International Journal of Teaching and Learning in Higher Education 2009, Volume 20, Number 2, 168-181
http://www.isetl.org/ijtlhe/ ISSN 1812-9129

Assessing the Impact of a Year-Long Faculty Development Program on Faculty Approaches to Teaching

Greg Light, Susanna Calkins, Melissa Luna, and Denise Drane
Northwestern University

This paper reports findings from an empirical four-year study designed to investigate the relationship between key constructs of an extended model of teaching and learning in higher education. Using a mixed-methods approach, we sought to assess the impact of a year-long faculty development program (FDP) designed for pre-tenure faculty on participant approaches to teaching. From our analysis of participant critical reports of teaching, post-program interviews, and the Approaches to Teaching Inventory (ATI), we found evidence of positive change in the approaches to teaching of junior faculty participants in the FDP. All three methods elicited evidence indicating that participating faculty moved towards more conceptual change/student focused approaches to teaching, and that a significant part of that change could be attributed to their participation in the program.

In a climate in which faculty accountability is ever more dependent on research and scholarship, especially as rewarded by promotion and tenure, improvement in the quality of teaching is an increasing concern. The development of high-quality teaching practice is critically important, especially for tenure-track faculty pressed by the demands of publication and research (Boice, 1992; Fairweather, 2002; Tang & Chamberlain, 2003; Wolverton, 1998). Faculty members at research intensive institutions often must negotiate conflicting expectations about teaching and research: the university may seem to publicly laud good teaching, but privately value good research more, especially in decisions of promotion and tenure (Leslie, 2002; Wright, 2005).

While a proliferation of teaching centers has sought to address the increasingly complex challenges of teaching in higher education through faculty development programs (FDPs), and a scholarship of faculty development has begun to flourish (Eggins & Macdonald, 2003; Elvidge, 2004), there has been a comparative dearth of research looking at the impact of these programs. In this study, we seek to investigate the relationship between key constructs of an extended model of teaching and learning in a research-intensive context (described more fully below). Using a mixed-methods approach, we draw on a comprehensive four-year study of a FDP designed for pre-tenure faculty in order to assess the impact of a year-long FDP on faculty approaches to teaching

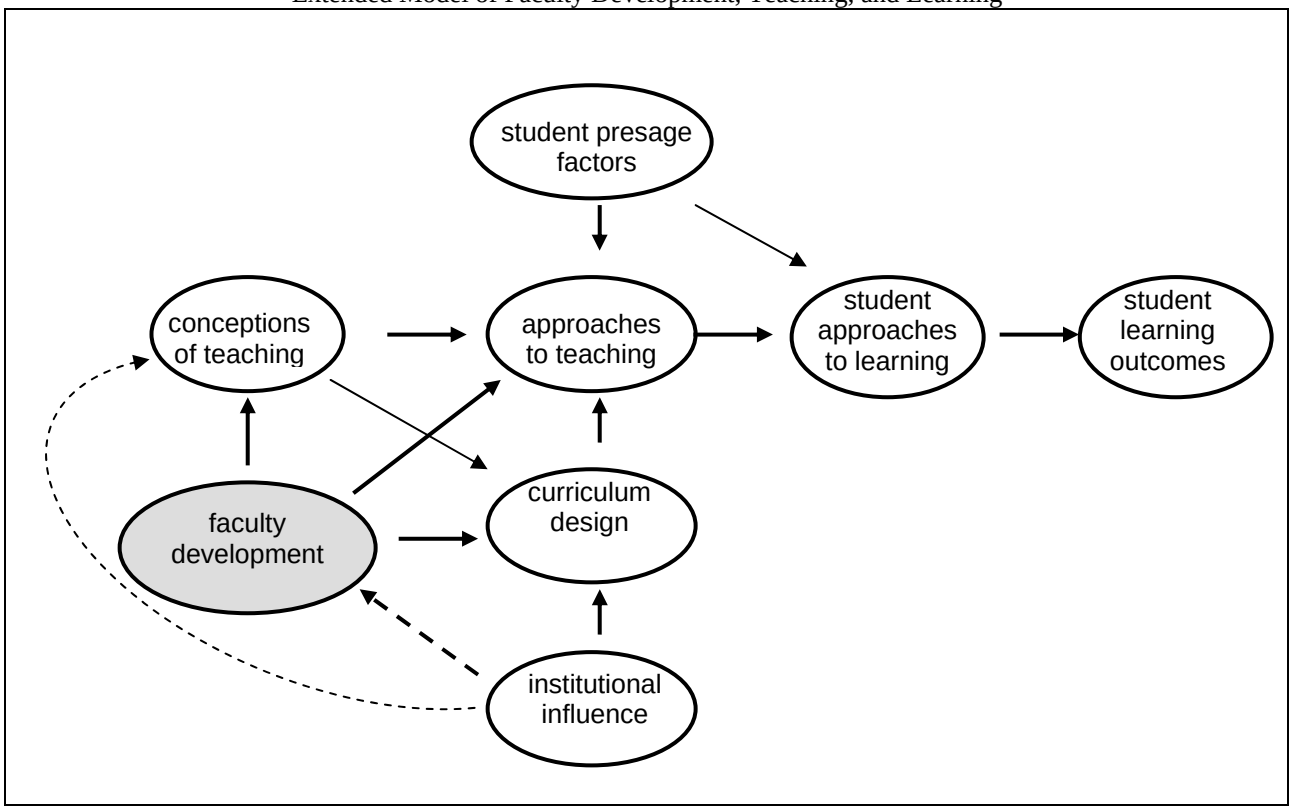
Model of Teaching & Learning

Kember's (1997) descriptive model of learning and teaching helps illustrate how faculty conceptions of teaching and student learning outcomes are linked by a series of related and mediating constructs: specifically teachers' approaches to teaching in a particular course and student approaches to learning in that course (Figure 1). This model further holds that a teacher's conceptions of teaching and approach to teaching may be affected by curriculum design and departmental and institutional pressures (Kember & Kwan, 2000). While the model has not been fully tested, individual aspects have been investigated, providing mounting evidence for their causal relationships to one another. In particular, the components of the model that address the relationships among student presage factors, student learning approaches, and learning outcomes have been widely studied (Biggs, 1987; Dart & Boulton-Lewis, 1998; Entwistle & Smith, 2002; Kember, Biggs, & Leung, 2004).

