and that these data were significant in helping FIN participants persuade administrators to support specific reforms. For example, after data collected by a FIN team proved that a college readiness workshop significantly improved student efficacy, the FIN team successfully persuaded college administrators to expand the workshop into a mandatory program within the department.

In sum, faculty participation in FIN resulted in data-informed changes to institutional programs and policies impacting a variety of areas. The following section highlights successes and challenges involved in implementing the FIN model for professional development.

Factors contributing to FIN successes

FIN participants reported that the collaborative aspect of inquiry work, involving both peers and students, provided an important support, as did the coaching support provided to teams throughout the course of their projects, and the knowledge sharing component involved in meeting project requirements.

Peer support as significant to the evolution of inquiry projects

The survey sought to assess factors that contributed to the overall success of FIN projects in terms of the implementation of the inquiry components. Asked to rate on a 5-point scale (from very helpful, to not at all helpful) specific factors supporting their inquiry work, the largest percentage, 77 percent (26), of respondents reported that support from other FIN team members was "very helpful" during the inquiry work.

On an open-ended survey question that sought to assess which components of FIN most impacted the inquiry process for participants, the largest percentage, 41 percent (14), reported that collaboration and support from colleagues contributed significantly to the evolution of inquiry projects. For example, one respondent indicated that discussions among FIN team members cultivated for key learning moments during the inquiry process, and allowed for a rich interpretation of events unfolding in the classroom. Another respondent reported that regular meetings and reflections with fellow faculty members about theory, pedagogy, and classroom practice impacted the development and implementation of the inquiry process. Finally, on an open-ended survey item that asked what made FIN unique among professional development

offerings, the largest percentage, 35 percent (12), reported that FIN was unique because it allowed for collaboration with colleagues.[3]

Student co-inquirers as a mechanism for shaping the teams' learning

After peer support, the second-most frequent response to the question on factors contributing to the success of FIN projects was the participation of students, or student co-inquirers. On an open-ended survey question that sought to assess which components of FIN most impacted the inquiry process for participants, 29 percent (10), reported that the participation of student co-inquirers contributed significantly to the evolution of inquiry projects.

In interviews, faculty reported that feedback from student co-inquirers during team meetings provided valuable insight into classroom events and teaching practices related to their inquiry work. Two faculty members indicated that student co-inquirers helped to inform next steps for the inquiry work, and shaped the teams' learning as they applied the inquiry process. Moreover, faculty reported that student participation in each stage of the project ensured that changes made in the classroom were informed by, and attuned to, the needs and preferences of students.

Coaching as a key support, especially for participants without prior inquiry experience

As support for their inquiry work, FIN teams were assigned coaches with expertise in developmental and vocational teaching and administration. When asked to rate on a 5-point scale (from very helpful to not at all helpful) how helpful they found the FIN coaches to the inquiry work, 76 percent (25) of respondents reported the coaching support to be "very helpful." On an open-ended survey question assessing the impact of FIN coaches on the inquiry process, 30 percent (10) of respondents indicated that coaches provided guidance to teams when they strayed from their initial plans and moved teams' thinking forward with feedback and constructive criticism. Faculty indicated that having a strong and trusting working relationship with the coaches, wherein teams could discuss ideas and struggles, proved useful when teams felt "stuck," missed deadlines, or required assistance in collecting and interpreting their data.

On a separate closed-ended survey question seeking to assess the level of perceived support provided by coaches on various components of the inquiry process, 70 percent (23) of respondents indicated that coaches provided "a great deal" of support in terms of encouragement throughout the inquiry process, and 58 percent (19) indicated they provided "a great deal" of support in terms of constructive feedback. However, 33 percent (11) of respondents reported that they only received "some" support from coaches in terms of data analysis, and 15 percent (5) indicated they received "little" or "none" in terms of support on data analysis.

