
"The IMPACT program is a large collaborative initiative, involving multiple key partners across campus."

PURDUE IS A LEADER IN INTERDISCIPLINARY COURSE REDESIGN

at a research intensive university. Currently, 120 courses have been redesigned at Purdue. It is IMPACT’s goal to work with faculty teaching foundational courses that are part of the new core curriculum, while maintaining a transformation rate of 60 courses per year over the next 3 years.
“THE OVERARCHING PURPOSE 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.

THERE IS STRONG EVIDENCE THAT STUDENT-CENTERED TEACHING LEADS TO IMPROVEMENTS IN STUDENTS’ ABILITIES TO SOLVE PROBLEMS AND UNDERSTAND CONCEPTS.”

The creation of a student-centered learning environment fosters student engagement and student competence, as well as increased attainment of course-specific learning outcomes, completion, retention, and graduation rates. Student-centered approaches, such as those utilizing collaborative 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.” IMPACT 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 (Deci & Ryan, 1985) 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.
IMPACT FACULTY FELLOWS come from a variety of disciplines university-wide. 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 works closely with a support team with expertise in pedagogy, instructional technology, and information literacy.

The following observations were made:

- Through the FLC and associated support teams, instructors gain practical, useful, research-based active-learning pedagogical techniques that they incorporate into their IMPACT redesigned course and other courses they teach.
- The FLC process gives instructors the opportunity to reflect upon their teaching practice and improves instructor satisfaction with their teaching.
- Instructors perceive IMPACT as having a significant effect on student engagement and critical thinking skills.
- Several key barriers to sustainability have been identified: cultural expectations of teaching and learning processes and roles among students and faculty, lack of institutional incentives for faculty practicing innovative teaching, and lack of resources to support new pedagogies.

The IMPACT faculty fellows often integrate technology into their course redesigns in order to foster student engagement, motivation, and active learning. These technologies tend to support student learning and create student-centered learning environments.

![Redesign Models](chart.png)
As DFW rates decrease, a lower proportion of students fail or withdraw from the courses. When it comes to creating a student-centered learning environment, our findings suggest that “how” the redesign is delivered is more important that the type of redesign used. Results indicate that both the supplemental and replacement model can foster equivalent level of student-centered learning. More data are needed for online courses in order to substantiate that conclusion.

**STUDENT PERCEPTIONS & LEARNING**

A STUDENT-CENTERED LEARNING CLIMATE IS SIGNIFICANTLY ASSOCIATED WITH GREATER PERCEPTIONS OF AUTONOMY, COMPETENCE, AND CONNECTEDNESS, AS WELL AS HIGHER LEVELS OF SELF-REGULATION (SELF-DETERMINED MOTIVATION). IN ADDITION, WHEN STUDENTS PERCEIVE THE LEARNING ENVIRONMENT TO BE STUDENT-CENTERED, THEY ALSO REPORT GREATER KNOWLEDGE TRANSFER, LEARNING GAINS, AND GREATER PERFORMANCE IN THE COURSE. STUDENTS ALSO RATE THE COURSE AND THE INSTRUCTOR MORE FAVORABLY IN A STUDENT-CENTERED ENVIRONMENT.
STUDENT SUCCESS AND RETENTION

Increases in student retention were observed for select IMPACT courses in the colleges of Sciences, Technology, Engineering, Health and Human Sciences, Agriculture, and Liberal Arts in Fall 2011, Spring 2012, Fall 2012, and Spring 2013.

The most positive results are obtained for the courses in the Spring 2013 cohort, where an overall increase in 1-year retention was observed. In the majority of these courses, the increase was at least 2%.

In light of IMPACT’s overarching goal to work with faculty to create student-centered learning environments, and the positive influence of a student-centered learning environment on student outcomes, future work could examine the effect of redesigns on DFW rates, course GPA, and retention to the university, as a function of student-centeredness.

In addition, more work needs to be done in order to identify what factors or redesign elements are most closely associated with the creation of a student-centered learning environment.

Finally, other motivational constructs part of self-determination theory are currently being explored to more fully understand the effect of the IMPACT program on student learning and success.
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 across campus 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 Purdue Extended Campus (PEC). 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.

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. 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”.

“There is strong evidence that student-centered teaching leads to improvements in students’ abilities to solve problems and understand concepts.”
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, 120 foundational courses will have been transformed at Purdue by the end of spring 2014 semester across 10 of the 11 colleges.
The inaugural IMPACT cohort was launched 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.”