Recently, more attention has been paid to characterizing conceptions of teaching and teaching approaches. Research has shown that there are two broad orientations towards teaching approaches (Kember, 1997; Prosser & Trigwell, 1999; Trigwell & Prosser, 2004), although there is some variation in the specific descriptions and theoretical distinctions of the orientations (Akerlind, 2003; Trigwell, 2003). Recent studies have distinguished between faculty who are concerned with teaching as essentially an organization of the content of the teacher's knowledge for transmission to the students—information transmission (IT)—and those who regard teaching as facilitating their students' personal construction of knowledge, also referred to as conceptual change (CC).

Kember (1997) found that 13 independent empirical studies identified similar conceptions of teaching of university academics, describing the two main orientations as teacher-centered/content oriented and student-centered/learning oriented. A third category, the student-teacher interaction, links the two orientations. Similarly, Prosser and Trigwell (1999) described the variation in the ways in which faculty

Figure 1
Extended Model of Faculty Development, Teaching, and Learning



Note. Adapted from Kember (1997)

experience teaching in higher education in terms of both conceptions of teaching and approaches to teaching. They identified six conceptions of teaching, which focus on the ways instructors conceive of, or understand teaching, and five approaches to teaching, which focus on the instructor's actual teaching strategies and intentions. Both conceptions and approaches range from being teacher-centered to learner-centered, and from transmitting information (and being content oriented) to promoting conceptual change (and being learning oriented). As in Kember's model, a third transitional category, links the two orientations.

Kember and Kwan (2000) later concluded, in their study of 17 university teachers, that teaching conceptions inform teaching approaches; thus, a learner-centered conception of teaching is required in order before any real change towards quality teaching and learning can occur. Also significant, research on these two main teaching orientations has disclosed an important relationship between faculty approaches to teaching and student approaches to learning (Gow & Kember, 1993; Kember & Gow, 1994; Prosser & Trigwell, 1999; Sheppard & Gilbert, 1991). IT approaches to teaching correlate with increased surface approaches to learning and CC approaches to teaching correlate more strongly with students' deeper approaches to learning.

This model, however, simply describes the structural relationship of key constructs in the practice of learning and teaching in higher education. We propose an extended, dynamic model in which interventions to impact key constructs are undertaken through formal faculty development activity (Figure 1 – see shaded area). Formal faculty development activity is, of course, not the only possible category of developmental faculty activity that might impact key constructs of teaching and learning. Informal activities including discussion with peers as well as undergraduate and graduate students can have substantive developmental effects. Faculty often find, for example, that such collaborative activities as informal mentoring, feedback from colleagues, conversations with peers and students, teaching support networks, and so on were very useful in developing their teaching (Ferman, 2002). To include them within a substantive model of teaching and learning, such informal activities would need to be framed and developed in terms of a credible teaching and learning model. For this reason, the faculty development construct discussed in this paper is focused on a formal professional development

activity with established learning and teaching objectives.

Reviews of more formal faculty development programs in higher education reveal a range of diverse goals that include the development of specific skills, the increased ability to reflect on teaching practice, and the development of self-confidence (Coffey & Gibbs, 2001; Gilbert & Gibbs, 1999). An increasing number of studies, however, have been framed in terms of the above model, looking at how programs might directly impact key constructs of the model, specifically faculty understanding of and approaches to teaching (Ho, Watkins, & Kelly, 2001; Trigwell, 2003). In an international study of 20 faculty development programs (FDPs) in 8 different countries, Gibbs and Coffey (2004) found that FDPs can increase the extent to which faculty take student-focused conceptual change approaches to teaching and, can, thereby, improve their student's approaches to learning. A separate independent study, Light, Luna, Drane, & Fleming (2004) also reported that participation in a substantive FDP can have a positive impact—gains towards CC approaches to teaching—on the development of faculty teaching.

This paper empirically examines the relationship between two key constructs of the above extended model: the impact of a faculty development intervention (program to improve teaching) on approaches to teaching. This paper focuses on the hypothesized relationship between the "FDP intervention" construct and the "approaches to teaching" construct. It will also provide preliminary evidence for the hypothesized relationship between the "FDP intervention" construct and the "curriculum design" construct.

Method

FDP Design

The design of the FDP in this study draws on a model of faculty development characterized by professional reflection and inquiry (Light, 2003; Light & Cox, 2001). The model is also consistent with McKenzie's (2002) findings that teachers who focused on variation in ways of experiencing teaching, particularly the variation between student-focused and teacher-focused ways of experiencing teaching and learning, were more likely to be aware of student focused approaches to teaching. The program is designed to facilitate deeper knowledge, understanding, and expertise in learning and teaching; to encourage evidence-based approaches to learning and teaching; and to help develop or revise a new or existing course. In terms of the length of program (8 months), hours of commitment (75+), and its focus on new faculty (pre-tenure), the scope of the program is comparable to other substantive FDP's from eight countries including many providing academic and professional certification (Gibbs & Coffey, 2004). Participants attend monthly dinner workshops led by faculty from the teaching center and a two-day retreat. Additionally, participants attend three project group meetings, 3-4 teaching and learning workshops, and consultation meetings with mentors and center faculty. Over the four years described in this study, the program was run in essentially the same way with change in only one of the three main facilitators.

Study Design

This study takes a mixed method approach to assess the impact of the FDP on change in faculty approaches to teaching. The focus of the study is on whether or not there was change which might be attributable to the FDP and less so on the extent or depth of that change. In addition to substantially increasing the number of subjects in the study from a previous study (Light et. al., 2004), the design employs three methods to assess change. The first looks at changes in how faculty approach their teaching as measured by the Approaches to Teaching Inventory (ATI) at the beginning and end of the program. The study employed a treatment group of junior tenure line faculty who took the program and a control group of comparable junior tenure line faculty who did not take the program. The second method focuses on reports of actual change implemented in or planned for their teaching, as indicated in written critical reports of the teaching projects which each program participant submitted at the end of the program. The third method examines statements of change made by participants during in-depth post-program interviews.