To assess whether prior experience with inquiry was related to how participants rated the helpfulness of coaching, further analysis of the data revealed that 81 percent (21) of those without prior inquiry experience rated their coaching support as very helpful, whereas only 57 percent (4) of those with prior inquiry experience responded that way. Also, 74 percent (20) of those without prior inquiry experience reported receiving encouragement from FIN coaches throughout the inquiry process, whereas only three respondents with experience reported

[3] Other top responses to this survey item about what made FIN unique among professional development offerings include that it offered exposure to new methods for impacting teaching and learning (32%), that it was well organized and structured (29%); and that it was cross-disciplinary (24%).

receiving such encouragement, underscoring differences in coaching experiences based on prior inquiry-type experience.

Making Visible as a mechanism for awareness building among colleagues

The Making Visible component of FIN encouraged faculty to share their learnings from their inquiry work widely with colleagues on campus, at conferences, and in their professional communities. In an effort to assess the extent to which information and learnings from FIN were shared, the survey asked respondents to report on awareness about their FIN work by non-FIN stakeholders. As revealed in table 6, below, 90 percent (28) indicated that colleagues in their department were aware of their FIN work, and 84 percent (26) reported that colleagues outside of their department were aware of their work. Seventy percent or more indicated that the dean or department chair was aware of their FIN work. Only a few respondents indicated that students or colleagues at other colleges were aware of their FIN work.

Table 6. Percentage of stakeholder groups outside of FIN community aware of teams' work (N=31)

Category (Closed-ended question; Respondents select all that apply)	Percent (n)
Colleagues in your department	90% (28)
Colleagues outside of faculty's department	84% (26)
Department chair	74% (23)
Dean	70% (22)
College vice president	68% (21)
College president	15% (48)
Chancellor	10% (3)
The Board of Trustees	10% (3)
Colleagues at other colleges	6% (2)
Students	3% (1)
Other college administrators	3% (1)
Other stakeholders	6% (2)

In interviews, FIN faculty reported that the process of preparing to present their work, as well as the act of sharing out, demonstrating progress, and receiving feedback at meetings and workshops, were important catalysts for moving their inquiry work forward. Moreover, faculty reported that the Making Visible component of FIN supported ongoing conversations around ways to share and demonstrate inquiry successes to benefit others. In this regard, faculty reported that Making Visible allowed several FIN teams to begin to connect with faculty in other disciplines at their college, to explore what faculty could learn from one another through cross-disciplinary inquiry work. For example, interviews with faculty and coaches revealed that FIN teams presented their inquiry findings at local events and statewide conferences.

Some challenging aspects of FIN

Finally, the analysis revealed that core components of the inquiry approach were challenging for FIN participants, especially for those without prior inquiry experience. Survey participants were asked to rate the difficulty of specific components of the inquiry process on a four-point summative scale (very challenging, somewhat challenging, minimally challenging, and not at all

challenging). Analysis of the responses to this survey item revealed that for 70 percent (23) of respondents, moving from collecting and analyzing data to implementing changes into their teaching practices was a somewhat or very challenging aspect of the inquiry process. Sixty-four percent (21) of respondents found developing a hypothesis to guide their inquiry project as very or somewhat challenging, and sixty-four percent (21) reported that involving students in the inquiry work was very or somewhat challenging. Table 7 below outlines these responses.

Table 7. Percentage of participants who found FIN activities "very challenging" or "somewhat challenging" (N=33)

Category *(Closed-ended question)*	Percent (n)
Moving from collecting and analyzing data to implementing changes	70% (23)
Developing a hypothesis	64% (21)
Involving students in the inquiry work	64% (21)
Analyzing data	61% (20)
Developing an inquiry question	61% (20)
Posting my inquiry findings on a website	55% (18)
Collecting data	52% (17)
Integrating what I learned through FIN into other work on my campus	47% (16)
Giving presentations about my inquiry work	42% (14)
Reporting back to the FIN leadership team about my inquiry work	33% (11)

Further analysis of the data to assess whether prior experience with inquiry was related to participants' reported challenges revealed that 74 percent (20) of those without prior inquiry experience found developing an inquiry question somewhat or very challenging. Conversely, 86 percent (6) of those with prior inquiry experience found developing the inquiry question as minimally or not at all challenging.