### Cohort 1
- Summer 2011 (10 courses)

### Cohort 2
- Fall 2011 (21 courses)
- Spring 2012

### Cohort 3
- Summer 2012 (6 courses)
- Fall 2012 (10 courses)
- Spring 2013 (15 courses)

### Cohort 4
- Fall 2013 (25 courses)
- Spring 2014 (33 courses)
“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 3 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.

“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.”

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

In addition to partly modeling the approach on NCAT course 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, Libraries, and PEC 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 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, 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 motivation as those forms of motivation 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. In this report, based on the data obtained from summer 2011 through fall 2013 cohorts, only data for competence has been collected and therefore analyzed. Data on the full spectrum of basic needs is now being collected and will be disclosed in next year’s report.
Figure 3. This graphic shows the relationship between active learning models and strategies, motivational principles, and student success variables.
The curriculum used as part of the IMPACT program and delivered through the Faculty Learning Communities (FLCs) can be divided into four components (Figure 4), organized by leading questions for faculty fellows to consider in the redesign of their course.

1) Where are you starting from? Who are your students?
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 do you want to approach the redesign and the attainment of your course goals and student learning outcomes?
4) What methods and activities will you use to accomplish the redesign and assess the effectiveness of the redesign?

Figure 4: Visual schematic of the IMPACT course redesign process
During the FLCs, IMPACT faculty fellows spend a significant amount of 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 motivational principles that encourage 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 that foster student-centered learning environments through student engagement and active learning
- Informed Learning based in an understanding and proficiency with information pathways

**Course Redesign Elements and Models**

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 designed to meet 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 feel they can trust the instructor to help them achieve their academic goals.

“The redesign elements are theory-driven and focus on satisfaction of basic psychological needs of autonomy, competence, and relatedness.”
In implementing these redesign elements in their classes, IMPACT faculty tend to loosely follow one of the following three redesign models:

**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.

**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.

**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.

![Redesign Models](image)

**Figure 5:** Types of redesign chosen by IMPACT fellows over the past three cohorts.
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. ITaP recently won the Campus Technology magazine annual award for top innovations, in 2012 for its mobile applications. Furthermore, ITaP is recognized internationally as a leader for campus technology innovation and has won 6 Campus Technology annual innovation awards since 2006. 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 Table 1, 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.

“…IMPACT faculty fellows integrate many of these technologies into their course redesigns in order to foster student engagement, motivation, and active learning.”

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**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 calibrated to match an instructor’s expectations and grading criteria.
### INSTRUCTIONAL TOOLS/TECHNOLOGIES

<table>
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<tr>
<th>Instructional Tools/Technologies</th>
<th>Frequency of Sections Using Tools (N=108)</th>
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<tbody>
<tr>
<td>Higher – Order Thinking Activities</td>
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<tr>
<td>Student Group Work</td>
<td>93</td>
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<tr>
<td>Problem Solving</td>
<td>89</td>
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<tr>
<td>Boilercast</td>
<td>74</td>
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<tr>
<td>Case-Based Learning</td>
<td>68</td>
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<tr>
<td>Inquiry-Based Learning</td>
<td>51</td>
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<tr>
<td>Team-Based Learning</td>
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<td>Problem-Based Learning</td>
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<td>Hotseat</td>
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<tr>
<td>Mixable</td>
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<td>Clickers</td>
<td>11</td>
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<td>Gradient</td>
<td>2</td>
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</tbody>
</table>

**Table 1:** Frequency of sections using various technologies or instructional tools
USE OF CLASSROOM

As the number of course redesigns grow steadily, instructors continue to demand more student-centered learning environments. In response, important collaborations between several campus units have contributed to the success of many newly developed or refurbish
ed classrooms spaces in 2014. According to Space Management & Academic Scheduling (SMAS), the following Classrooms and other Learning Spaces became available this past year:

