

2015

Annual IMPACT Report 2015: A report by the IMPACT Data Collection and Analysis Team, Parts 1 and 2

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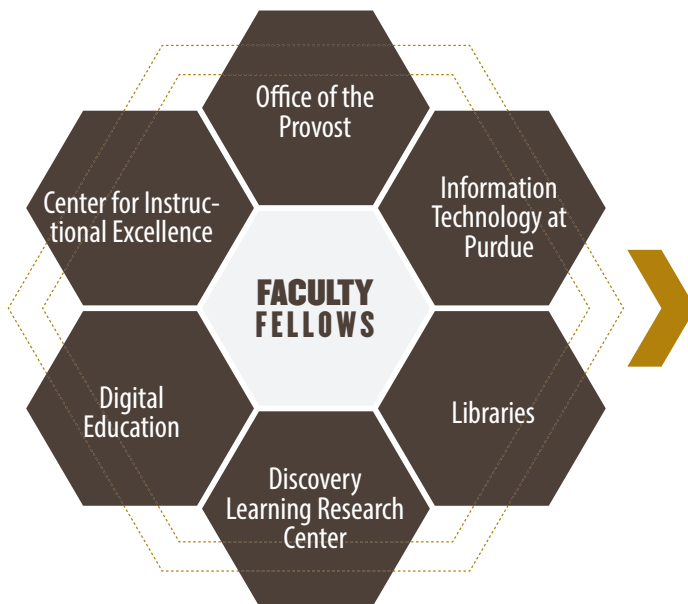
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OVERVIEW OF THE PROGRAM

Instruction Matters: Purdue Academic Course Transformation (IMPACT) was launched by the Provost’s Office in December 2010. IMPACT aims to create a more student-centered environment by engaging students in their own learning in order to improve student success as well as completion, retention, and graduation rates, in large enrollment, foundational classes. The IMPACT program is a large collaborative initiative on the Purdue West Lafayette campus (see **Figure 1**). It is an integrated campus-wide effort, involving multiple key partners including the President’s Office, Office of the Provost, Center for Instructional Excellence (CIE), Information Technologies at Purdue (ITaP), Purdue Libraries, the Discovery Learning Research Center (DLRC), and Digital Education. In addition, the President’s Office identified IMPACT as a component of the Purdue Moves initiatives, within the Transformative Education area, in the Fall 2013.

IMPACT is also recognized as part of the University Innovation Alliance (UIA) and the Department of Education with a \$2.3 million grant to support Success through Transformative Education and Mentoring.



Financial Support:

Provost’s Office, President’s Office.

Support Staff Contribution:

CIE, Libraries, and ITaP.

Program Assessment:

CIE, DLRC, and OIRAE

Scholarship of Teaching and Learning:

DLRC, CIE, Libraries, and ITaP.

Figure 1. Collaborations among units involved in the IMPACT program



There is strong evidence that student-centered teaching leads to improvements in students' abilities to solve problems and understand concepts

There is strong evidence that student-centered teaching leads to improvements in students' abilities to solve problems and understand concepts. Reviews of the literature and considerable research suggest that student-centered approaches, such as those utilizing collaborative learning, cooperative learning, problem-based learning, or active learning in general, enhance learning to a greater degree than purely face-to-face instruction (Prince, 2004; Weimer, 2013). As defined in Michael (2006), active learning is a "process of having students engage in some activity that forces them to reflect upon ideas and how they are using those ideas".

Results have shown statistically significant improvement in student retention and performance

IMPACT is partly modeled after the work conducted by Carol Twigg, President and CEO of the National Center for Academic Transformation (NCAT). NCAT has been engaged in course redesign since 1999, and NCAT projects have been supported by several foundations, including the Fund for the Improvement of Postsecondary Education (FIPSE) and the Bill and Melinda Gates Foundation. Outcomes of the NCAT redesigns have been very encouraging. Results have shown statistically significant improvement in student retention and performance in subsequent courses, improved student learning of core concepts, and enhanced performance on standardized exams, critical thinking skills and oral proficiency.

