Systematic Assessment of a High Impact Course Design Institute

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Abstract

Herein, we describe an intensive, week long course design institute (CDI) designed to introduce participants to the scholarly and evidence driven process of learning focused course design. Impact of this intervention is demonstrated using a multifaceted approach: (a) post CDI satisfaction and perception surveys, (b) pre /post CDI surveys probing pedagogical confidence and perceptions regarding importance of syllabi components, and (c) pre /post CDI syllabi analysis using a reliable syllabus rubric validated for higher education courses. The combined results of these qualitative and quantitative studies indicate that participants value the CDI experience, believe they learn basic principles of learning focused course design, report they are more confident enacting learning focused concepts in the classroom, believe they are better able to design learning focused syllabi, and they actually design more learning focused courses/syllabi.

Keywords: research, instructional development, programs, course design

Multiday course design institutes (CDIs) are a popular intensive workshop format for educational developers across cultural and disciplinary contexts and institutional types (Johnson, Nelms, Linder, & Palmer, 2012). Although structures vary, most institutes are developed from the principles of backward and integrated course design (Fink, 2013; Wiggins & McTighe, 2005), educative assessment (Huba & Freed, 2000; Wiggins, 1998), active learning (Bonwell & Eison, 1991), and student motivation (Schunk, Pintrich, & Meece, 2007; Svinicki, 2004). In general, CDIs aim to help instructors create rich, active, supportive classroom environments grounded in evidence based practices; expand their pedagogical content knowledge; become reflective practitioners; and foster teaching community and personal growth.

The University of Virginia's week long CDI is similarly grounded in the literature and supported by the theoretical frameworks of backward integrated course design (Fink, 2013; Wiggins & McTighe, 2005) and Fink's taxonomy of significant learning (Fink, 2013). The overarching goal is for participants to design or

redesign a course—and future courses—grounded in learning focused, evidenced based principles. To achieve this goal participants must

- recognize how and why certain features of learning environments impact student motivation;

- define the characteristics of content and learning focused courses;

- describe the range of situational factors influencing the design of their course;

- articulate a robust set of long range, high level learning goals;

- define epistemologically based learning objectives derived from the instructor's learning goals that are (a) well defined, (b) measurable, and (c) span the six dimensions of Fink's Taxonomy;

- describe a set of course level assessments aligned with the learning objectives to creatively and authentically assess student learning;

- draft a detailed assignment description for one of the major assessments;

- develop a series of learning activities to support the assessment of the most challenging learning objective;

- scaffold and space learning activities appropriately to support and maximize learning;

- align learning objectives, major assessments, and learning activities so they support and reinforce each other; and

- develop a learning focused syllabus that represents the (re)designed course in written form.

This focus and intentionality makes CDIs like ours potentially powerful instructional development experiences capable of shifting teacher beliefs, levels of confidence, and practices toward a learning focus. However, to what extent, exactly, do these types of intensive course design interventions impact teaching beliefs and practices and, ultimately, student learning? In other words, can CDIs be viewed as a high impact educational development practice?

In a recent review of the educational development literature, Chism, Holley, & Harris (2012) identified 49 evidence based studies focused on the efficacy of multiday institutes. Based on the combined results of these studies, they concluded that workshops of one day or more "have positive effects on teaching attitudes and changes in teaching practices" (p. 153).The vast majority of the studies they referenced, however, only reported participant perception data. While an emerging body of research extends these satisfaction and perception based studies to include a variety of direct measures and along multiple facets (Admundsen & Wilson, 2012; Chism, Holley, & Harris, 2012; Fink, 2013; Hines, 2011; Stefani, 2010; Steinert et al., 2006; Stes, Min Leliveld, Gijbels, & Van Petegem, 2010), to our knowledge, there exists no systematic study of intensive CDIs in the literature. As such, we adopted and applied Kreber and Brook's (2001) six component educational development impact model to our own CDI to better answer questions of impact. Here, we summarize the salient features of our CDI intervention, and then, we describe a set of studies probing the first three components of Kreber and Brook's model: (a) participant perceptions and satisfaction; (b) participant beliefs about teaching and learning; and (c) participant teaching practices.

General Overview of CDI

During our CDI, an interdisciplinary group of instructors design or substantially redesign courses to promote significant, long term learning. Participants explore learning focused design principles in a large group setting and then work on individual course designs in assigned six person, discipline or pedagogy focused learning teams. For example, there may be a learning team of science instructors or a team focused on incorporating writing into the curriculum. Each learning team is led by an experienced educational developer, called a team facilitator. In addition to general group facilitation, the team facilitators provide support and individualized feedback on works in progress. Participants are invited to consult one on one with learning team facilitators throughout the week, with the last hour of each day reserved for consultations. At the end of each workshop day, participants submit their draft syllabi to their learning team facilitator for written comments.

We limit the number of participants to 42 (i.e., seven learning teams of six participants). We find that the large group discussions that punctuate many of our activities are less effective when the number of participants increases beyond seven learning teams. Logistically, it is also difficult to find space large enough to accommodate greater numbers.

The key tangible outcome for CDI participants is a learning focused syllabus. We promote what Ken Bain (2004) calls a "promising syllabus": a learning focused document that communicates clearly and compellingly what students will gain from the course, what they will do to achieve the promise it lays out, how they will know they are getting there, and how best to study. We emphasize the syllabus because of its capacity to serve as a framework and a container for instructors' course design ideas. To increase motivation and allow participants to review and learn from the most exemplary syllabi produced during the institute, we conclude CDI with a syllabus competition during which participants vote on the best learning focused syllabi.

Programming

Our CDI is held annually near the end of May or the beginning of June. When we have offered it earlier, participants found it difficult to shift immediately from teaching in the spring semester to thinking about a new course. We have also tried models in which CDI programming was spread out over a semester, but busy schedules made it difficult for instructors to stay engaged. Our conclusion is that the intense, week long institute during the early summer provides the ideal learning environment for participants.

The day to day programming of CDI is designed and implemented by two to three members of our center's staff. The overall structure of the institute mirrors the backward integrated design process; Day 1 is focused on goals and objectives, Day 2 on assessment, and Day 3 on learning activities. Integration is a theme throughout each day and is emphasized on Day 4.

Days run from 9:00 am until 4:00 pm, Monday–Thursday and 9:00 am–1:30 pm on Friday. Each day is composed of five blocks (Appendix). Except on the first and last days, the morning block (9:00–10:30) is reserved for participants to continue developing ideas from the previous day, either individually or in feedback pairs. During the 10:45 am–12:15 pm block, participants are introduced to course design concepts through direct and inquiry based instruction, small group activities, and personal reflection. During the 1:00–2:30 pm block, participants expand and generalize concepts through exploration and discussion. During the afternoon blocks (2:30–3:00 and 3:00–4:00 pm), participants apply the concepts to their individual course designs. The programming space is reserved until 5:00 pm Monday–Thursday, and the majority of participants continue to work during this time.