- EE 129: Complete Renovation | Lecture Hall | beam mounted tablet chairs
- PHYS 112: Complete Renovation | Lecture Hall | beam mounted tablet chairs
- MSEE B12: Complete Renovation | Lecture Hall | beam mounted tablet chairs
- PHYS 203: Complete Renovation | Lecture Hall | beam mounted tablet chairs
- KNOY B033: Complete Renovation | Lecture Hall | strip tables & chairs
- WTHR 420: Complete Renovation | Active Learning | wedge tables & task chairs
- BCHM 105: Complete Renovation | Active Learning | wedge tables & task chairs
- RHPH 162: Complete Renovation | Active Learning | SCALE-UP tables & task chairs
- LYLE 1150: New Building | Active Learning | SCALE-UP tables & task chairs
- LYLE 1160: New Building | Active Learning | mobile tables & task chairs
- MATH 215: Complete Renovation | Active Learning | mobile tablet chairs
- PSYC 3102: Complete Renovation - Active Learning | mobile tablet chairs
- ARMS 1103: Refurnished for Active Learning | mobile tablet chairs
- BRNG 1206: Refurnished for Active Learning | mobile tablet chairs
- MJJS 1083: Refurnished for Active Learning | tables & task chairs
- MJJS 1001: Lecture Hall | furniture added for increased capacity
- FRNY B124: Furniture added for increased capacity
- FRNY G124: Furniture added for increased capacity
- HIKS B848: Furniture added for increased capacity
- HIKS B853: Relocation of tables for better classroom use
- HEAV 123: Returns to service as a classroom | mobile tables & sled-based chairs
- DLR 143A & 143B: Refurnishing for Active Learning | a Multi-Modal ‘test’ classroom
Therefore, as of fall, 2014, Purdue University currently has 29 active learning classrooms with flat flooring; 4 active-learning tiered lecture halls, and a multi-modal classroom (living room concept) being researched in the Discovery Learning Research Center.

Research by the Discovery Learning Research, Office of Institutional Research Assessment and Effectiveness, and Purdue Libraries is underway to examine Purdue’s active learning spaces. Student and instructor perception data about IMPACT classroom spaces and technology used is being collected and analyzed. Comparison data will also investigate differences in grades and DFW rates of students in a course using an active learning classroom and those in a traditional classroom.
FACULTY LEARNING COMMUNITY (FLC) CURRICULUM

Organization

The Faculty Learning Community (or FLC) that we use 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 Purdue Extended Campus.”

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 Purdue Extended Campus. 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.

Deliverables and Work

The IMPACT FLC occurs over 14 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 represents 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:

1. **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.

2. **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. These outcomes are defined along a taxonomic dimension, using Bloom’s three taxonomic domains. The research question and course-level outcomes and specific learning objectives are all submitted early in the FLC and revised later after reflection.

3. **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.

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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.

2 Anderson and Krathwohl’s 2000 update of Bloom’s Taxonomy is utilized in the FLC to provide greater specificity for fellows, as needed.
Syllabus

To see a sample of the latest FLC syllabus, click here:
http://www.purdue.edu/impact/pdf/Fall%202014%20FLC%20syllabus.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.

The Faculty Learning Community prioritizes connection among peers. To realize these connections, fellows from previous cohorts serve as invited guests for several of the sessions, providing 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 discussion to dialogues between all participants and the session facilitator. The facilitator of each session works to ensure active learning, reflection and discussion 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 utilizes supplemental and hybrid models. 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.

Support for course redesign does not end with the semester of the FLC. 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 redesign and maintain their familiarity with each course. This allows the fellow to guide the degree of interaction, while still providing a supportive relationship during the design implementation.
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...”
The purpose of this section is to provide a summary report on data collected, analyses conducted, and results obtained, since the beginning of the IMPACT program. The assessment of IMPACT falls into three different categories (see Figure 5 below):

- Faculty and Institutional Change (led by the DLRC)
- Student Perceptions and Learning (led by CIE)
- Student Success and Retention (led by OIRAE)

**Figure 5**: Assessment goals for the IMPACT program
This section summarizes faculty self-reported changes to teaching practices (regarding course planning, preparation and implementation) as a result of participation in the IMPACT program.

IMPACT fellows were surveyed and interviewed throughout their participation in the program. Faculty are asked about their perceptions of the faculty development activities, the impacts of participation on their teaching approaches, the benefits and challenges of participation and redesign implementation, and the catalysts and barriers to sustaining and transferring their new teaching practices. Survey data are tabulated and analyzed descriptively. Mean response rates to surveys are approximately 66%. Interview data are transcribed and analyzed for salient themes associated with the areas of interest. Results are discussed below by area of interest.

- Faculty reported impacts on teaching
- Faculty reported impacts on students
- Faculty reported barriers to sustainability

Faculty reported impacts on teaching

Surveys conducted with IMPACT participants at the end of the FLC process suggest that they gain knowledge about many aspects of teaching and learning during the Faculty Learning Community (FLC). Table 2 displays mean values of participant agreement with statements regarding the impact of the FLC on their knowledge and planned teaching approaches.