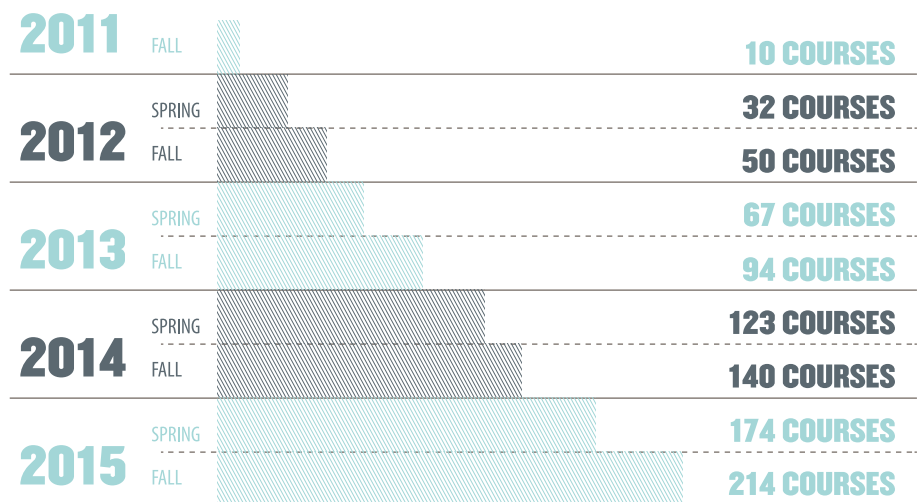
Although inspired by NCAT, Purdue's approach to course redesign is more flexible, allowing faculty to make many choices regarding the tools and strategies they want to use to achieve their redesigns. While many universities are prioritizing active learning and student success, few are doing so at a broad campus-wide scale like Purdue. While approximately 110 courses at a variety of institutions have been redesigned through NCAT from 1999 through 2012, 206 courses will have been transformed at Purdue by the end of the fall 2015 semester across 10 of the 11 colleges.



NUMBER OF COURSES TRANSFORMED AND STUDENTS IMPACTED

The inaugural IMPACT cohort was formed in the summer of 2011. The number of courses which have been redesigned in each cohort is presented below. Course redesign programs at other institutions of higher education do not typically transcend disciplines within each institution; instead, they tend to be confined to one department, especially in STEM fields with large enrollment courses. Purdue is a leader in interdisciplinary course redesign at a research intensive university.

Purdue is a leader in interdisciplinary course redesign at a research intensive university



Currently, IMPACT’s goal is to work with faculty teaching foundational courses that are part of the new core curriculum at Purdue, while maintaining a transformation rate of 60 courses per year over the next 2 years.



GOALS AND GUIDING PRINCIPLES OF THE IMPACT PROGRAM

The overarching goal of IMPACT is to achieve a greater student-centered learning environment by incorporating active and collaborative learning as well as other student-centered teaching and learning practices and technologies into large enrollment foundational courses. The creation of a student-centered learning environment will foster student engagement and student competence, as well as increased attainment of course-specific learning outcomes, degree completion, retention, and graduation rate.

Specifically, the goals of the IMPACT program can be summarized as follows:

- To refocus the campus culture on student-centered pedagogy and student success.
- To increase student engagement, competence, and learning gains.
- To develop a network of faculty, knowledgeable in teaching and learning best practices and passionate about teaching through Faculty Learning Communities (FLCs).
- To base course redesign on research-based pedagogies.
- To enhance and sustain IMPACT by adding new IMPACT faculty fellows annually.
- To support faculty-led course redesign with campus-wide resources.
- To reflect, assess, and share results to benefit future courses, students, and institutional culture.

FACULTY FELLOWS

IMPACT faculty fellows come from a variety of disciplines university-wide. Every semester, interested faculty submit their



application to become part of the next IMPACT cohort. Each application is reviewed by the IMPACT management committee and cohort selection is made. For more information about past and current IMPACT faculty fellows, visit the IMPACT website (<http://www.purdue.edu/impact/>).

FACULTY LEARNING COMMUNITY (FLCS) PROFESSIONAL DEVELOPMENT CURRICULUM

Every redesign is tailored to the needs of the faculty member, students, and the course

In addition to being partly modeled on the NCAT approach to redesign, the FLC professional development component of IMPACT has been influenced by several research-based best practices in teaching and learning, as well as motivation theories, and innovations in teaching and learning technologies, some of which were created at Purdue (e.g., Purdue Studio applications HotSeat and Mixable). The course redesign plan recognizes that the needs of faculty and students in each course may differ. Every redesign is tailored to the needs of the faculty member, students, and the course. To accomplish the goals of the redesign, each faculty fellow accepted in the program works closely with a support team comprised of staff members in CIE, ITaP, and Libraries with expertise in pedagogy, technology, and information literacy (**Figure 1**). There is no “one-size fits all” model or formula. Therefore, the work of each support team is extremely important.