Participants

Over four years, 52 faculty members (13, 11, 12, and 16 respectively) participated in the program in four separate annual occurrences of the program. One person dropped out during each of the first 2 years and the last year. The 49 remaining faculty represented a wide range of disciplines. Twenty-nine were from sciences, medicine and engineering disciplines, and 20 were from the social sciences and humanities; 48 of 49 participants attended at least 70% of the planned activities, and 40 attended 90-100% of these activities. Participants received a modest stipend for educational expenses upon their successful completion of the program requirements, which included the written critical account described in this paper, but they did not receive funds or gifts for participating in the study.

There were 29 faculty members in the control group. They were drawn from the same pool of faculty as the program participants, which included all university schools and departments. The control group consisted of new junior tenure line faculty at approximately the same point in their careers as those in the FDP. Requests to participate in the study were sent out to 79 faculty who had had participated in a one-day new faculty workshop on teaching, which had been held annually in the previous three years. As in the FDP, this workshop was voluntary and attracted faculty interested in improving their teaching. Of these 79 faculty, 29 originally agreed to participate. Of those 29, pre and post data were collected from 16 faculty in the control group. Four were from the sciences, medicine, and engineering, and 12 were from the social sciences and humanities. The control group did not receive funds or gifts for participating in the study.

Instruments

Faculty who participated in the program during the 4 years of the study and all control group faculty completed the Approaches to Teaching Inventory (ATI). The ATI is a standardized Likert scale inventory developed to provide a measure of faculty approach to teaching (Prosser & Trigwell, 1999; Trigwell & Prosser, 1996a). It consists of 16 items and is intended to capture variation in two conceptually discrete dimensions by way of two sub scales corresponding with the two main orientations described above: information transmission/teacher focused (IT) and conceptual change/student focused (CC). The 8 items in each of these approach scales are further divided into two sets of four items focused respectively on the instructor's teaching intention and strategy.

All faculty members who completed the program also submitted a critical project report of actual teaching change implemented (or planned) for their course at the end of program. The project consisted of the redesign of an existing course, or the design of a new course or of a significant part of a new course that the participant taught during the year of the program or would be teaching during the next academic year. The report offered a reflective, critical account of the development and implementation (undertaken or planned) of the teaching innovation, with reference to the relevant teaching and learning literature. In the critical accounts, faculty members were asked to address the following areas: general description, learning outcomes, teaching activities, student assessment, and course evaluation methods/findings.

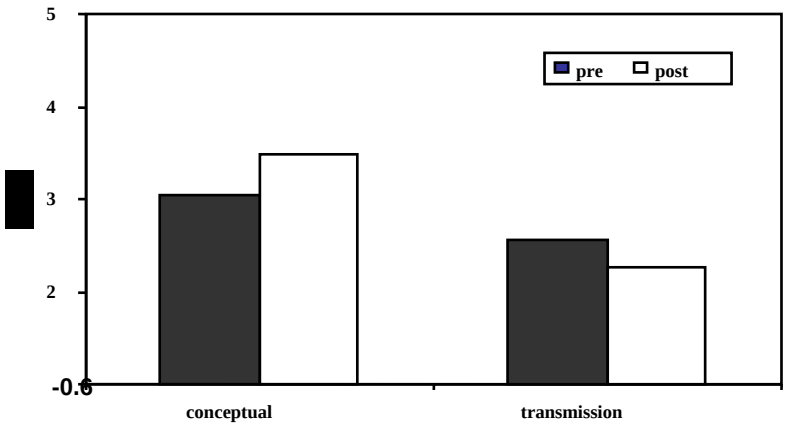
In addition, faculty members who participated in the third and fourth years of the program were interviewed at the end of the program. The interviews took a semi-structured format and were designed to elicit participants' approaches to and conceptions of teaching and learning, and to discover whether those conceptions and approaches may have changed as a result of the program. The pre-program interviews also served to determine expectations about the program, while the post-program interviews were designed to gain feedback about the program's overall effectiveness.

Procedure

ATI. The eight items on each scale were averaged to produce two subscale (CC and IT) scores. The pre- and post tests were analyzed for gains and/or losses on each subscale. Paired t-tests were carried out to determine if there were any statistically significant changes in conceptual and transmission scale scores during the course of the program. Independent t-tests were used to determine if there were statistically significant differences in CC and IT gains between FDP faculty and control faculty. All statistical analyses were performed with Statistical Package for the Social Sciences (SPSS) version 12 for Windows. Cohen's d (standardized mean difference) effect sizes were also calculated (Cohen, 1988).

Critical reports. In each of the four years, FDP faculty worked on their projects over the course of the program. They were assigned to a project group with two or three other participants. Each group met three times with a program facilitator to discuss and critique each others' projects. All 49 FDP participants submitted a critical project report at the completion of their participation, which were then analyzed for three specific categories of evidence: (a) evidence of student-centered teaching practice, (b) evidence of personal statements of change in their approach to teaching, and (c) evidence of personal statements of change attributed to their participation in the FDP. Student-centered teaching was indicated when one or more of the following criteria was displayed: (a) when specific student-centered teaching words or phrases (e.g., *student-centered learning, deep learning, engaging students, problem-based learning, interactive teaching*) were present in the critical account with respect to their teaching intentions or strategies, (b) when a student-centered model was described in any section of the critical account (e.g., with respect to learning objectives, teaching methods, student assessment), or (c) when there was an emphasis on student learning over content or coverage in the narrative of the critical account. A change to student-centered teaching was indicated when one or more of the following criteria was met if (a) evidence of student-centered teaching was accompanied by a specific statement of change in teaching (e.g., "I changed") or (b) evidence of student-centered teaching was accompanied by a before and

Figure 2
Pre-post Comparison in Mean CC and IT Subscale Scores for FDP



after statement (e.g., "I used to…but now I…"). A change to student-centered teaching attributable to the FDP was indicated if evidence of change was accompanied by a specific change statement mentioning participation in the FDP.

In the analysis of the critical reports, one of us read through all of the reports to isolate passages concerning the categories of evidence indicated above using the pre-determined criteria. Another researcher then independently reviewed the passages, checking for accuracy in the categorization of such passages. In this analysis of the critical reports, there were no cases of disagreement between the two researchers.