<table>
<thead>
<tr>
<th>QUESTION</th>
<th>N</th>
<th>MEAN</th>
<th>STD. DEVIATION</th>
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<tbody>
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<td>I gained useful ideas from the support team</td>
<td>67</td>
<td>5.46</td>
<td>.804</td>
</tr>
<tr>
<td>I plan to apply/use the lessons learned in my other class</td>
<td>66</td>
<td>5.44</td>
<td>.659</td>
</tr>
<tr>
<td>I had the opportunity to reflect more on my teaching and how to improve it</td>
<td>67</td>
<td>5.36</td>
<td>.773</td>
</tr>
<tr>
<td>I gained specific activities that I can incorporate into my course</td>
<td>67</td>
<td>5.28</td>
<td>1.042</td>
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<tr>
<td>I am enthusiastic about implementing my course redesign</td>
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<td>5.28</td>
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<td>My participation in IMPACT will add value to the course I teach</td>
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<td>5.22</td>
<td>.902</td>
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<tr>
<td>I was able to create clearer learning objectives for my course</td>
<td>66</td>
<td>5.21</td>
<td>.814</td>
</tr>
<tr>
<td>I enjoyed social interaction with colleagues at the workshop</td>
<td>67</td>
<td>5.19</td>
<td>.783</td>
</tr>
</tbody>
</table>

Table 2. Faculty perceptions of FLC impacts
Interviews conducted with faculty in multiple cohorts reveal that through participation in IMPACT they learn about a) how to use learning objectives to effectively plan a learner-centered course and b) specific, research-based teaching strategies that foster active learning in students. For example, comments regarding lessons learned included:

“I was ... learning a lot more about learning outcomes ... That was for me the most useful part about class prep, or forming classes and so on.”

_________________________ and ____________________________

“Yeah I feel like I mean a more concrete way to learn about the pedagogy the science behind the teaching. I mean that it was helpful in that way.”
Longitudinal survey data collected from the Fall 2012 and Spring 2013 cohorts (N=16) reflect these changes in faculty use of learning objectives as tools for facilitating student centered teaching and assessment. At both entrance to the IMPACT program and after redesign implementation, participants are asked how they design the content and assessment of their course. After participating in IMPACT and implementing their first redesigned course, instructors are significantly more likely to report choosing assessment methods based on their alignment with the course learning objectives.

Longitudinal survey data also indicate that participation in IMPACT significantly improves instructor satisfaction with their teaching approaches, their ability to identify, and effortlessly implement appropriate instructional technology.

**Faculty reported impacts on students**

Longitudinal surveys collected from the Fall 2012 and Spring 2013 cohorts (N = 16) assesses faculty’s perceptions of student use of key skills (e.g., critical thinking and good study habits) and engagement using several behavioral indicators both at the entrance to the IMPACT program and after implementing the redesigned course for the first time. Faculty report significantly positive changes in student engagement and use of key academic skills. For example, after participating in IMPACT and completing their first implementation of a redesigned course, faculty are more likely to agree that students were active participants and engaged in the course. They are more likely to agree that students demonstrate critical thinking skills and good study habits.

“…after participating in IMPACT and completing their first implementation of a redesigned course, faculty are more likely to agree that students were active participants and engaged in the course.”

**Faculty reported barriers to sustainability**

Promoting sustainability is one key goal of the IMPACT program. To examine perceived barriers to sustainability, IMPACT fellows are surveyed and interviewed periodically beginning with their entrance to the program and continuing yearly after they have first implemented their redesign. Descriptive and thematic analysis of qualitative data collected after faculty have implemented their first redesigned course reveal that faculty and instructors encounter barriers on several levels. Those barriers include cultural and structural disconnects, as well as, resource availability.

“The most commonly cited barriers are the lack of a common culture of teaching and learning among faculty, administrators and students.”
The most commonly cited barriers are the lack of a common culture of teaching and learning among faculty, administrators and students. IMPACT fellows describe encountering resistance at all levels—students, colleagues and unit administrators. However, the magnitude and breadth of resistance varies across campus units.

Students, in particular, were often resistant. Their expectations for college teaching and learning were at odds with the redesigned course.

“\nWhat didn’t work well was that too many of the students just weren’t listening and participating, and I think the reason for that is that a lot of freshmen tend to be oriented towards ‘what piece of information do I have to repeat for the exam’…’what’s the one little piece of information with meaning that you want me to repeat’ and it’s very hard to get them out of that [way of thinking about teaching and learning].”\n\nFaculty often mentioned needing to “sell” the redesign or “convince” colleagues in their unit that redesigning their course to make it more active and student-centered was a good idea. Those who were unsure about the support of their unit colleagues and administrators felt that they were taking a risk by participating in IMPACT.