SELF-DETERMINATION THEORY (SDT; DECI & RYAN, 1985; 2000)

The IMPACT program is guided by a strong theoretical framework, which has been validated and used in several research projects over the past 40 years. Self-determination theory (SDT) is a motivational theory that posits the existence of three basic psychological needs, which when fulfilled, contribute to the creation of a student-centered, autonomy-supportive learning environment. The basic needs are autonomy, competence,



The IMPACT program is guided by a strong theoretical framework, which has been validated and used in several research projects over the past 40 years.

and relatedness. **Autonomy**, in the context of SDT, does not mean independence but rather feelings of volition and choice. For example, students tend to feel autonomous when they are given choices and options about how to perform or present their work. **Competence** has been the focus of multiple higher education studies, and represents the extent to which students believe they have mastered content material or are able to perform academically (Deci, Koestner, & Ryan, 1999; Deci & Ryan, 2000). Finally, students perceive that their need for relatedness is met when they feel connected, intellectually and emotionally, to other students in the class, as well as to their instructor. In addition, **connectedness** to the material presented in class, also termed relevance, is important to foster perceived relatedness.

According to SDT, when basic psychological needs are met in student-centered, autonomy-supportive environments, self-determined motivation is fostered. SDT defines self-determined

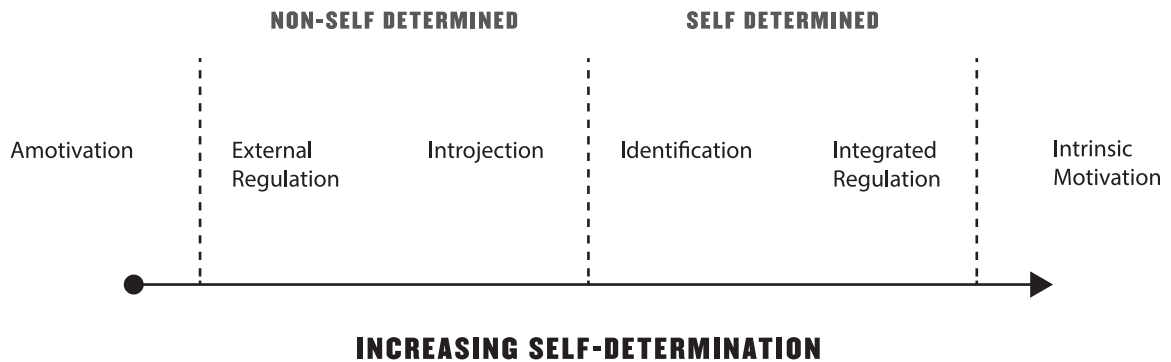


Figure 2: Forms of motivation proposed by Self-Determination Theory.

Adapted from Deci, E. L. & Ryan, R. M. (2000). The “what” and “why” of goal pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry*, 11, 227-268.



Fulfillment of basic psychological needs of autonomy, competence, and relatedness. In turn, fulfillment of basic psychological needs fosters student motivation, which can then lead to student success, learning, retention, and ultimately progress toward degree completion

motivation as those guiding behaviors that are valued and chosen volitionally (identification). In contrast, non-self-determined motivation underlies behaviors that are coerced or pressured by others (coercion). **Figure 2** presents the forms of motivation according to their underlying level of self-determination.

In designing and evaluating the effectiveness of IMPACT, we examine the extent to which the transformations create a student-centered learning environment as assessed using SDT framework. As shown in **Figure 3**, we examine the motivational mechanisms (SDT principles) as moderators of the relationship between redesign models using active learning strategies and student success and outcomes. Our general moderation hypothesis is that active learning strategies are effective as long as they contribute to the creation of a student-centered (autonomy-supportive) environment by fostering the fulfillment of basic psychological needs of autonomy, competence, and relatedness. In turn, fulfillment of basic psychological needs fosters student motivation, which can then lead to student success, learning, retention, and ultimately progress toward degree completion.