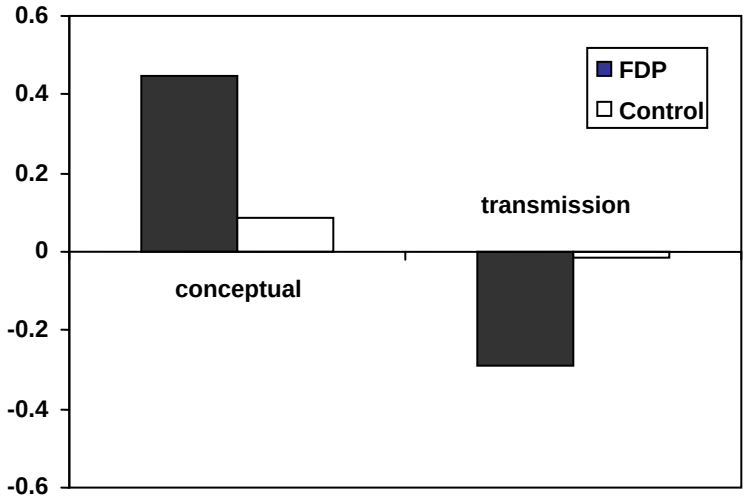
Interviews. In the third and fourth years of the program, we interviewed 25 FDP faculty members individually within a month after the program ended. The interviews usually lasted 40-50 minutes each, and were audio-taped and fully transcribed. We focused our analysis primarily on faculty reports of change to determine whether or not the data supported the evidence from the critical reports. We analyzed the interviews for evidence of (a) student-centered teaching, (b) a change towards student-centered teaching, and (c) a change towards student-centered teaching that could be attributed to participation in the FDP. As with analysis of the critical reports, student-centered teaching was indicated when one or more of the following criteria were displayed: (a) when participants used specific student-centered teaching words or phrases (e.g., *student-centered learning, deep learning, engaging students, problem-based learning, interactive teaching*) with respect to their teaching intentions or strategies, (b) when participants described a student-centered model of teaching when speaking about aspects of their own teaching, or (c) when participants emphasized student learning over content or coverage in their teaching. A change to student-centered teaching was indicated when one or more of the following criteria were met: (a) evidence of student-centered teaching was accompanied by a specific statement of change in teaching (e.g., "I changed") or (b) evidence of student-centered teaching was accompanied by a before and after statement (e.g., "I used to…but now I…"). A change to student-centered teaching attributable to the FDP was indicated if (a) evidence of change was accompanied by a specific change statement mentioning participation in the FDP, or (b) evidence of change was accompanied by a specific change statement in direct response to the interviewer's question about participation in the FDP.

To conduct this analysis, one of us read through all of the interview transcripts to isolate passages concerning student-centered teaching that met the pre-determined criteria. Two others examined the condensed transcripts to categorize the responses within the three general areas of evidence using the same criteria. The three of us, as a group, then compared our categorizations to achieve consensus. In cases of disagreement, we went back to the transcripts independently to re-examine the larger context of the statement to achieve resolution. Throughout the process, we reviewed the transcripts in their entirety to assure that quotations remained in context and appropriately fit their assigned categories.

Results

ATI results. Forty-six faculty members completed the FDP. Twenty-two were from the humanities/social sciences and 24 were from

Figure 3
Mean Gain in CC and IT Subscale Scores for FDP and Control



science/medicine/engineering. Sixteen control faculty had complete pre- and post-program ATI data. Twelve were from humanities/social sciences and 4 were from science/medicine/engineering.

ATI data from the 4 years were aggregated into one data set. The mean pre-program CC subscale score for FDP faculty was 3.26 and the mean pre-program IT subscale score was 2.57. A paired t-test revealed a statistically significant mean increase on the conceptual change/student focused (CC) subscale of 0.31 points for FDP faculty (T_{45} = 2.92, p = 0.005; 95%CI 0.10-0.52). Mean information transmission/teacher focused (IT) scores for FDP faculty decreased by 0.24 points. This decrease was also statistically significant (T_{45} = 2.83, p = 0.007; 95%CI 0.07-0.41). (Figure 2). Effect sizes associated with these changes, 0.43 and 0.42, respectively, are considered moderate (Cohen, 1988).

In contrast, there were virtually no changes on CC and IT subscale scores for control faculty. Paired t-tests revealed a non-significant mean reduction of 0.04 points (T_{15} = 0.32, p = 0.754; 95%CI –0.21-0.28) on the CC subscale and a mean reduction on the IT subscale of 0.02 points (T_{15} = 0.0.154, p = 0.879). FDP and control participants were compared in terms of amount of change in IT and CC subscales using independent t-tests. Mean change for the FDP group was 0.35 points higher on the CC subscale (T_{60} = 1.80, p=0.077; 95%CI –0.04-0.73). Mean reduction for the FDP group was 0.22 points greater on the IT subscale (T_{60} = 1.59, p = 0.116; 95%CI –0.07-0.58) (see Figure 3).

Critical reports. Critical reports ranged from one and a half to eleven pages in length (mean length 5.25 pages), not including appendices, syllabi, assignment descriptions, and course evaluations. To ensure that the analysis focused on evidence which the faculty had critically reported as important to their projects, the appendices were not included in document analyses other than to clarify meanings within the report. While faculty members were asked to provide a critical account of their projects in the report, they were not specifically asked to comment on changes in their own approach or refer to the role of the FDP. All data are drawn directly from reports**.** The three categories of evidence are intended to build an overall case. The first category does not specifically address changes in approach to teaching; it provides evidence of student-centered teaching activities. The second category provides evidence in terms of individual statements of change in teaching approaches towards student-centered approaches. The third category provides direct evidence of change which can be attributed to participation in the FDP.

Table 1 provides an overview of the evidence for change in teaching with respect to the three categories of evidence mentioned above. In all but five cases, faculty provided evidence of both student-centered practice and change towards student-centered practices, with some accounts providing a stronger description of such practice and change than others. In just over half the critical accounts, faculty also attributed at least part of the change they experienced to their participation in the program. These expressions of change were not directly solicited by the researchers. In the discussion that follows, examples of that evidence and what they mean are provided for each category.