“I wish I knew how to tell that story better, I think when I tell that story some of my colleagues are feeling threatened and it shouldn’t be threatening…I wish I knew that my department valued this…I wish I knew how to measure and convince my department of the value of this…”

Some IMPACT fellows were unsure if their unit supported their efforts and others lamented that without a larger coordination within and across units they were unsure if their redesigned course would make much difference.

Structural barriers described by participants included issues varying from complex course registration designations to institutional promotion processes and faculty appointments that do not incentivize innovative teaching. Lack of incentives for innovative teaching was the most commonly cited structural barrier. IMPACT fellows pointed out that the university promotion process does not weight their teaching heavily, so there is some disincentive to allocate their already stretched time to changing their course—especially if their appointment is primarily devoted to research. For example, one faculty participant described his experience:

“In terms of my career advancement at Purdue this was actually a task and not an advantage…having a majority research appointment doesn’t mean you don’t care about teaching but it does mean that time is the critical bit and so dealing with people’s time efficiently is really important.”
Additionally, when teaching is included for consideration in the promotion and tenure process, it is often student evaluations, not pedagogical innovation, that is considered. As such, student resistance to new forms of teaching may be a disincentive to sustaining or transferring redesign practices.

“Participants described a shortage of physical classroom spaces that met their needs and a shortage of teaching assistants who were prepared to aid in the implementation of the redesigned course.”

The final barrier discussed by faculty was a lack of physical and human resources for implementing redesigned courses. Participants described a shortage of physical classroom spaces that met their needs and a shortage of teaching assistants who were prepared to aid in the implementation of the redesigned course. Current active learning spaces, while increasing in number, are still few and often not able to accommodate science demonstrations. Because many of the redesigned courses are large, foundational courses, faculty are relying on teaching assistants to play a larger role during what was previously lecture time and is now filled with activities and discussions mediated by instructors and teaching assistants. Teaching assistants need additional training to develop the skills to manage and facilitate learning in this context. Some instructors have experienced teaching assistants available, but many others—typically in courses where the teaching assistants were previously serving as graders—require access to high quality training for their teaching assistants.

In sum, through the IMPACT Faculty Learning Community (FLC) and interactions with associated support teams, instructors are gaining practical, useful, research-based active-learning pedagogical techniques that they are incorporating into their IMPACT redesigned course and other courses that they teach. The FLC process gives instructors the opportunity to reflect upon their teaching practice and improves instructor satisfaction with their teaching. Instructors appreciate the opportunity to talk about teaching with their peers and gain ideas from a wide range of disciplines. Instructors perceive IMPACT as significantly effecting student engagement and critical thinking skills. Overall, faculty are seeing positive outcomes and successfully implementing their redesigns. Faculty have identified several key barriers to sustainability of their new pedagogical approaches, such as: cultural expectations of teaching and learning processes and roles among students and faculty; lack of institutional incentives for faculty practicing innovative teaching; lack of resources to support new pedagogies. These barriers are not universal to all instructors and all units, but faculty felt that, where they were present, they posed a challenge to the sustainability of the outcomes generated by IMPACT.

“Instructors appreciate the opportunity to talk about teaching with their peers and gain ideas from a wide range of disciplines.”
STUDENT PERCEPTIONS AND LEARNING

The results reported in this section were collected in Fall 2013 and Spring 2014 on all IMPACT courses taught during that period with the use of a student survey. The survey was administered to students at the end of the semester to capture their perceptions of the classroom environment and their learning gains. A copy of the survey can be obtained upon request. The questions of interest are grouped into the following constructs.

- Learning Climate (6 items), Autonomy (7 items), Competence (6 items), Relatedness (8 items), Perceived Knowledge Transfer (8 items), Learning Gains (8 items), Self-determined Motivation (18 items).

The first part of this section will present relationships between the student perceptions listed above and will be based in data obtained in Spring 2014 only. The second part of this section will present comparisons between courses categorized based on the extent to which the learning environment was determined to be student-centered, and will be based on data obtained in Fall 2013 and Spring 2014.