The day to day programming generally follows the experiential learning cycle described by Kolb (1984). This cycle, which borrows heavily from the work of Dewey and Piaget, rests on the premise that learning begins with a concrete experience *and* requires reflection, abstraction, and active testing. This cycle guides the overall structure of CDI and the individual segments of the blocks. For example, during the morning block of Day 1, participants look individually at different syllabi—a highly content focused one, a highly learning focused one, and one that falls in between—and answer a series of questions about them: what is the purpose of each document, who is the audience, what does the instructor appear to value, and what evidence supports your answers? This activity provides a concrete experience and an opportunity for reflection. During a large group debrief, participants answer another series of questions (to enable continued *reflection*):

- Imagine you are a student and you know nothing about these courses except what you read in the syllabi. Which course would you prefer to take?
- Which course do you feel creates the most engaging learning environment?
- In which course do you believe you would learn more?

After the activity, participants have time to consider which aspects of learning focused syllabi might work well for their own course and teaching style (*abstraction*) and then begin to incorporate these ideas into their own syllabi (*active testing*).

Participant Profile

Our CDI is open to all instructors, including non tenure track, tenure track, and tenured faculty, academic faculty (e.g., center/unit directors, and staff), graduate students, and postdoctoral fellows. Instructors are accepted to participate through an application process. The application requests basic contact and demographic information about the instructor, details about the course the instructor wishes to design or redesign, and brief statements from the instructor about their interest in and goals for participation in CDI.

Since 2008, we have hosted six institutes, and we have worked with 215 instructors, representing all faculty ranks and nearly all schools and departments (Figure 1) at our institution. The disciplinary distribution generally matches the university's overall profile.
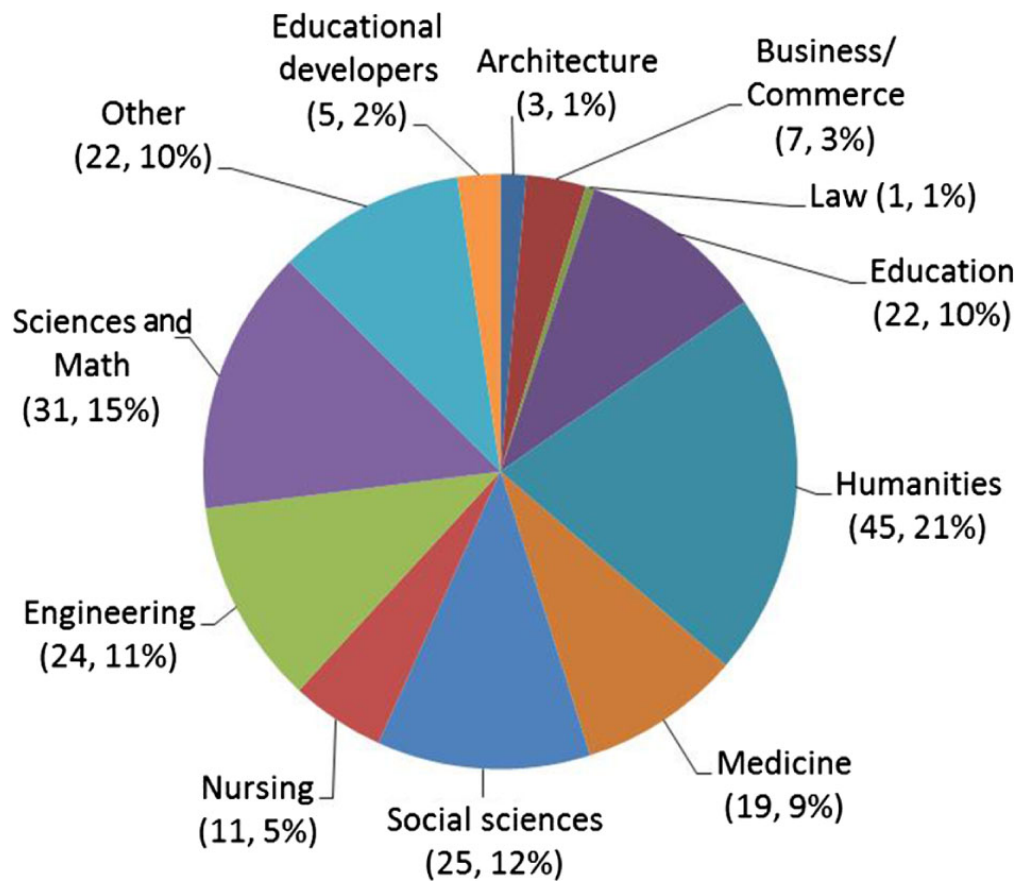
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Figure 1. CDI Participant Distribution Across Different Academic Areas (N = 215)

Measuring Impact

Kreber and Brook's (2001) educational development impact model guides the assessment of our CDI. This particular model (Figure 2) is a robust variation of and a complement to other impact models (Chism & Szabo, 1998; Guskey, 2000; Kirkpatrick, 1998; Smith, 2004; Steinert et al., 2006; Stes et al., 2010). It includes six impact points (IP): (a) participant perceptions of and satisfaction with the intervention; (b) participant beliefs about teaching and learning; (c) participant teaching practices [1][#N1]; (d) student perceptions about the participant's teaching practices; (e) student learning; and (f) culture of the institution.
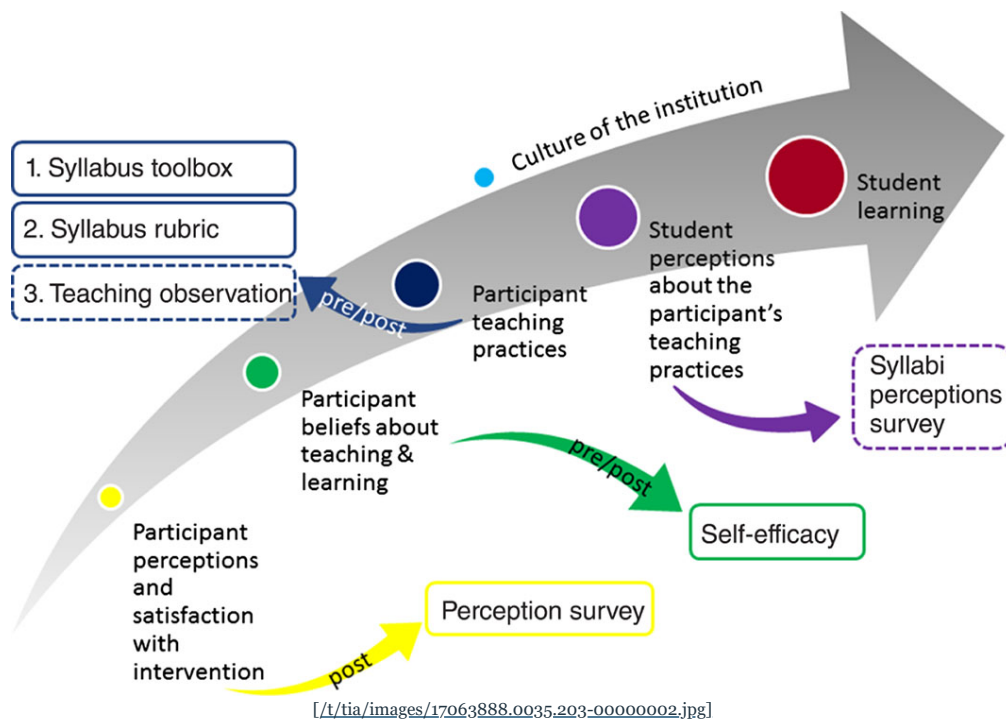
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Figure 2. CDI Assessment Strategy Mapped onto Kreber and Brook's Six Point Impact Model for Educational Development Programs Solid boxes surround assessment components that are part of the current study; dashed boxes surround components that are part of follow up studies. "Culture of the institution" is set apart from the other impact points because changes in the other five lead to changes in institutional culture.