Student-Centered Teaching Practice

Data from student-centered teaching practices were taken from faculty statements about various aspects of teaching, including learning objectives, teaching activities, and assessment methods. These activities share a common focus on student learning, particularly a concern with encouraging students to take a deeper approach to their learning in the course as opposed to a surface approach, as one history professor indicated:

> Indeed, my main goal as a teacher in this and every other course is to move the students beyond surface learning of the material toward a deeper, critical engagement with various themes and modes of argument.

Similarly, a political science professor wrote,

> Now my goal is to engage students and create a more dynamic environment for deeper learning…thus my focus now will be on critical thinking and problem-solving, rather than disseminating as much surface-learning material as I can.

This focus on encouraging deep student learning is evident from statements made about various teaching practices regarding descriptions of teaching activities and learning objectives respectively. An engineering professor reported how he encouraged his students to think critically and deeply about the course material by taking a student-centered approach in his teaching:

> I feel particularly strongly about [using] case studies because they enable students who are thoughtful and deep learners an opportunity to excel. Superficial and strategic learners would most likely focus on answering the questions on the assignment sheet, whereas deep learners may try different approaches and focus on the underlying problem and on providing a set of recommendations that are practical and substantiated with thorough analysis.

In another example, a professor of medicine described how he encouraged his students to think for themselves and to take ownership of their learning:

> As much as possible, I attempted to let them [my students] do all the talking. I also encouraged the other professors to do the same. As the course progressed, the dynamic did change from one of almost complete deference to one of almost complete independence!

Also, a chemistry professor expressed one of her teaching goals to make her course student-centered:

> One goal of this course is to make each area as interactive as possible so that specific student benefits would be realized and student intellect will increase.

Change in Teaching Practice

The statements describing faculty change in their understanding of teaching were expressed in a variety of ways. Some faculty reported the change directly in terms of changes in their conception of particular teaching practices, as one professor of Slavic literature wrote:

> One of the most welcome results of the conceptual changes underlying a new conception of myself as a facilitator…has been a new vision of the large lecture course. Instead of conceiving large lectures as something categorically different from small seminars, I now view both learning environments as situations suitable for active interaction between instructor and students and for small, peer-referenced learning as well as instructor-driven learning.

Another professor of linguistics discussed how he began to see the value in using a different teaching method:

Table 1
Faculty Statement of Change from Critical Teaching Accounts

Faculty Statements (From FDP Critical Reports: N=49)	Reports showing evidence of change:
Student-Centered Teaching Practice	49
Change to Student-Centered Teaching Practices	44
Change Attributed to Participation in the FDP	25

> A second general lesson is that hands-on, problem-based methods are extremely effective in getting students to understand theoretical issues. I found that allowing them to manipulate and explore concrete instantiations of theories engages students much more than a simple lecture-style presentation of the same questions.

Other faculty members discussed change in approach in terms of a change to teaching which motivated students less through grades and more through strategies to engage them in thinking. An electrical and computer engineering professor reported how he had redesigned elements of his course in order to foster deep learning:

> I chose to construct anew the laboratory assignments for (the course) with the goal of engaging students and converting them from grade centered (strategic learning) to concept centered (deep learning) students.

A computer science professor also sought to restructure his courses by emphasizing deeper student learning through his assessment scheme:

> In trying to make students take responsibility for their learning, student presentations as well as class participation were made an important component of the grading scheme. Class discussions following these presentations helped teach students not to skim over the top of a topic like a jet skier, but to put [on] scuba diving equipment and go down to examine underlying causes and relationships.

Finally, other professors expressed their own fears and uncertainties in making such changes in their teaching practice. A professor of medicine stated,

> This is a radically different undertaking for me. It does not reflect a regurgitation of anything that I have experienced or taught. In fact, I was never explicitly taught how to be an academic instructor, and it is a rather daunting task to design this project.

Change Attributed to Participation in the FDP

While participants were not asked to comment on change with respect to the FDP, many made statements indicating change in approach to teaching directly attributed to participation in the FDP. They focused on particular methods/activities of teaching and assessment as well as more general ways of thinking about teaching, as one literary scholar wrote:

> First, I incorporated lessons learned from the (FDP) retreat and from a (FDP) workshop on lecturing by trying to create the occasion of the course itself as an especially timely one in the context of the contemporary world. Thus I attempted to activate the space of the lecture hall as an 'event' in its own right. I broke the invisible wall between lecturer and audience by engaging students from the audience—asking questions of the students and taking comments from them sometimes, summoning students to read passages from the texts in question other times.

According to a materials science professor, the FDP provided him with specific student focused teaching approaches that he could use in his courses:

> Consequently small-group projects were assigned in place of home works. The (FDP workshop) on Improving Small Group Teaching provided many helpful suggestions for implementing a teaching method that is widely unused in the School of Engineering and Applied Science. In particular the workshop provided fair and educational means of evaluating group activities.

One chemical engineering professor described how the FDP enabled him to move beyond a coverage approach in his teaching:

> Being an inexperienced teacher, I felt obliged to fall into the usual trap of 'making sure certain material is covered in class' [quotation marks added by professor]. This clashes strongly with what I believe teaching is all about and, unfortunately, with what I expressed to the students. Thus the most important lesson I learned through my participation in the [FDP] is that I can set 'goals-in-which-I-believe' for any course I teach.

Finally, another professor of medicine wrote about both the current and lasting impact the FDP has on her teaching:

> As I hope is evidenced in this project, my participation in the (FDP) has helped me to better understand ways in which to engage students and has expanded my understanding of how one can assess their learning. I am happy to have had the opportunity to participate in the

> program and am certain that my experiences here will continue to inform my teaching.

Interviews

In the interviews, 24 (of 25) faculty members indicated that they utilized student-centered activities in their teaching. In only one case did the transcripts fail to provide evidence that the faculty member utilized student-centered activities in their teaching. As in the critical reports, a student-centered teaching practice, whether expressed as a learning objective, teaching activity, or assessment method, was one that emphasized student learning and encouraged students to learn deeply. For example, one chemistry professor noted,

> I think in terms of teaching styles, small group learning and really engaging the students to ask questions. And so [I plan on] actually incorporating a lot of small group activities to help them learn, in both my courses.