Student-centered courses were categorized in the following way: Only courses with at least 15 responses to the post-survey and a response rate of at least 25% (acceptable response rate for survey research), were considered. A course was considered “high” student-centered if at least 75% of the student responses rated the learning environment as student-centered (above the scale mid-point on the learning climate scale). All other courses were considered “lower” student-centered. Based on this categorization, about 70% of the IMPACT courses that met the response rate inclusion criteria were categorized as “high” student-centered (N = 5433 enrollments).

“… about 70% of the IMPACT courses were categorized as “high” student-centered.”
Relationships between Student Perceptions

The relevant demographics are presented in Table 3. The correlations presented in this section are based on the post-survey data (N = 4641).

<table>
<thead>
<tr>
<th></th>
<th>All Students (N = 12193)</th>
<th>Post-Survey Students (N = 4641)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gender</strong></td>
<td>41% female, 57% male</td>
<td>50% female, 50% male</td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td>Age ranged from 16 to 55 (M = 19.97, SD = 2.25)</td>
<td>Age ranged from 16 to 55 (M = 20.17, SD = 2.60)</td>
</tr>
<tr>
<td><strong>Ethnicity</strong></td>
<td>64% White, 18% International, 5% Asian, 3% Black/African-American, 4% Latino/Hispanic</td>
<td>67% White, 19% International, 4% Asian, 3% Black/African-American, 4% Latino/Hispanic</td>
</tr>
<tr>
<td><strong>Underrepresented Minority</strong></td>
<td>8.8% underrepresented minority</td>
<td>7.5% underrepresented minority</td>
</tr>
<tr>
<td><strong>Class Level</strong></td>
<td>26% freshmen, 33% sophomores, 23% juniors, 18% seniors</td>
<td>22% freshmen, 32% sophomores, 27% juniors, 19% seniors</td>
</tr>
<tr>
<td><strong>Overall GPA</strong></td>
<td>GPA ranged from 0 to 4.0 (M = 3.00, SD = 0.61)</td>
<td>GPA ranged from 0 to 4.0 (M = 3.13, SD = 0.56)</td>
</tr>
<tr>
<td><strong>IMPACT Course Grade</strong></td>
<td>Course grade ranged from 0 to 4.0 (M = 2.99, SD = 1.06)</td>
<td>Course grade ranged from 0 to 4.0 (M = 3.25, SD = 0.91)</td>
</tr>
</tbody>
</table>

Table 3. Demographics for Spring 2014 data

As seen in Table 4, relationships between constructs follow predictions of Self-Determination Theory (Deci & Ryan, 1985, 2000), which is the theoretical framework used to guide the IMPACT redesigns (consult Part I of the Annual Report for details on the theoretical model). All correlations were statistically significant. A student-centered learning climate is significantly associated with greater perceptions of autonomy, competence, and connectedness, as well as higher levels of self-regulation (self-determined motivation). In addition, when students perceive the learning environment to be student-centered, they also report greater knowledge transfer, learning gains, and greater performance in the course.

“… when students perceive the learning environment to be student-centered, they also report greater knowledge transfer, learning gains, and perform better in the course.”

<table>
<thead>
<tr>
<th>Learning Climate</th>
<th>Correlation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Autonomy</td>
<td>.66</td>
</tr>
<tr>
<td>Competence</td>
<td>.58</td>
</tr>
<tr>
<td>Connectedness</td>
<td>.49</td>
</tr>
<tr>
<td>Self-Determined Motivation</td>
<td>.50</td>
</tr>
<tr>
<td>Knowledge Transfer</td>
<td>.55</td>
</tr>
<tr>
<td>Learning Gains</td>
<td>.51</td>
</tr>
<tr>
<td>Course Grade</td>
<td>.20</td>
</tr>
</tbody>
</table>

Table 4. Correlations between Learning Climate, Student Perceptions, and Course Grade in Spring 2014
Does Redesign Type Make a Difference?

“The overarching goal of IMPACT is to achieve student-centered learning environments through a variety of active learning pedagogies.”

When it comes to creating a student-centered learning environment, our findings suggest that “how” the redesign is delivered is more important than the type of redesign used. Results indicate that both the supplemental and replacement model can foster equivalent level of student-centered learning (See Figure 6). More data are needed for online courses in order to substantiate that conclusion. When differences exist, the replacement/flipped model tends to outperform the other models.