To date, we have conducted a set of complementary studies on our CDI that focus on impact points 1–3: participant perceptions/satisfaction, participant beliefs about teaching and learning, and participant teaching practices. Specifically, we used:

- a post institute survey to gauge participants' perceptions of and satisfaction with their CDI experience (IP 1);

- a pre /post CDI survey to measure changes in participants' pedagogical confidence (IP 2);

- a novel pre /post CDI self report tool to probe participants' perceived ability to design and create learning focused courses and syllabi (IP 3);

- a reliable syllabus rubric (Palmer, Bach, & Streifer, 2014) to assess participants' actual ability to design learning focused syllabi (IP 3).

These assessment efforts create a narrative based on the following progression of research questions:

- Are participants satisfied with their CDI experience, and do they believe the intervention gives them the knowledge and skills necessary to shift toward more learning focused, evidence based teaching practices? (IP 1)

- Are participants more confident in their ability to carry out evidence based teaching practices? (IP 2)

- Can participants demonstrate a basic understanding of the backward integrated course design strategy to construct the basic framework of a learning focused syllabus? (IP 3)

- Can participants *actually* design a learning focused syllabus? (IP 3)

In follow up studies, we are currently addressing whether participants enact their learning focused syllabus in the classroom (IP 3; research currently underway), whether students perceive a difference between content versus learning focused syllabi (IP 4; ref. blinded, 2015), and whether instructors observe student learning gains associated with changes in their teaching beliefs and practices (research pending).

Impact Point 1: Participant Perceptions and Satisfaction

Participants' perceptions of and satisfaction with CDI were assessed using an anonymous electronic post intervention survey. It included a mix of questions that ranged from open ended ones about overall experience, highlights, lessons learned, and the value of CDI to specific, Likert style questions focused on the quality and usefulness of resources. Participants were asked to complete the survey immediately after CDI, and reminders were sent one and two weeks following the original request. Of 215 participants, 179 completed the survey, giving a response rate of 83.3%.

CDI participants have annually rated the CDI 4.8 overall (out of 5.0) or above, and 100% have said they would recommend CDI to a colleague. They find the mix of interactive lectures, large group discussions, and learning team conversations helpful (4.3, 4.2, and 4.4 of 5.0, respectively). Representative comments to the question, "How would you describe your overall experience in the Institute?" include:

- "This is by far the best teaching workshop I have ever attended."
- "This [Institute] allowed me to think deeply about the reasons for teaching my classes—and ultimately, the reasons I became a teacher."
- "Intense, demanding, but extremely productive. I worked harder and faster than I would have on my own. I also loved the environment—being surrounded by people who care about and love teaching was inspiring."
- "In two words: [the CDI experience was] life altering. This may seem overblown, but it is 100% true. I came in thinking I had a handle on my course, but realized very soon I needed to go back to the drawing board. The result is exponentially improved."

Throughout the perception data, CDI participants report having a better understanding of how to "design a learning centered course" and confidence that they are able to develop meaningful goals and objectives, create authentic assignments and learning experiences, and align the various aspects of their courses. They also report having a better understanding of "how to invite students into the learning process" and how to create engaging learning environments, both in their syllabi and in their courses. To qualify and quantify these stated beliefs, we examined participants' confidence in carrying out various pedagogical tasks associated with learning focused, evidence based teaching.

Impact Point 2: Participant Beliefs About *Teaching and Learning (Pedagogical Confidence)*

In the earlier years of CDI, we used Angelo and Cross' (1993) Teaching Goals Inventory to probe changes in pedagogical beliefs. We found, however, little to no change in instructors' goals for teaching and student learning. The vast majority of participants espoused a set of learning focused goals prior to CDI and still held those goals after the intervention. As we reflected on this, we realized it was one thing for an instructor to believe something important and another for them to change teaching practices in response to their beliefs. Consequently, we shifted our assessment efforts to focus on self efficacy rather than beliefs.

Self efficacy is one's perceived ability to engage in and complete a desired performance (Bandura, 1986). An important component of self efficacy is one's confidence that one will succeed at a given task. According to Bandura, when people judge themselves capable, they are more apt to integrate the task into their personal standards and expected outcomes. Applying this theory to CDI, we expected instructors' confidence levels to better predict whether they would undertake certain pedagogical tasks within the design and execution of their courses.

Methods

Using an electronic survey, participants in the 2013 and 2014 CDIs ($n = 84$) were asked to report their confidence with a variety of pedagogical tasks, most of which corresponded directly to intended CDI outcomes. For example, participants were asked to report on their confidence to "foster student motivation through environment and manipulations." To help ensure validity, tasks not intended as CDI outcomes were also included, for example, confidence to "manage disruptive students in the class." Participants completed the survey one week prior to attending CDI and again within 1–2 weeks following attendance. Two reminders were sent to non respondents.

To capture instructor *perceived* self efficacy, we used Balam's (2006) Teaching Appraisal Inventory (TAI). This 43 item instrument was influenced by Guskey's (1982) finding of a positive relationship between instructors' confidence and how much those teachers thought they could influence students' success in their courses. Rather than focusing on locus of control, self esteem, or outcome expectancies, Balam's inventory focuses on instructor's confidence. Specifically, CDI participants were asked to indicate how confident they were in carrying out specific evidence based teaching practices. Using the question stem "How much do you think you can...," participants indicated their current confidence on the following scale: not at all, very little, some, moderately, quite a bit, a great deal, completely.

To allow us to more directly connect the 43 classroom practices probed with the TAI to the intended CDI outcomes, we grouped them into seven overarching categories, or scales (Table 1): Goals and Objectives, Assessment, Classroom Environment, Learning Activities, Class Facilitation, Effective Assignments, and Overall Teaching. Bandura (2006) suggests that scales of self efficacy are most effective when tailored to address the particular domain of interest. In light of this, we assigned questions from Balam's (2006) TAI to scales parallel to our CDI process:

1. Goals and Objectives Scale: During CDI, we encourage instructors to create a robust set of learning goals and objectives and to use these to communicate their intentions to students and motivate them to engage with course content.

2. Assessment Scale: Throughout our design process, we emphasize that assessments should be authentic, educative, discriminating, and should support learning objectives. Also, formative feedback is an essential component of good assessment.