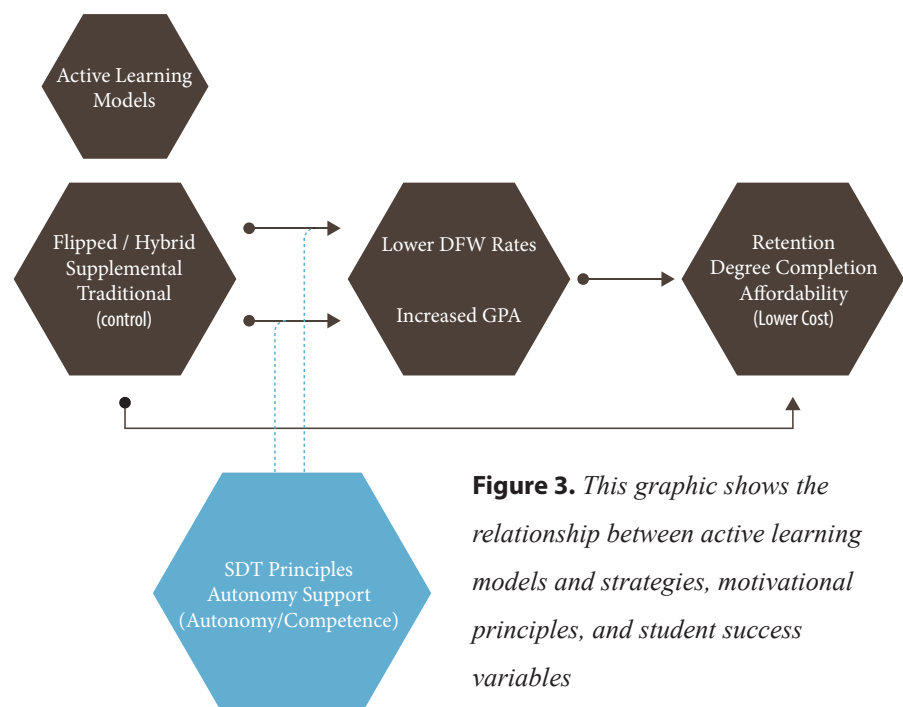


Figure 3. This graphic shows the relationship between active learning models and strategies, motivational principles, and student success variables



FACULTY LEARNING COMMUNITIES (FLC), REDESIGN MODELS, TECHNOLOGIES, AND PHYSICAL SPACE USAGE

The curriculum used as part of the IMPACT program and delivered through the Faculty Learning Communities (FLCs) can be divided into five components (Figure 4), organized by leading questions for faculty fellows to consider in the redesign of their course.

1. Where are your students starting from and how do you motivate them to learn?
2. What do you want to accomplish, what do you want your students to be able to do, know, and appreciate at the end of the course?
3. How will you measure whether the students have achieved the desired skills, knowledge, and/or engagement?
4. How do you want to approach the redesign and the attainment of your course goals and student learning outcomes?
5. What methods and activities will you use to accomplish the redesign and assess the effectiveness of the transformation?

THE FACULTY LEARNING CURRICULUM





During the FLCs, IMPACT faculty fellows spend time carefully considering the pre-requisites and post-requisites for their course, reflecting on the delivery, content, and structure of their course, and learning about new pedagogies, research and principles that support and foster active learning. Specifically, faculty fellows explore:

- Their students' characteristics and prior knowledge
- The development of student learning outcomes and objectives
- The alignment of course learning outcomes with appropriate and authentic assessments
- Motivation principles and theories
- Transformation models and elements of course redesign which foster student-centered teaching and learning
- Research-based links between improved student learning, pedagogical approaches, and theories
- Active learning techniques like, Team-Based, Case-Based, and Problem-Based Learning
- Innovative tools and technologies which foster student-centered learning environments through student engagement and active learning
- Informed Learning strategies which enable engaging with information to learn actively



Course Redesign Elements and Models

The redesign elements are theory-driven and focus on satisfaction of basic psychological needs of autonomy, competence, and relatedness.

IMPACT faculty, working in collaboration with their redesign teams, transform their courses by taking into consideration redesign elements which have been found to foster student-centered learning environments. Each redesign is focused on the attainment of the faculty-determined student learning outcomes and goals.