![Learning Climate Graph]

**Figure 6.** Learning climate by redesign type in Spring 2014. (Online only, N = 332; Replacement, N = 1319; Supplemental, N = 2646)

In sum, regardless of the redesign model used, students in the courses which produce higher level of student-centered learning tend to feel more competent and believe they can transfer their knowledge more easily to other academic areas. In addition, these students tend to earn higher course grades, provide more positive evaluations of their learning, the course, and the instructor when compared to students in courses associated with lower level of student-centered learning.

**Effects of Student-Centered Learning | Comparisons between courses categorized based on the extent to which the learning environment was determined to be student-centered**

The relevant demographics for this section are presented in Table 5. The following findings are based on data collected with the post-survey, in Fall 2013 and Spring 2014, and represent a total of 159 course sections.
Table 5. Demographics for Fall 2013 and Spring 2014 data

Students in IMPACT courses which were associated with a high level of student-centered learning reported significantly greater levels of perceived competence (see Figure 7) as well as significantly greater learning gains on faculty identified learning outcomes (see Figure 8).

![Image of bar chart showing perceived competence in function of student-centered learning in Fall 2013-Spring 2014]
These students also reported that they would be able to transfer knowledge obtained in the IMPACT course to other relevant academic areas or life in general (see Figure 9).
Students in high student-centered courses also rated the course as well as the instructor significantly more positively than students in lower student-centered courses (See Figure 10).

![COURSE EVAL](image)

*Figure 10*. Course evaluations in function of student-centered learning in Fall 2013-2014

All the significant effects reported above, were associated with moderate to large effect sizes.

In sum, our analyses of the IMPACT program thus far support the notion that non-academic factors, such as the extent to which the environment is student-centered, are associated with a variety of student perceptions and improved student performance.

“Taking into consideration a student-centered learning environment is extremely important in interpreting the data and the effectiveness of the redesigns conducted through IMPACT.”
STUDENT SUCCESS AND RETENTION

Comparison between IMPACT and corresponding Non-IMPACT courses on DFW rates and course GPA

Aggregate analysis across all IMPACT courses is made difficult by the fact that the IMPACT program has dramatically changed since its inception in 2011. As IMPACT faculty and staff learned more about the conditions and redesign elements, which fostered a student-centered learning environment, corresponding changes were made to the Faculty Learning Community and redesign process. The scope of the program and course targets have similarly changed since the beginning of the program. Therefore, analyses were conducted at the cohort level to examine differences in DFW rates and course GPA. Differences will be highlighted in the presentation of the findings below.

FALL 2011 COHORT

DFW rates

For courses included in the Fall 2011 cohort, a significant decrease in DFW rates was observed. It is important to note here that in the first IMPACT cohort, courses with high DFW rates had been intentionally targeted and selected to be part of the first cohort (see Figure 11).

Figure 11. DFW Rate for IMPACT/Non-IMPACT courses by year for the Fall 2011 Cohort
Course GPA

Student performance in IMPACT courses was significantly lower three years prior to implementation of IMPACT redesigns and marginally lower a year before the implementation of the redesigns. Overall, the trend for student performance was lower in IMPACT courses compared to Non-IMPACT courses before the redesign (see Figure 12). After the initial redesign iteration, a significant jump in course GPA was observed for students in IMPACT courses, resulting in a significant difference between IMPACT courses and Non-IMPACT courses. In year two and three post-implementation, these differences leveled off.

Figure 12. GPA for IMPACT/Non-IMPACT courses by year for the Fall 2011 Cohort

It is important to pause here in order to note that the relationship between DFW rates and course GPA is not a linear one and that factors which positively affect DFW rates will not necessarily also contribute to an increase in course GPA. As DFW rates decrease, a lower proportion of students fail or withdraw from the courses. Consequently, more students who are likely to pass the course or perform at course average would be kept in the “course pool”. This situation would not necessarily lead to an increase in course GPA, although it would definitely benefit the students since a greater proportion of them would not need to retake the course, would continue progress through degree requirements, and would graduate on time.

“As DFW rates decrease, a lower proportion of students fail or withdraw from the courses.”
SPRING 2012 COHORT

DFW rates and Course GPA

For courses included in the Spring 2012 cohort, no differences were observed between IMPACT and Non-IMPACT courses for either DFW rates or course GPA. Despite the consistently low DFW rate, of some importance and possibly significance, is the beginning of a downward trend observed for DFW rates in IMPACT courses, which almost reached marginal significance two years after the implementation of the redesigns (see Figure 13). The GPA graph is presented in Figure 14.