3. Classroom Environment Scale: We emphasize that the learning environment is influenced by what happens before, during, and outside of class sessions. It is affected by what instructors expect of students and how this expectation is framed. What the instructor does to support learning, how they encourage mastery, and how they provide feedback matters.

4. Learning Activities Scale: Not only do we promote active learning as evidence based practice, but we also model active learning techniques and demonstrate how traditional models can be reimagined to promote learning.

5. Class Facilitation Scale: CDI addresses components of class facilitation through the modeling of best practices during CDI sessions.

6. Effective Assignments Scale: Participants work in small groups throughout CDI to explore and evaluate different assignments and adapt them for their own courses.

7. All of the various aspects of CDI combine to address the topics assigned to the overall teaching scale.

Table 1. Pedagogical Confidence Scales Derived From Balam's (2006) Teaching Appraisal Inventory (TAI)

Scale	TAI Questions: How Much Do You Think You Can...
Goals and objectives	• state the objectives of the class to your students • show students that you care about their achievement • stimulate students' interest in the subject area • increase students' interest of the course you are teaching
Assessment	• integrate different techniques to assess students' learning • provide feedback to your students on their progress in the class • assess students fairly • implement fair evaluation to assess student learning
Classroom environment	• establish good rapport with your students • provide help to students outside of the class period

	• create teaching and learning environment that would foster motivation for even the unmotivated students
	• foster student motivation through environment and manipulations
	• be helpful when students have problems
Learning activities	• provide students with authentic examples to enhance their learning
	• integrate technology in your lecture to enhance your students' learning
	• organize your lectures to facilitate student learning
	• discuss the current research related to the class content
	• present the material in a way that facilitates note taking
	• emphasize the major points in your lecture
	• apply new teaching methods to better meet your students' needs
Class facilitation	• facilitate class discussions
	• keep the class on task during class periods
	• effectively answer students' questions related to the class content
	• encourage students to ask questions related to the class material
	• maintain your enthusiasm in teaching even if the students do not seem to be interested in the material
	• encourage your students to express their ideas in the class
	• provide different points of view related to the topic when applicable
	• answer students' questions clearly
	• use alternative examples to further explain the subject when students are confused
	• hold students' attention during class
	• conduct your class in an energetic way
	• manage disruptive students in the class
Effective assignments	• provide class assignments in which students collaborate with each other
	• provide students with assignments that facilitate their understanding the material
	• assign your students reading/assignments that are valuable to their learning
	• lead students to apply their learning into novel situations
Overall teaching	• promote students' learning
	• stimulate your students' thinking
	• enhance your students' learning
	• help students develop their critical thinking
	• teach well overall
	• explain the course material very well
	• handle conflicts with students

In other words, these scales—created by grouping multiple TAI questions together—allow us to more accurately account for the complexity of the various pedagogical concepts (e.g., assessment) explored in CDI and thus allow us to more reliably measure participants' confidence broadly across key categories. For comparison purposes, it is important to note here that these categorical scales also loosely parallel the syllabus toolbox and rubric tools discussed in detail later in this article.

Results and Discussion

The statistics for the pedagogical confidence scales are shown in Table 2. All seven categorical scales were found to have high levels of internal consistency (Tavakol & Dennick, 2011); Cronbach's alpha (α) ranged from 0.728 to 0.915, supporting our claim that combining questions into these scales accurately reflects associations made by our participants.

Table 2. Statistics for Pedagogical Confidence Scales

	α	Median Pre	Median Post	z	p	r
Goals and objectives ($n = 62$)	0.790	22	24	−4.754	<.001	0.427
Assessment ($n = 59$)	0.728	20	23	−5.928	<.001	0.546
Classroom environment ($n = 62$)	0.800	27	29	−5.005	<.001	0.449
Learning activities ($n = 62$)	0.833	36	41	−5.442	<.001	0.505
Classroom facilitation ($n = 57$)	0.915	63	68	−4.718	<.001	0.442
Effective assignments ($n = 62$)	0.833	20	23	−5.597	<.001	0.507
Overall teaching ($n = 61$)	0.903	31	36	−5.204	<.001	0.471

Survey questions on pedagogical confidence were included in 2013 and 2014. Responses to each question were not required, so the actual n for each group is indicated.

Of the 84 participants in 2013 and 2014 cohorts, 62 completed both the pre and post survey (74% response rate). We combined these data and evaluated them using the scales shown in Table 1 to determine the impact CDI had on participants' pedagogical confidence (Table 2). To statistically analyze the Likert scale answers, we assigned the following numerical values to each answer: not at all (1), very little (2), some (3), moderately (4), quite a bit (5), a great deal (6), and completely (7). We used a Wilcoxon signed rank test to evaluate the change between participants' pre and post survey answers. This non parametric alternative to the paired Student's t test for matched pairs is commonly used as a statistical hypothesis when the population distribution is unknown or cannot be assumed to be normally distributed (McDonald, 2014). The Wilcoxon signed rank test (z) compares the median scores for the two years the survey was delivered and evaluates the magnitude of difference between the two medians.

Statistical significance, represented by the p value, was found for all seven of the pedagogical confidence scales ($p < .001$), indicating that participants' increased pedagogical confidence across all scales was a result of their participation in CDI.

Effect size data provide additional evidence in support of our CDI's efficacy. Unlike statistical significance, which is influenced by n, effect sizes are more resistant to sample size error. As such, they better indicate the magnitude of the difference between groups and, thus, represent a more accurate measure of the relationship between the variables (Ferguson, 2009). Pearson's r was used to measure effect sizes for the pedagogical confidence scales: 0.2 = small effect size, 0.5 = medium, and 0.8 = large (Sullivan & Feinn, 2012). The effect sizes for the various scales range from 0.427 to 0.546. While all these effect sizes are only in the medium range, when combined with statistical significance, they reinforce our conclusion that CDI is an effective instructional development intervention.

In summary, the statistical and practical significance observed for each of the seven pedagogical confidence scales suggests that instructors who participated in CDI were more confident in their ability to engage in learning focused teaching practices. Research suggesting increased self efficacy often translates into an increased likelihood that the individual will engage in personal and organizational change (Bandura, 1986). Thus, one expects the CDI intervention to have a practical impact on the pedagogical skills of instructors.

Impact Point 3: Teaching Practices (Syllabus Toolbox)

Shifting from measures of confidence to measures of practice, we examined participants' ability to describe the key components of learning focused syllabi using a "syllabus toolbox" instrument (Palmer, Bach, & Inkelas, 2014). [2][#N2] Specifically, participants were asked to indicate from a prepopulated list the typical components they would include in a syllabus when developing a new course (e.g., instructor information, learning objectives, or attendance policies). On the post CDI survey, participants were presented the same list and again asked what types of information they would include in their syllabus.

Our hypothesis was that instructors would include more learning focused components and fewer content or policy focused ones.