Table 2 provides an overview of faculty awareness of change with respect to student-centered activities in their teaching. Faculty participants were directly asked if their teaching changed as a result of their participation in the FDP. As such, we interpreted all the responses that reported change in teaching as evidence that the change could be attributed to the FDP, using the criteria described above in the methods section. There was, as mentioned earlier, no evidence of change in the case of only one faculty member. In describing these results, we make an important distinction between the clarity of the evidence from which the results are derived. The statements of 14 faculty provide strong evidence which clearly showed an awareness that they had changed their approach to student-centered teaching, and that the change could be attributed to participation in the FDP. Another 10 reported change as a result of participation in the FDP, but the awareness of change they described was less clearly articulated.

Strong Articulation of Change

It should be noted that the term *strong*, applied with respect to the 14 FDP participants, here refers to the evidence of change, not the extent or depth of that change. We considered a statement to provide strong evidence if it was characterized by a clarity of awareness of change on three dimensions: (a) change actually occurring, (b) that change being toward a student-centered approach, and (c) change being due, at least in part, to participation in the FDP.

Speaking of his own change in approach to teaching, a sociology professor explained that content and coverage were less important goals than encouraging his students to be deep, rather than strategic, learners:

> Before I would tell the students they need to know this or that but now it's more 'no, you don't need to know that.' I am more selective on what material is important for the students to read. I get them to focus on the most important materials, get them to understand it. I focus more on deep learning more than absorbing all the material. I feel less pressure to cover all the material.

Even more emphatically, a chemistry professor strongly attributed a deeper approach to teaching, and his realization that he no longer needed to command his students by transmitting information, as a result of participation in the FDP:

> Whereas, instead of being a strategic teacher I am more of a deep teacher. Instead [of] having a very strong personality being in command of the class and just giving out as much information as

Table 2
Faculty Awareness of Change from Interviews

Faculty Articulation of Change (from Interviews)		Number (N=25)	
	Awareness of Change	Change 24	No Change 1
Strong	Awareness of change clearly articulated on three dimensions: 1) change, 2) change to a student-centered practice, 3) change due to participation in the FDP	14	
Weak	Awareness of change unclearly articulated on at least one of three dimensions: 1) change, 2) change to a student-centered practice, 3) change due to participation in the FDP	10	
None	Awareness of change unclearly articulated on all three dimensions		1

> possible. Now I am into higher levels of thinking in terms of how to present things, what's best….

Another professor of medicine discussed how the FDP contributed to how she thought about students differently:

> But I have been fairly frustrated with the students here at [the university] because I felt like I couldn't just do that. I couldn't just stand up and have them be engaged. And I think before the (FDP) I was perfectly happy to just blame the students. Like, oh, they're disinterested students, they're not good students. I don't have to do anything different. When really if I go out of my way to engage them, then actually they are pretty good students. So that was a big shift for me.

This sentiment was echoed by a professor of political science who stated that

> I did learn some major things from the teaching cannon like the different kinds of students, different kinds of learners that might be strategic, deep or surface. Active learning is the term you guys introduced at one point but I thought it related to me in designing this big lecture classes because it made me think a little bit more about how to get the students involved in the class rather than being passive.

Weak Articulation of Change

The articulation of change in teaching by 10 of the faculty participating in the FDP is described as weak. Once again, *weak* here refers to the clarity of the evidence of change, and not necessarily to the extent or depth of that change. We considered a statement to suggest weak evidence of change if its articulation was characterized by a lack of clarity of awareness on one or more of the three dimensions described above. This presented itself in one of the following ways: (a) the faculty member indicated change had occurred but did not say that the change was toward a student-centered approach, (b) the faculty member indicated the beginnings of awareness of change but did not say if the change had to do with a student-centered approach, (c) the participant was unsure whether the change was due only or primarily to FDP participation, (d) the statement of change was not well articulated, or (e) there was no substantial change as the faculty member already utilized a student-centered approach prior to participation in the program. For example, one civil and environmental engineering professor commented that she learned about how to utilize problem based learning more effectively from her involvement in the FDP, but since she already employed such student-centered teaching practices, we did not believe it could be said that she changed her teaching approach or practice, but rather reinforced already existing practice.

Another example of a weakly articulated expression of change can be seen in the words of a linguistics professor:

> [My teaching's] changing sort of unconsciously. I am still doing the same kinds of things: I didn't really change the way I teach fundamentally…But hopefully some of the faults I had and the things I learned about how to present things, how to make sure students remain engaged.

In this case, we considered the remark to be weak because the faculty member seemed only generally aware that his teaching was changing, but he did not understand the nature of that change. We decided that his remark was an indication of weakly articulated change, since throughout the interview, he spoke about seeking to "engage" his students as he had not done before.

Another engineering faculty member attributed change in their teaching to participation in the FDP, but was unclear as to the nature of that change:

> I learned that teaching is much more than tips and instead of getting a list of the ten best suggestions, I feel that the program focused on the learning process, the philosophy or science of learning…I have a better understanding of what it means to be a teacher and all these principles will stay with me for a long time.

We understood the engineering faculty member's remark to be weak because she talked about having learned about teaching from her participation in the FDP, but she did not indicate whether she had changed her approach to student-centered teaching.

Discussion

Findings from the mixed method approach employed in this study suggest positive change in the approaches to teaching of junior faculty participants in the FDP. All three methods elicited evidence indicating that participating faculty changed towards more student-centered practices and conceptual change/student focused approaches to teaching. It also suggests that a significant part of that change could be attributed to their participation in the program. Together they provide substantive evidence for the addition of the supplementary, FDP intervention construct included in the extended learning and teaching model proposed in Figure 1 above. The results

primarily support the relationship between this construct and the approaches to teaching construct of the model. Additional evidence from the analysis of the interviews, suggesting more general changes in thinking about teaching, provide evidence of the relationship with the conceptions of teaching construct, but very preliminary. Similarly, textual analysis of the participants critical reports of the design of a particular course support the hypothesized relationship between the FDP intervention construct and the curriculum design construct, but only narrowly construed in terms of its relationship to the design of a particular course. We are not claiming the evidence supports the hypothesized relationship with curriculum design more widely construed as, for example, the organization of different subjects in a program.