The redesign elements are theory-driven and focus on satisfaction of basic psychological needs of **autonomy, competence, and relatedness**. Redesigns, which contribute to the satisfaction of students' needs for **autonomy** focus on provision of choices and options to students, provision of a rationale for tasks that are not interesting and not inherently perceived as valuable, and a willingness to consider students' perspective. The need for **competence** is satisfied when opportunities to learn and demonstrate one's skills are provided on a regular basis and in a way that allows students to receive feedback, improve their performance, and try again. In this context, scaffolding of learning experiences is very important. Course redesigns foster the need for **relatedness** when students are provided opportunities to interact and learn from one another, as well as opportunities to interact with the instructor in a meaningful way. This does not mean that students need to develop a close relationship with everyone in the class, including the instructor, but it does mean that students need to feel they can trust the instructor to help them achieve their academic goals in a mutually beneficial partnership.



In implementing these redesign elements in their classes, IMPACT faculty tend to loosely follow one of the following three redesign models:



Fully Online Model

The fully online model eliminates all in-class meetings and moves all learning experiences online, using Web-based, multi-media resources, commercial software, or automatically evaluated assessments with guided feedback and alternative staffing models.



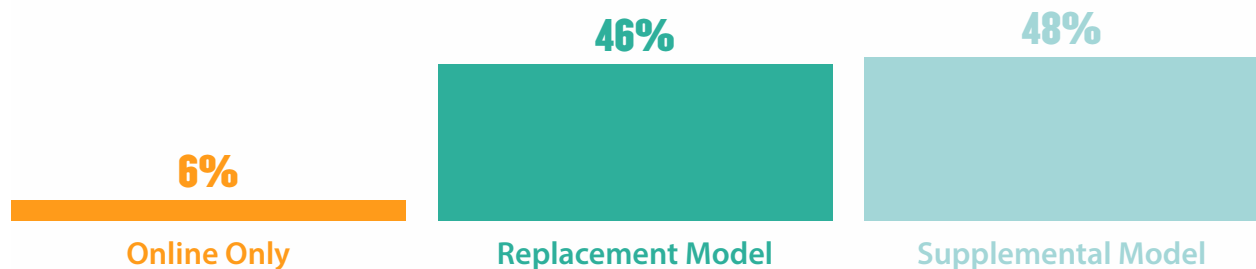
The Replacement Model (Including Hybrid and Flipped)

Instructor-created video lectures or other videos and interactive lessons are reviewed by students before class. Class time is mostly used for working through problems and collaborative learning. Some face-to-face class time can be eliminated and replaced by out-of-class, online, and interactive learning activities.



Supplemental Model

The supplemental model typically retains the basic structure of the traditional course but supplements lectures and textbook readings with technology-based, online, out-of-class activities. Some active learning strategies can also be integrated during the face-to-face lectures.



Out of 108 Sections



USE OF TECHNOLOGY

Information Technology at Purdue (ITaP) has developed a portfolio of technology tools to enhance learning and engagement in and out of the classroom. In 2012, ITaP received the *Campus Technology* magazine annual award for top innovations for the 6th time since 2006. Furthermore, ITaP is recognized internationally as a leader for campus technology innovation. You can learn more about the Studio suite of technologies at the following link <http://www.itap.purdue.edu/studio/hq/>

As shown below in there are a variety of technologies and instructional tools one can use in order to create an engaging and collaborative learning environment. IMPACT faculty fellows integrate many of these technologies into their course redesigns in order to foster student engagement, motivation, and active learning. Visit the ITaP website to learn more about the IMPACT faculty fellows who have made use of these technologies to support student learning and create student-centered learning environments.



BoilerCast: BoilerCast is a lecture capture system that enhances and extends instructional activities whether in face-to-face, blended or fully online courses. It is available in select classrooms and powered by software and hardware from Echo360.



Mixable: Creates a course stream. Connects students in a course to share thoughts, images, videos, and other files in a Facebook-like environment accessible from mobile devices as well as computers.



Hotseat: Through an online interactive interface, Hotseat allows students to post questions, respond to comments, and answer questions in real time in large classrooms.



Gradient: Modeled on the Calibrated Peer-Review project from UCLA, Gradient is a web-based tool that incorporates writing elements of drafting, feedback, and reflection, all cali-



brated to match an instructor’s expectations and grading criteria.