Methods

The McNemar test—a chi square test used when data consists of dichotomous, paired responses that are not normally distributed (Adedokun & Burgess, 2012)—was used to determine the statistical significance of the pre and post CDI data for each component. Since the McNeamar test is a type of chi square, effect sizes were calculated using Cramer's *V*. According to Rea and Parker (2005), it is appropriate to interpret Cramer's *V* using the following scale: $0.0 \leq V < .10$ = negligible association, $.10 \leq V < .20$ = weak association, $.20 V \leq .40 <$ = moderate association, $.40 \leq V < .60$ = relatively strong association, $.60 \leq V < .80$ = strong association, and $.80 \leq V \leq 1.00$ = very strong association.

Results and Discussion

From 2012 to 2014, 81 of 123 participants completed the syllabus toolbox component section of the pre and post CDI survey, a 68.9% response rate. Table 3 lists the syllabus components provided to instructors and the detailed statistics for each. With statistical significance established at $p < .05$, we saw a statistically significant and positive change in participants' plans to include learning goals, objectives, and assessment goals; information about faculty student interaction, student student interaction, estimated work load, and methods of instruction; rationale for pedagogical techniques; tips for success; statement on students in distress; and instructor biography in their syllabi. Interestingly, we also see a statistically significant but *negative* change in participants' plans to include course policies.

Table 3. Syllabus Toolbox Items and Statistics (n = 81)

	Yes on Presurvey (%)	Yes on Postsurvey (%)	*p*	Cramer's *V*
Goals and objectives				
Course description	97.5	97.5	1.00	025
Learning goals or objectives	84.0	97.5	007[*]	070
Course prerequisites	46.9	40.7	359	530
Assessment				
Grading procedures	81.5	72.8	167	352
Assessment description	77.8	90.1	052	022
Evaluation criteria	35.8	43.2	345	284
Assessment goals	18.5	76.5	<.001[*]	111
Classroom environment				
Fostering student student interaction	39.5	72.8	<.001[*]	039
Fostering faculty student interaction	33.3	80.2	<.001[*]	153
Estimated student workload	9.9	23.5	019[*]	207
Learning activities				
Course calendar or schedule	90.1	90.1	1.00	168
Methods of instruction	48.1	74.1	001[*]	288
Important dates	38.3	45.7	345	298
Rationale for pedagogical techniques	16.0	45.7	001[*]	274
Tips for success	14.8	59.3	001[*]	204
General information				
Basic information	100.0	98.8	na	na
Materials	97.5	90.1	070	054
Course policies	87.7	74.1	027[*]	206
Statement on academic fraud	60.5	64.2	690	345
Supplementary material	40.7	50.6	229	166
Accommodations for students with disabilities	37.0	43.2	332	570
Statement on students in distress	11.1	24.7	007[*]	435
Instructor biography	7.4	25.9	<.001[*]	371

The statistics for each item was evaluated independently, but the data are organized to loosely parallel the pedagogical confidence scales and syllabus rubric.

*p < .05.

For the statistically significant syllabus components, we found moderate effect sizes (i.e., $.20 \leq V < .40$) for five categories: methods of instruction, rationale for pedagogical techniques, tips for success, instructor biography, and policies. Based on these moderate effect sizes, we concluded that there was a meaningful, not just statistical, change to CDI participants' intention to include these five categories when writing syllabi. The effect sizes for the other three—assessment goals, faculty student interaction, and student student interaction—were negligible or weak, possibly indicating that the changes are due to confounding factors.

These results are consistent with the objectives of CDI and its focus on helping instructors create and articulate learning focused courses rather than content or policy focused ones. The changes reflect a heightened awareness that a learner is at the center of the instructor's courses and that by including certain types of information in their syllabi, instructors can make the learning process more transparent, collaborative, and welcoming/inclusive to students.

In summary, the syllabus toolbox data suggest that CDI impacts what instructors deem important to include in their syllabi, and the changes between the pre and post surveys suggest that they are likely to include more learning focused information. However, do they and in what ways? To address these questions, we used our syllabus rubric to analyze participants pre and post CDI syllabi.

Impact Point 3: Participant Practices (Syllabus Analysis)

Though syllabi have historically served contractual, record keeping, and communication functions (see, e.g., O'Brien, Millis, & Cohen, 2008; Parkes, & Harris, 2002), their potential to serve as learning tools has gained traction (see, e.g., Habanek, 2005; Singham, 2007). When framed as such, the document looks and reads very differently from more traditional, content focused syllabi. While the primary objective of our CDI is for participants to design or redesign a course grounded in evidence based principles, we emphasize the syllabus as an artifact of and container for their design ideas. This emphasis allows us to treat the document as a foundational component of instructors' teaching practices and evidence of impact.

Recently, we developed a reliable syllabus rubric, which was validated for higher education courses, to help quantitatively and qualitatively assess the degree to which a syllabus achieves a learning focused orientation (Palmer, Bach, & Streifer, 2014, 2014). The main rubric focuses on four criteria typical of learning centered syllabi: (a) learning goals and objectives, (b) assessment activities, (c) schedule, and (d) overall learning environment. We break down each criterion into multiple components and designate each as *essential*, *important*, or *less important*. Components are scored on the strength of supporting evidence present in a syllabus. *Strong* evidence indicates that many (but not necessarily all) of the characteristics of the component are present in the syllabus and match the descriptions of the components closely. *Moderate* evidence indicates that some of the characteristics of the component are present in the syllabus and/or only partly match the descriptions. *Low* evidence indicates that very few characteristics of the component are present in the syllabus and/or do not match the descriptions. A quantitative score is calculated based on a weighted system that takes into account the importance of the components as well as the strength of the evidence. The maximum score possible is 46; we categorize syllabi based on these ranges: content focused 0–16, transitional 17–30, and learning focused 31–46.

By applying this rubric to pre CDI syllabi and then to CDI developed syllabi by the same instructor, we are able to detect overall movement toward a more learning focused document as well as movement along specific criteria (e.g., Goals and Objectives).

Methods

Using a one group pretest posttest design (H_0: post CDI syllabi scores are not greater than pre CDI syllabi scores), we analyzed 54 pre /post CDI syllabi pairs (108 syllabi) using our syllabus rubric. These syllabi represent 25.1% of CDI participants ($n = 215$). During the CDI application process, we collected pre CDI syllabi from those instructors who were *redesigning* a course. Post CDI syllabi were collected from all instructors immediately at the conclusion of CDI. In cases where the post CDI syllabi were clearly incomplete, we requested final versions two weeks after the start of the semester in which the redesigned course was taught. We excluded from our sample all syllabi for which we only had one component of the

pre /post pair, syllabi where the pre and post CDI syllabi clearly articulated different courses, and "syllabi" from instructors who designed nontraditional learning environments during CDI, such as professional development programs. This "cleaning" process left 54 pre /post CDI syllabi pairs for our analysis.