In both the main CC and IT subscales of the Approaches to Teaching Inventory, the results were in the anticipated direction with healthy effect sizes. The results support the findings by Gibbs and Coffey (2004) in an international study of the efficacy of FDPs. We calculated effects sizes (Kline, 2004) for the Gibbs and Coffey study and compared them with effect sizes found in the present study. Effects sizes on both subscales were larger in the present study (0.45 vs. 0.12 on the IT subscale and 0.63 vs. 0.41 on the CC subscale).

FDP faculty changed on both the CC and IT subscales of the ATI, with changes in the anticipated direction and healthy effect sizes. In contrast, there was negligible change in control faculty. These results also support the findings by Gibbs and Coffey (2004) in an international study of the efficacy of FDPs. We calculated effects sizes (Kline, 2004) for the Gibbs and Coffey study and compared them with effect sizes found in the present study. The effect size was larger on the CC subscale in the present study (0.45 vs. 0.12) and virtually identical on the IT subscale (0.42 vs. 0.41).

Given the small sample size in the control group, potential biases in the way in which the two groups were selected and the divergence in the disciplinary profile between the two groups, we need to interpret these results cautiously. It is also worth mentioning that as with most, if not all instruments, development of the ATI has drawn some criticism, in particular from Meyer and Eley (2005) who point out several psychometric limitations in its development.

Analysis of critical reports, while limited to specific statements of evidence related to the design of one particular course, nevertheless, supports the ATI results with evidence of change implemented in, or planned for, actual course teaching. It should be noted, however, that while the findings from the study of the critical reports provide evidence for the development of student-centered intentions/strategies across the overall pool of participants in the FDP, it does not, at this point, provide substantive evidence of the extent and depth of that development across the key aspects or dimensions of the course and learning environment designed. There is no attempt, for example, to measure the depth and or breadth of the change by counting the number of statements in the reports, or interpreting them for depth and commitment. While the critical reports describe the design of a new course, or changes faculty made to an existing course, they were not specifically asked to assess the extent of change or its relationship to the FDP. Given the diversity of academic contexts, disciplines, student numbers and grade levels, such analyses were not felt to be appropriate. Similarly, there is no attempt to make internal comparisons about the extent of student-teaching practices versus more teacher-centered teaching practices which the reports also suggested. The focus of the analysis was on whether there was change, whether it was towards student-centered practice and whether it might be attributable to the FDP. Finally, it should be remembered that these critical reports are self reports and do not necessarily fully reflect what actually happened on the particular courses reported, or what subsequently occurred on the particular courses planned.

The analysis of the interview findings focused on specific statements of change related to student-centered approaches to teaching. In so far as the interview data were analyzed with respect to the same criteria as the critical reports, the findings support those reported from the critical reports. It should be noted, however, that the unit of analysis of the interviews was broader than the course focused unit of the critical reports. While the critical report focused on a particular course, the interviews were concerned with more general statements on change in the participants teaching practice or approach. These statements suggest that the change which they attribute to the FDP is more generally applicable to their understanding of teaching practice as a whole (e.g., “I have a better understanding of what it means to be a teacher”). It should be noted that a less than clear articulation of change does not mean there was no change or that the change itself was not substantial. The interviews provide very preliminary support for change beyond the particular course context.

Conclusion

At a time when teaching in higher education has come under increased pressures for accountability and pressure for improvement (Wilson, 2002), research evidence supporting the efficacy of initiatives and programs to improve teaching is increasingly important. In addition, it is critically important to embed that

research within empirically supported, theoretically sound frameworks relating teaching development in higher education to credible improvements in student learning outcomes. This study provides evidence for the potential of such programs to elicit changes in faculty approaches to their teaching within a framework which suggests that these changes can positively impact student learning. In so doing, it argues for a broader model of learning and teaching extending to and inclusive of the faculty development construct hypothesized at the beginning of this paper.

The recent growth of centers for the improvement of teaching and learning has resulted in a wide range of different programs and initiatives for faculty development. This general effort has, for the most part been working in a theoretical void, with little robust research evidence to support much of that work. The positive relationship between faculty development and student learning outcomes, which such programs have tacitly claimed, has rarely been meaningfully demonstrated, either theoretically and empirically. This study is intended as one of a number of projects beginning to remedy that gap and probe it further. The evidence for the potential of such programs raises additional questions about the nature of the encounter of faculty and program? In this respect, the authors are presently engaged in a range of empirical studies examining various aspects of that encounter, including (a) modes of faculty encounter, (b) the impact of the encounter with the program on student learning, (c) faculty experiences of academic learning which they bring to that encounter, and (d) the role of disciplinary mentors in that encounter.

References

Akerlind, G.S. (2003). Growing and developing as a university teacher--variation in meaning. *Studies in Higher Education 28*, (4) 375-390.

Biggs, J. (1987). *Student approaches to learning and studying.* Melbourne, Australia: Australian Council for Educational Research.

Boice, R. (1992). *The new faculty member: Supporting and fostering professional development.* San Francisco: Jossey-Bass.

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillsdale, NJ: Lawrence Erlbaum Associates.

Coffey, M., & Gibbs, G. (2001). The strategic goals of the training of university teachers. In C. Rust (Ed.), *Improving student learning strategically* (pp. 121-139). Oxford, United Kingdom: Oxford Center for Staff and Learning Development.

Dart, B., & Boulton-Lewis, G. (Eds.). (1998). *Teaching and learning in higher education.* Melbourne, Australia: Australian Council for Educational Research.

Eggins, H., & MacDonald, R. (Eds.). (2003). *The scholarship of academic development.* Buckingham, United Kingdom: The Society for Research into Higher Education.

Entwistle, N. (1997) Contrasting perspectives on learning. In F. Marton, D. Hounsell, & Entwistle, N. (Eds.), *The experience of learning* (pp. 3-22). Edinburgh, Scotland: Scottish Academic Press.

Entwistle, N., & Smith, C. (2002). Personal understanding and target understanding: Mapping influences on the outcomes of learning. *British Journal of Educational Psychology, 72,* 321-342.

Fairweather, J. S. (2002). The mythologies of faculty productivity: Implications for institutional policy and decision making. *The Journal of Higher Education, 73(1),* 26-48.

Ferman, T. (2002). Academic professional development practice: What lecturers find valuable. *International Journal for Academic Development, 7*(2), 146-158.