USES OF CLASSROOMS

As the number of course redesigns grow steadily, instructors continue to demand more physical classroom spaces facilitating the creation of student-centered learning environments. In response, important collaborations between several campus units have contributed to the success of many newly developed or refurbished classroom spaces in the last few years. Below is a listing of classroom types and capacities, along with anticipated room openings.



Examples of Scale Up
MGMT 301 | HIKS G980D






		2015	2017
<i>total rooms available</i>			
SCALE UP			
9-person teams around tables. Based on NCSU design.		27-108	8 19
MULTI MODAL			
Flexibility prioritized with multiple types of modular tables, chairs of different heights, mix of elevated 2-person conference tables and 3-6 person work table. All movable.		62	2 2
TURN2TEAM			
Long wide tables with dedicated power outlets, swivel chairs can face presentations or turn to team behind them		40-120	5 7
MEDIA SHARING			
Similar to Turn2Team, with smaller 8-person benches and elevated seats in tiered classrooms. Display monitors for each bench and individual whiteboards.		16-70	5 5
LEARN LAB			
Dedicated workstation computer for each student. Student and benches facing each other, multiple projection from central podium.		40-68	2 2



Examples of Scale Up

BCM 101 | HIKS B848

FACULTY LEARNING COMMUNITY (FLC) CURRICULUM

		2015	2017
<i>total rooms available</i>			
I21 BENCHING	4-person teams seated face-to-face at benches with swivel task chairs, dual projected images on both ends of classroom with supported power connections.	 66-104	2 4
MOBILE TABLE-ARM	Individual roller chairs with rectangular working space.	 20-42	13 13
FLEXIBLE TABLE & CHAIR	Prioritizes flexible configuration, 2-person tables and mobile chairs with casters, support projection images.	 20-50	0 11
6 ROUND	6-person discussion groups at 60" hexagonal-based tables, low-tech.	 72-102	2 5
BOILER-UP	6-person wedge-shaped tables, triple projection screens, whiteboards accessible for all tables and swivel chairs. Based on University of Windsor model.	 120-180	0 2

ORGANIZATION

The Faculty Learning Community or FLC utilized in IMPACT lies at the heart of the transformation process. In order to balance the needs of the transformation curriculum, with its specific deliverables, and the faculty autonomy and loose structure of an FLC, we have modified the traditional FLC model. The FLC more closely mirrors a graduate seminar, with specific “assignments” at various parts in the course. We also organize the faculty of each Cohort into smaller groups within the FLC, wherein they can interact with fellow instructors and their dedicated support staff.



The support team consists of individuals from four different units on campus: the Center for Instructional Excellence, Teaching and Learning Technologies in ITaP, Purdue Libraries, and Digital Education

The FLC groups consist of 2, 3 or 4 faculty, with a corresponding number of support team members, depending on the needs and circumstances of the participating fellows. For instance, a cohort may have three faculty members from different departments who all have large courses and express a desire to foster stronger student engagement. Or, a department may make a concerted effort to have several connected courses in one cohort, and their fellows will comprise one group in order to maximize curricular alignment in their design.

The support team consists of individuals from four different units on campus: the Center for Instructional Excellence, Teaching and Learning Technologies in ITaP, Purdue Libraries, and Digital Education. Each support team has one “primary” member who is responsible for arranging out-of-class meetings and coordinating faculty development in the group. The remaining teams consist of “secondary” support members who provide both their general knowledge of redesign and expertise from their respective units. The support team works to meet the needs of the faculty and the faculty-determined student learning outcomes and goals.

DELIVERABLES AND WORK

The IMPACT FLC occurs over 13 sessions, each 75 minutes in length during a fall or spring semester. Each week has specific work that the fellow is expected to complete outside of the FLC session. This work is conducted through Purdue’s Blackboard Learn website, mirroring the type of pre-work that faculty in interactive classes may ask of their undergraduate students. Readings, videos, and resources are all available on the course website, and fellows have access to the site throughout and after their participation in the FLC. The pre-work averages between 1-2 hours weekly. In concert with the emphasis on a dedicated and focused course design initiative, the total time commitment is 3-4 hours per week. As reflected in the faculty funding



supplement, IMPACT necessitates a sincere time commitment during the FLC semester.