![Figure 13](image13.png)

**Figure 13.** DFW rate for IMPACT/Non-IMPACT courses by year for the Spring 2012 Cohort

![Figure 14](image14.png)

**Figure 14.** GPA for IMPACT/Non-IMPACT courses by year for the Spring 2012 Cohort
The courses selected to be part of the Spring 2012 cohort historically had not exhibited DFW rates in excess of 20%. In addition, we have noted that in many cases, several iterations of a redesigned course are required to achieve the full effect of the redesigns. Faculty take time to become accustomed to new pedagogies and work to incorporate those new ways of teaching into their existing course structure. It remains to be seen if this downward trend will continue as faculty fellows from the Spring 2012 cohort continue to iterate their course redesign.

“Faculty have to take time to get used to new pedagogies and work to effectively incorporate those new ways of teaching into their course.”

**FALL 2012 COHORT**

**DFW rates and Course GPA**

Differences between IMPACT and Non-IMPACT courses were not observed for the Fall 2012 cohort, for either DFW rates or course GPA. Courses that were included in the Fall 2012 cohort already had markedly low DFW rates, with an average around 12%. Therefore, a significant reduction in DFW rates was not expected (see Figure 15). The graph for GPA data is presented in Figure 16.

![Graph](image.png)

*Figure 15. DFW Rates for IMPACT/Non-IMPACT courses by year for the Fall 2012 Cohort*
A downward trend in DFW rates can be observed for courses included in Spring 2013 cohort (see Figure 17). The small sample size of Non-IMPACT courses complicates comparison of redesigned courses in the Spring 2013 cohort to control sections. Although differences in the number of course sections available for comparisons for the IMPACT and Non-IMPACT courses are common throughout the program period, for Spring 2013 cohort, only two Non-IMPACT sections were available for comparisons with the 50 IMPACT sections. This great difference in sample size may limit the generalizability of the findings and should be taken in consideration when examining results. In addition, only one year of data following the implementation of the redesigns is available for courses part of the Spring 2013 cohort. These results are preliminary.
Course GPA

For courses included in the Spring 2013 cohort, student performance appears to remain relatively constant. More data are needed to establish a trend (see Figure 18).
FALL 2013 COHORT

DFW rates and Course GPA

For courses included in the Fall 2013 Cohort there is a significant difference between the IMPACT and Not-IMPACT sections for all years for both GPA and DFW rates. Following the Purdue Moves initiative, in the Fall 2013, the IMPACT program began to target courses included in the newly approved Purdue core curriculum. As evidenced by the findings depicted in Figures 19 and 20, the core courses which became part of the Fall 2013 cohort were already exhibiting low DFW rates and high GPA. In all the comparisons, the IMPACT courses appeared significantly better than the corresponding non-IMPACT courses even before the implementation of the redesigns. More data from future iterations are needed in order to see how this trend will develop and whether the discrepancy between the IMPACT and Non-IMPACT courses will become more pronounced.

Figure 19. DFW rate for IMPACT/Non-IMPACT courses by year for the Fall 2013 Cohort
**IMPACT on 1-year, 2-year, and 3-year student retention**

Overall, when examining all cohorts at the aggregate level, there is no significant difference in retention to the university. However, increases in student retention were observed for specific IMPACT courses in Fall 2011, Spring 2012, Fall 2012, and Spring 2013. Specifically, we note increases in retention in courses in the college of Sciences, Technology, Engineering, Health and Human Sciences, Agriculture, and Liberal Arts. The most positive results are obtained for the courses in the Spring 2013 cohort, where an overall increase in 1-year retention was observed. In the majority of these courses, the increase was at least 2%.

It is important to note that for the Fall 2012 and Spring 2013 cohorts, only one year of data following the implementation of the redesign is available for comparisons. More data is needed to establish robust trends.
In light of IMPACT’s overarching goal to work with faculty to create student-centered learning environments, and the positive influence of a student-centered learning environment on student outcomes including performance, future work could examine the effect of redesigns on DFW rates, course GPA, and retention to the university, as a function of student-centeredness. More specifically, courses that are being categorized as high student-centered would be tracked separately from courses that are categorized as low student-centered. We hypothesize that greater effects on DFW rates, course GPA, and retention to the university would be observed for high student-centered courses.

In addition, more work needs to be done in order to identify what factors or redesign elements are linked or more closely associated with the creation of a student-centered learning environment.

Finally, additional constructs, which are part of self-determination theory (consult Part I of the report for more information), are currently being explored to more fully understand the effect of the IMPACT program on student learning and success. In future reports, student motivation data will be analyzed, interpreted, and integrated in the report.