Discussion and Implications

The study found that faculty participation in FIN impacted teaching through faculty involvement in inquiry-guided data collection and data analysis, and subsequent faculty implementation of data-informed, student-centered teaching practices. Data collected by faculty included a wide range of data types, from student performance data, to student interviews, surveys, and classroom video data. Subsequent data-informed revisions to teaching practices were reportedly based on increased understanding of student learning styles, as well as greater awareness of the educational and cultural backgrounds of students. Revisions to teaching practice aligned more accurately with student learning needs, including increased interaction between teachers and students, as well as student-centered curricula. With regard to student learning, the study found that participation in FIN resulted in overall improvements in student academic performance and outcomes.

In addition to improvements in teaching and learning, faculty participation in FIN also resulted in data-informed advocacy for institutional program and policy reform. Reforms ranged from revised curricula, to changes in student assessment policy. The collaborative aspects of the FIN model were perceived by faculty as successful supports to their inquiry processes. In particular, participants valued the peer-based team environment, and the participation of student co-

inquirers and the mentorship of FIN coaches, although those without prior inquiry experience perceived a need for increased support from coaches, particularly with regard to data analysis and other core components of the inquiry approach.

On the whole, the findings point to the importance of supporting and incentivizing faculty in the collection and analysis of data on student needs and teaching practices. As demonstrated, promoting data use and making data accessible is only a first step in improving pedagogical practices. As the findings of this study suggest, it is also necessary to build capacity and skills for data use, analysis, and reporting—through, for example, coaching or peer-based mentoring and knowledge sharing around data use practices. These further steps may require the revision of extant policies affecting faculty professional development, and the review of reporting systems for faculty, courses, and programs within colleges.

Additionally, the findings highlight the need for institutional support to cultivate the development of faculty communities of inquiry both within departments and across disciplines and colleges, allowing new knowledge and approaches developed through inquiry work to spread. Specifically, in order to foster the spread and scale of data-driven inquiry practices on campus, institutional support may be directed at developing and sustaining mechanisms by which faculty can share and learn from one another, and by which they can share key developments with administrators and college leaders.

Finally, given that faculty participation in FIN affected policies or programs at institutions for nearly half of the program participants, the study suggests that inquiry-based professional development can be an effective catalyst for programmatic reform and institutional change on a larger scale. Further, the interest expressed by faculty in sharing their work with colleagues and other stakeholders suggests that inquiry-based professional development work could be leveraged to scale, in order to fuel institutional reform. This process might involve, for instance, incentivizing faculty participants in inquiry-based professional development or projects to share their learnings interdepartmentally and with college administration, in order to extend the reach of their work.

Conclusion

The study suggests that the establishment of inquiry-based professional development on community college campuses is worth expanding and examining more carefully. More research is needed to explore the relationship between these approaches and student outcomes within courses and across departments. These initiatives seem likely to flourish if community college leaders are more vigorous in support of faculty collaboration, coaching, and efforts to link faculty with data to improve instruction. The research also suggests that faculty can benefit from coaching, peer and student input, and that their efforts have the potential to drive changes in institutional policy and practice and nurturing a campus culture more conducive to innovation.

As this study has provided insight into the relationship between faculty professional development, faculty adoption of new pedagogical approaches to basic skills education, and improved student learning, it has also affirmed the need for future research to build theory in this realm—specifically in terms of providing additional, substantive evidence of the relationship between inquiry and enhanced teaching and learning, as well as further narrowing in on the concrete components that best support it. Additional research is also needed to inform the

implementation of the inquiry model on a broader scale, and within larger institutions and networks of educators.

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