The sample profile is shown in Figure 3. Besides overrepresentation from STEM disciplines and underrepresentation from social science fields, the relative percentages in each group compare well with the overall participant profile of CDI (see Figure 1). The overrepresentation from STEM disciplines in the sample is a result of us supporting a year long STEM faculty learning community from 2013 to 2015. One of the requirements of this program is for participants to attend CDI and submit their pre and post CDI syllabus. The underrepresentation from social science fields stems from the fact that many of these participants designed new courses and thus had no pre CDI syllabus.
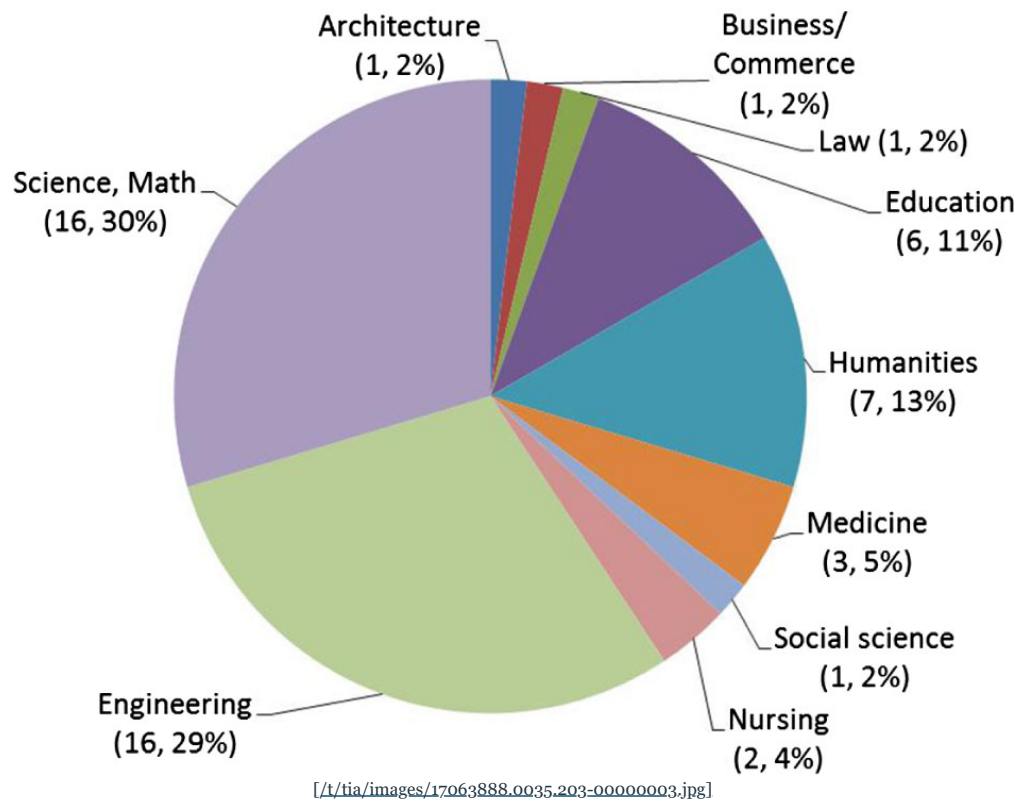

[/t/tia/images/17063888.0035.203-00000003.jpg]

*Figure 3. CDI Participant Distribution Across Different Academic Areas for Syllabus Analysis Sample (*n = *54)*

The syllabi were assigned arbitrary identification codes by a third party not directly associated with the research project and then sorted randomly for scoring. "Blinding" the syllabi this way ensured that the researchers were unaware of the designation of each syllabus as pre or post. Although we would have preferred to blind the names of the instructors' who authored the syllabi, this was technically difficult because many syllabi were submitted as PDFs.

Each syllabus was initially scored against the syllabus rubric independently by Author 1 and Author 2. Component level and overall scores were then compared between raters. All components defined as *essential* in the rubric having a rater difference greater than 0 and all other components having a rater difference greater than 1 were identified and then rescored by the researchers. Rescoring was performed collaboratively, without knowledge of the original scores, until consensus was reached. This process produced differences in the total scores between raters of less than or equal to 4 points (or less than 10% of the total score possible) for all syllabi pairs. The total score for each syllabus was then determined to be the average of the raters' total scores.

The normalized gain (<g>) for each instructor was calculated as described by Hake (1998):

<g> = 100*(post total score – pre total score)/(46 – pre total score), where 46 is the maximum score possible. This number takes into account the *possible* gain between pre and post CDI scores for each instructor. We defined the region of low gain to be less than or equal to 0.3, moderate gain between 0.3 and 0.7, and high gain greater than or equal to 0.7. The overall normalized gain (<<g>>) was calculated by averaging the normalized gains for all instructors. This calculation allows one to predict the gain in syllabus score an average instructor would expect to achieve after redesigning their course in CDI, regardless of where he/she started on the content to learning focused continuum.

Visual analysis of the histogram of pre CDI syllabi scores revealed a positive, or right skewed, distribution, while the histogram of post CDI scores exhibited a negative, or left scored, distribution. Because of the non normal distributions, the Wilcoxon signed rank test (McDonald, 2014) was used to determine statistical significance between overall and criterion level pre and post CDI scores. Effect sizes were measured with Pearson's *r* (Sullivan & Feinn, 2012).

Results and Discussion

Pre CDI syllabi scores are shown in Figure 4. Total scores ranged from 0 (2 syllabi) to 46 points. [3].[#N3] The mean score was 9.4 (*SD* = 10.0). Forty seven syllabi fell in the content focused range (87%), five in the transitional range (9%), and two in the learning focused range (4%). The breakdown of the total score into criterion level scores shows those syllabi that scored low on our rubric failed to include a clear, robust set of learning goals/objectives, lacked details about major summative assessments, and showed no alignment between objectives and assessments. In some cases, low scoring syllabi scored higher on assessment activities than might be expected. This is a consequence of how the individual components of our rubric interact with each other. For example, a syllabus may not articulate a robust set of learning objectives (e.g., complete focus on foundational knowledge) or define assessment activities well, *but* the objectives and assessments may be in perfect alignment (e.g., foundational knowledge measured with traditional multiple choice tests). Syllabi exhibiting this characteristic score points for alignment but not for several other interrelated components. Many low scoring syllabi also failed to describe a learning focused learning environment, adopting instead a neutral or authoritative tone and focusing almost exclusively on rules and basic classroom procedures.
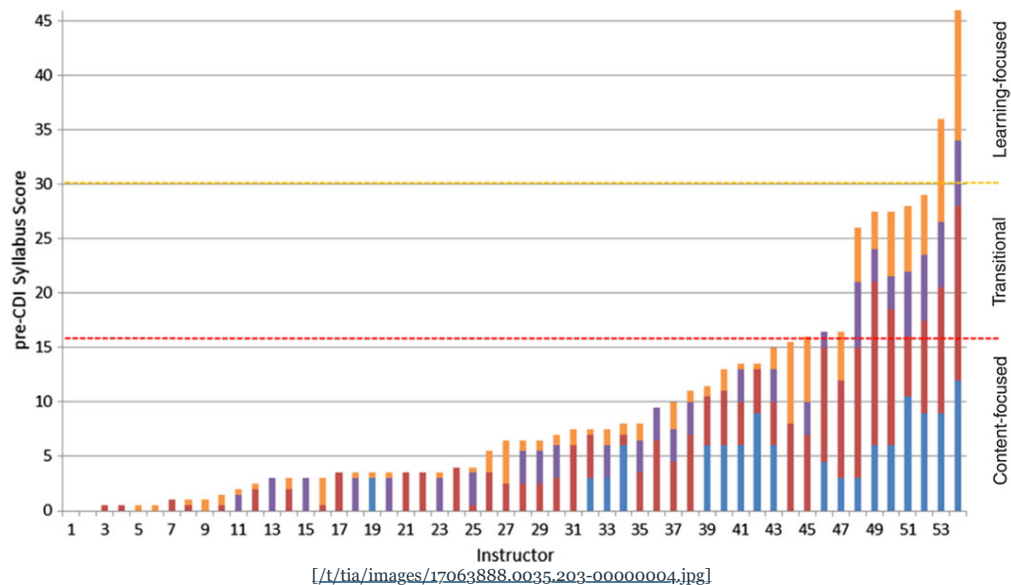