Fellows complete assignments throughout the semester depending on the particular focus for each session. However, all fellows are asked to complete three “deliverables” that are vital to course design and assessment of the effectiveness of the redesign. These include:

RESEARCH QUESTION

The IMPACT program is guided by research and scholarly inquiry; therefore, all FLC participants are asked to submit a research question concerning their redesign. The scope of the research question is determined by each fellow, but represents a specific, answerable inquiry regarding modification to the course. The fellow considers evidence that may be used to answer the question and, working with the research team, explores the particular query in the semesters following the redesign. Dedicated support resources are available for research question construction, data analysis, and publication. See the ‘Program Effectiveness’ page of the IMPACT website for examples:

<http://www.purdue.edu/impact/>

COURSE OUTCOMES FOR STUDENTS

Research is often linked to student learning outcomes. Fellows submit 3-5 course-level skills or understandings that students who successfully complete the course will demonstrate. These outcomes may align with departmental or accreditation requirements and are completely at the discretion of the fellow. The fellows further explore specific learning objectives that support the course-level outcomes.¹ These outcomes are defined along a taxonomic dimension, using Bloom’s three taxonomic do-

¹ “Outcome” and “Objective” are often used interchangeably in literature on student learning, and certain accrediting bodies prioritize one term over the other. IMPACT uses “course-level outcome” and “specific-learning objective” to differentiate the level of specificity.



mains.² The research question and course-level outcomes and specific learning objectives are all submitted early in the FLC and revised later following guided reflection.

ASSESSMENT MAP

The final submission is an assessment plan that maps course-level outcomes (and possibly specific learning objectives) to student course work. This map may extend to each assignment, project or even question that the student completes, but is necessarily mapped at least to a summative project or exam. This assessment map is used to help answer each fellow's research question regarding their design and to assess the effectiveness of the redesign at improving student learning.

SYLLABUS

To see a sample of the latest FLC syllabus, click here: <http://www.purdue.edu/impact/assets/documents/FLC%20Syllabus%202015.pdf>

GUIDING PRINCIPLES

While the IMPACT FLC involves the formal creation of specific documents, the principles that guide the learning community and sessions prioritize faculty control of the process and discussion and active learning in all aspects whenever possible.

Faculty are not required to follow any specific template for their redesign, nor are they to integrate any specific methodologies, technologies, models or frameworks. The support teams work with each individual instructor to adapt the FLC curriculum and activities to the needs of the faculty member. Even as these needs change over the course of a semester, the IMPACT management and support teams work to maximize the fellow's own choices in the redesign process.

² Anderson and Krathwohl's 2000 update of Bloom's Taxonomy is utilized in the FLC to provide greater specificity for fellows



The Faculty Learning Community prioritizes connections among peers. To realize these connections, fellows from previous cohorts serve as invited guests for several of the sessions, sharing expertise and direct experience from their redesign. They often serve as the most powerful voice for IMPACT fellows, as they can offer an unadulterated view of the process, the benefits and potential challenges, as well as the gains of particular approaches.

Whenever possible, the FLC is held in one of Purdue's many "active learning spaces." These are spaces that allow for seamless transition between group or pair-based discussions to dialogues between all participants and the session facilitator. The facilitator of each session works to ensure that active learning, reflections and discussions are prioritized for the participants, modeling several of the techniques that have enabled IMPACT faculty to increase student engagement and higher-order thinking in their undergraduate courses. In particular, the IMPACT FLC features supplemental and hybrid models of course design. IMPACT does not stress or prioritize any particular mode of redesign, but the curriculum features robust online resources and "pre-work" in an attempt to maximize faculty time and discussion and introduce the fellows to methods with which they may not be familiar.

While the IMPACT FLC involves the formal creation of specific documents, the principles that guide the learning community and sessions prioritize faculty control of the process, and discussion and active learning in all aspects..."

Support for course redesign does not end at the conclusion of the FLC semester. Support team members are available for consultation and assistance as needed by the fellows. Since course design is an iterative process, support team members connect with faculty in the semesters following the FLC to gauge the comfort level of the fellows with the redesign and maintain their familiarity with each course. This allows the fellows to guide the degree of interaction, while still providing a supportive relationship during the design implementation.