Gilbert, A., & Gibbs, G. (1999). A proposal for an international collaborative research program to identify the impact of initial training on university teachers. *Research and Development in Higher Education, 21*, 131-143.

Gibbs, G., & Coffey, G. (2004). The impact of training of university teachers on their teaching skills, their approach to teaching and the approach to learning of their students. *Active Learning in Higher Education, 5*(1), 87-101.

Gow, L., & Kember, D. (1993). Conceptions of teaching and their relationship to student learning. *British Journal of Educational Psychology, 63*, 20-33.

Ho, A., Watkins, D., & Kelly, M. (2001). The conceptual change approach to improving teaching and learning: An evaluation of a Hong Kong staff development programme. *Higher Education, 42*, 143-169.

Kember, D. (1997). A reconceptualisation of the research into university academics' conceptions of teaching. *Learning and Instruction, 7*(3), 255-275.

Kember, D., & Gow, L. (1994). Orientations to teaching and their effect on the quality of student learning. *Journal of Higher Education, 65(*1), 58-74.

Kember, D., & Kwan, K-P. (2000). Lecturers' approaches to teaching and their relationship to conceptions of good teaching. *Instructional Science 28*, 469-490.

Kember, D., Biggs, J., & Leung, D. Y. P. (2004). Examining the multidimensionality of approaches to learning through the development of a revised

version of the Learning Process Questionaire. *British Journal of Educational Psychology*, *74*, 261-280.

Kline, R. B. (2004). *Beyond significance testing: Reforming data analysis methods in behavioral research.* Washington, DC: American Psychological Association.

Leslie, D. W. (2002). Resolving the dispute: Teaching is academe's core value. *The Journal of Higher Education*, *73*(1), 49-73.

Light, G., & Cox R. (2001) *Learning and teaching in higher education: The reflective professional*, London: Paul Chapman Ltd.

Light, G. (2003). Realizing academic development: A model for embedding research practice in the practice of teaching. In H. Eggins & R. Macdonald (Eds.), *The scholarship of academic development* (pp. 152-162). Buckingham, United Kingdom: Society for Research into Higher Education & Open University Press.

Light, G., Luna, M., Drane, D., Fleming, V. (2004, April). *Transforming pre-tenure faculty approaches to teaching: faculty development at a research university*. Paper presented at the 2004 annual AERA meeting, San Diego, CA.

Marton, F., & Booth, S. (1997). *Learning and awareness.* Mahwah, NJ: Lawrence Erlbaum Associates.

Marton, F., Hounsell, D., & Entwistle, N. (Eds.). (1997). *The experience of learning*, Edinburgh, Scotland: Scottish Academic Press.

McKenzie, J. (2002). Variation and relevance structures for university teachers' learning: Bringing about change in ways of experiencing teaching. *Higher Education Research and Development*, 234-241.

Meyer, J. H. F., & Eley, M. E. (2006). The approaches to teaching inventory: A critique of its development and applicability. *British Journal of Educational Psychology, 76*, 633-649.

Prosser, M., & Trigwell, K. (1999). *Understanding learning and teaching: The experience in higher education.* Buckingham, United Kingdom: Society for Research into Higher Education and Open University Press.

Sheppard, C., & Gilbert, J. (1991) Course design, teaching method and student epistemology. *Higher Education, 22*, 229-249.

Tang, T., & Chamberlain, M. (2003). Effects of rank, tenure, length of service, and institution on faculty attitudes toward research and teaching: the case of regional state universities. *Journal of Education for Business.79*, 103-110.

Trigwell, K. (2003). A relational approach model for academic development. In H. Eggins & R. Macdonald (Eds.), *The scholarship of academic development.* Buckingham, United Kingdom: The Society for Research into Higher Education.

Trigwell, K., & Prosser, M. (1996). Congruence between intention and strategy in science teachers' approach to teaching. *Higher Education, 32*, 77-87.

Trigwell, K., & Prosser, M. (2004). Development and use of the Approaches to Teaching Inventory. *Educational Psychology Review, 16*(4) 409-424.

Wilson, R. (2002, March 22). Report says undergraduate education has improved in recent years. *The Chronicle of Higher Education*, p. A12.

Wolverton, M. (1998). Treading the tenure-track tightrope: Finding balance between research excellence and quality teaching. *Innovative Higher Education, 23*(1), 61-79.

Wright, M. (2005). Always at odds?: Congruence in faculty beliefs about teaching at a research university. *The Journal of Higher Education, 76*(3), 331-353.

GREGORY LIGHT is the director of the Searle Center for Teaching Excellence and an associate professory in the school of educationand social policy at Northwestern University. Prior to Coming to Northwestern, he was on the faculty of the Institute of Education, University of London in the U.K. where he was deputy head and then interim head of the department of Life Long Learning. He has taught post-graduate courses in higher and professional education and consulted across the higher and professional education sector in North America, Europe and Asia. His research and scholarship focuses on the theory and practice of learning and teaching in higher and professional education. His research and his publications are focused on student learning and the professional development of teaching in higher education. He is author (with Roy Cox and Susanna Calkins) of the book *Learning and Teaching in Higher Education: The Reflective Professional*, (Sage 2001, 2009).

SUSANNA CALKINS is an Associate Director at the Searle Center for Teaching Excellence at Northwestern University, where she oversees several faculty development initiatives. She received her PhD in European History from Purdue University, and currently teaches in the Masters of Education program at Northwestern. Her recent research and publications have focused on mentoring, teaching and learning in higher education, the role of technology in teaching, and the history of student ratings. She is also co-author of *Learning and Teaching in Higher Education: The Reflective Professional* (Sage 2009).

MELISSA LUNA is a graduate student in the Learning Sciences in the School of Education and Social Policy at Northwestern University. Her research interests include teacher thinking and learning, science education, and professional development. In addition, she serves on the faculty development team at Northwestern's Searle Center for Teaching Excellence on faculty programming and research.

DENISE DRANE is Associate Director for Research and Evaluation at the Searle Center for Teaching Excellence at Northwestern University and an Adjunct Professor in the School of Communication Sciences and Disorders. She has worked on a variety of research and evaluation projects related to faculty development, teaching and learning in science, math and engineering education, nanoscience education and collaborative learning.