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*Figure 4. Pre CDI Syllabi Scores (*n = 54*) Sorted by Overall Score Component level scores are indicated by color: blue = learning goals and objectives; red = assessment activities; purple = schedule; orange = learning environment.*

Post CDI syllabi scores are shown in Figure 5. Total scores ranged from 12.5 to 46 points. The mean score was 31.4 (*SD* = 9.32). Three syllabi fell in the content focused range (6%), 21 in the transitional range (39%), and 30 in the learning focused range (55%). All but two syllabi articulated a clear and robust set of learning objectives. In general, assessment activities were well defined and aligned with objectives, and

the learning environments that were described supported both cognitive and affective needs of students. In a little over half the syllabi, the schedule was fully articulated and contained enough information (e.g., topics, context, questions, and dates) to guide students through the course.
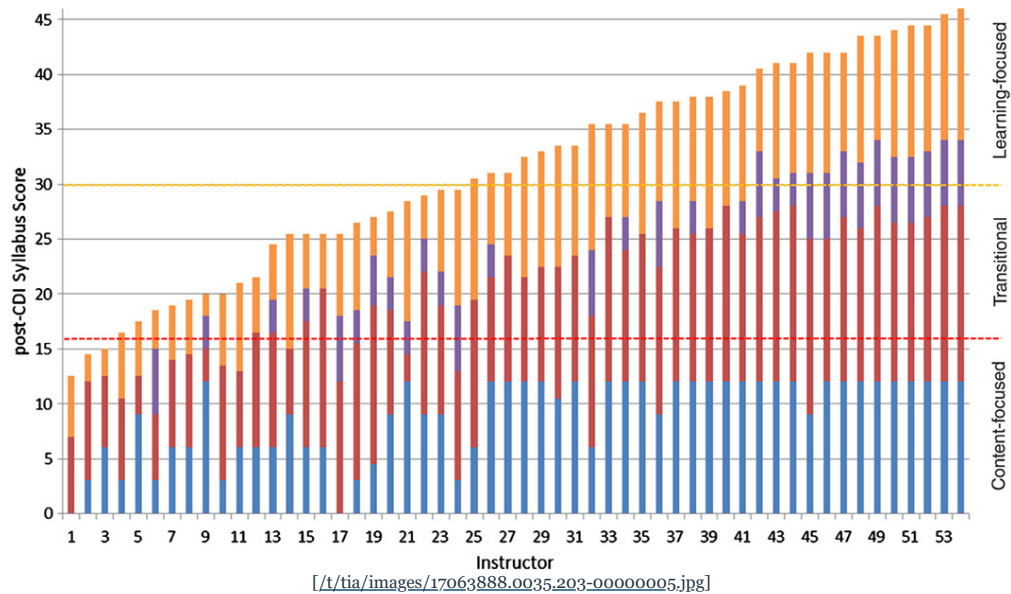

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*Figure 5. Post CDI Syllabi Scores (*n = 54) *Sorted by Overall Score Component level scores are indicated by color: blue = learning goals and objectives; red = assessment activities; purple = schedule; orange = learning environment.*

The plot of percent gain versus percent pre CDI syllabus score is shown in Figure 6. [4] [#N4] Using our definitions of low, moderate, and high gain (see Methods section), six instructors fell in the low gain region, 27 in moderate gain, and 20 in high gain. All but four instructors whose pre CDI syllabus scored in the content focused range showed moderate to high gains. The four instructors who did not achieve moderate to high gains had less well defined goals and objectives and failed to articulate an effective learning environment and detailed course schedule. Interestingly, most instructors who began in the transitional region exhibited high gains. Such a trend may occur because these instructors already understood evidence based course design principles and simply used CDI to extend and refine the ideas. The two instructors who initially had learning focused syllabi showed minimal or no gain. This result is not entirely surprising given that there was little room for the instructors to improve.
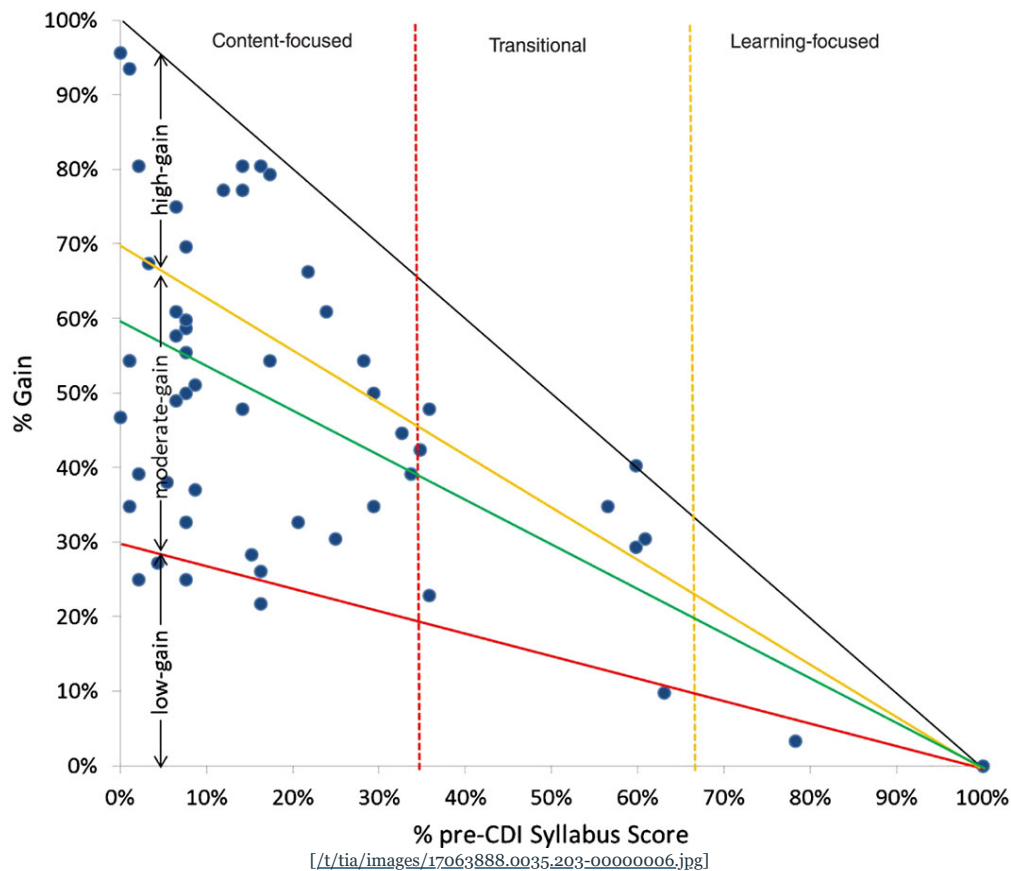
[/t/tia/images/17063888.0035.203-00000006.jpg]

Figure 6. Plot of % pre CDI syllabus Score Versus % Gain Low gain (%<g> ≤ 30%), moderate gain (30 < %<g> < 70%), and high gain (%<g> ≥ 70%) regions are separated by solid red and yellow lines. Content , transitional , and learning focused regions for pre CDI syllabi are separated by dashed vertical lines. The average normalized percent gain %<<g>> is represented by a solid green line.

The overall percent normalized gain (i.e., the average of the instructors' percent normalized gains; %<<g>>) was determined to be 60.4% (SD = 22.4%). This indicates that the average instructor is expected to gain 60.4% of the points possible to them regardless of their pre CDI syllabus scores. In other words, the CDI intervention appears effective at moving the average instructor to at least the transitional range of the rubric.

As shown in Table 4, statistical significance was found for overall and criterion level pre and post CDI scores. Effect sizes were measured with Pearson's r (Sullivan & Feinn, 2012), and we found a practical significance (r: 0.2 = small, 0.5 = medium, and 0.8 = large) for all but the Schedule criterion. In other words, the CDI intervention successfully helps instructors create stronger learning focused goals, objectives, and assessment activities and cultivate a more learning focused classroom environment. Although we see statistical significance in instructors' ability to describe a more learning focused course schedule, the small practical significance suggests that the intervention is less effective in this area. This finding is not unexpected, however, since the concept of a learning focused course schedule is introduced last in our course design process, and participants spend the least amount of time developing it. It is also difficult for participants to design a complete, learning focused schedule during CDI because we deemphasize content, encouraging them to delay making content related decisions until late in the design process.

Table 4. Overall and Criterion Level Pre and Post CDI Statistics (n = 54)

	Median Pre	Median Post	z	p	r
Overall	6.50	31.75	−6.39	<.001	−0.61
Goals and objectives	0.00	11.25	−6.07	<.001	−0.58
Assessment activities	3.25	12.00	−6.17	<.001	−0.59
Learning environment	1.00	9.00	−6.37	<.001	−0.61

| Schedule | 0.00 | 3.00 | −2.95 | 003 | −0.28 |

Concluding Remarks

Using Kreber and Brook's (2001) educational development impact model, we have begun to systematically assess the impact of our CDI. The results of this multidimensional study provide evidence that our CDI invention has a highly positive impact on participant perceptions, confidence, and practices related to syllabus development. Specifically, participant satisfaction and perception studies detailed in this article suggest that instructors believe CDI is a worthwhile experience, and they report gaining knowledge and skills in designing learning focused courses. Pre/post measures of pedagogical confidence support their stated beliefs. Pre/post measures of the participants' *perceived* and *actual* ability to design learning focused syllabi are consistent with a learning focus.

While similar outcomes might be expected of CDIs at other institutions, additional studies are needed to determine the key programmatic features leading to the observed impact. In other words, is the length of the institute important? Are the support of learning teams and facilitators, the experiential learning cycles, the focus on the syllabus as the organizing course design construct, or some combination of features responsible for the observed outcomes?

We are currently extending our research to consider whether participants' classroom performance matches what they articulate in their syllabi. We are also examining student perceptions of the learning focused syllabi (and courses) instructors create during CDI (blinded, 2015). Future studies will examine whether the CDI intervention leads to concomitant gains in student learning.

Acknowledgments

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Notes

1. Because teaching is complex and what goes into instructors' "teaching performance" happens before the course, during class time, and outside the classroom, we have changed the language of Kreber and Brook's third and fourth focus from "…teaching *performance*," to "…teaching practices." Teaching practices encompass a wide range of actions beyond in class performance, including supporting student learning outside of class; developing teaching materials such as syllabi, assignments, and assessments; and creating a safe and supportive learning environment. Although Kreber and Brook define this focus to include all these aspects of teaching, we believe this slight rewording better describes the intent in a US context. [#N1-ptr1]

2. Indirectly, this tool chest also probed instructors' beliefs about designing and articulating effective learning environments since some of the toolbox items are more closely aligned with a learning focus than others. [#N2-ptr1]

3. The author produced this syllabus while attending a previous iteration of CDI. [#N3-ptr1]

4. Mathematically, the absolute value of the slope line connecting the point ("pre CDI syllabus score" = 100%, "% gain" = 0%) with any instructor point ("% pre CDI syllabus score"$_i$, "% gain"$_i$) equals the percent normalized gain (%<g>). [#N4-ptr1]

Appendix: CDI Block Schedule

	Monday	Tuesday	Wednesday	Thursday	Friday
9:00–10:30	CDI overview Understanding student motivation	Closing the loop: learning goals and objectives Principles of assessment	Closing the loop: assessment Principles of active learning	Closing the loop: learning activities Feedback and grading	Exchanging syllabi: discovering new possibilities
10:30–10:45	Break	Break	Break	Break	Break

10:45–12:15	Principles of course design	Principles of assessment and assignment design	Planning powerful learning activities	Individual work	Implementing the design
12:15–1:00	Lunch	Lunch	Lunch	Lunch	Lunch and Panel; Institute ends @ 1:30
1:00–4:00	Exploring learning goals\n\nDeveloping learning objectives	Designing effective learning assessments/assignments\n\nPacing and scaffolding	Exploring learning activities\n\nDeveloping the course schedule	Individual work\n\nExchanging syllabi: feedback triads	Submit near final/final syllabus; complete CDI feedback
[1:30–3:30; varies slightly each day]	Individual work\n\nOne on one consultations with CDI faculty	Individual work\n\nOne on one consultations with CDI faculty and/or UVa students	Individual work\n\nOne on one consultations with CDI faculty and/or UVa students	Individual work\n\nOne on one consultations with CDI faculty and/or UVa students	
4:00–5:00 (optional)	*Welcome Reception*	*Optional mini Workshop: Technology enhanced Assessment*	*Optional mini Workshop: Technology enhanced Learning*	*Optional mini Workshop: Electronic Syllabus Tools*	*Have lingering questions?*\n\nContact us anytime throughout the summer and academic year
Homework On Monday–Wednesday evenings, leave a working draft of your syllabus in DropBox by 6:00 pm for feedback	1. Determine learning goals and objectives\n2. Create a new learner focused course description	1. Refine learning objectives\n2. Draft descriptions of major assessment activities Develop description for one major assignment; integrate	1. Refine assessments\n2. Determine overall instructional strategy\n3. Develop 1–2 specific activities to support a major assessment	1. Refine learning activities\n2. Define grading scheme\n3. Determine tentative schedule\n4. Complete syllabus	