Using CIRP Surveys to Assess and Enhance the Student Experience

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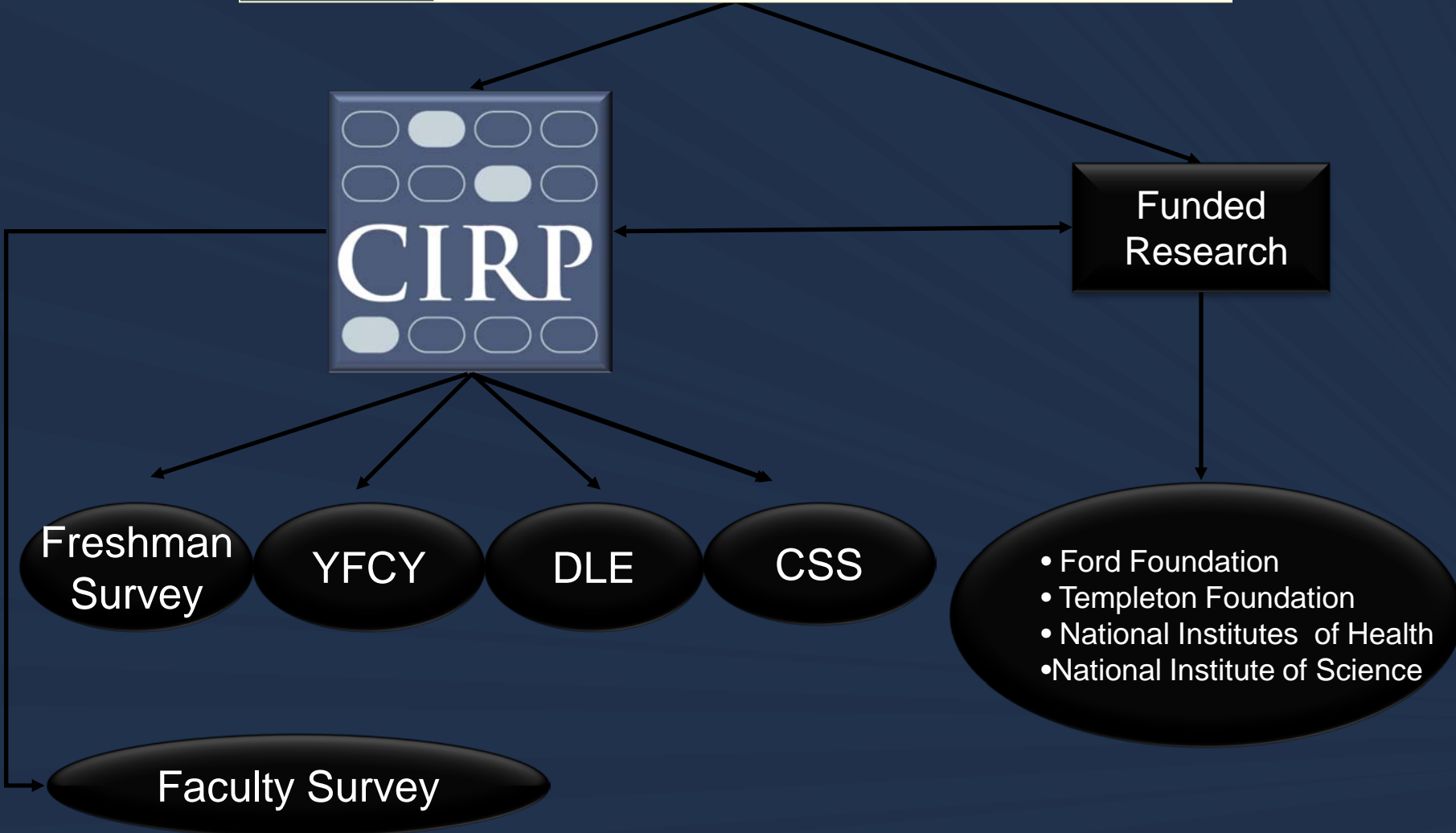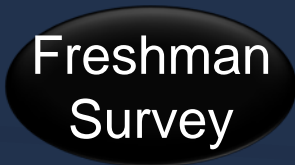Butler University

CIRP

Session Objectives

- Briefly introduce CIRP as an assessment tool
- Understand potential applications of results to examine the undergraduate experience
- Highlight innovative institutional examples of CIRP use
- Discuss challenges and insights to using data

What do CIRP Surveys Capture?

Environment
YFCY/DLE/CSS
(e.g., place of residence
during college, interactions
with peers and faculty, curricular
and co-curricular experiences)

Input

CIRP Freshman Survey

(e.g., academic performance
in high school, financial concerns,
expectations, degree aspirations,
self-concept in high school, race, sex)

Outcome
YFCY/DLE/CSS
(e.g., gains in college, satisfaction
with college, retention,
post-college plans)

CIRP

CIRP and Assessment

- Help shed light on the undergraduate experience
- Understand strengths and weaknesses in educational programs
- Identify areas that need attention to improve student learning and success
- Help set expectations
- Help pinpoint aspects of the college experience that are not in line with institutional expectations
- Link with other institutional data

CIRP

Converting CIRP Results into Action

- Assessment information should be actionable

- Goal of engaging in assessment is improvement-- of curricular or co-curricular programs, activities, services and ultimately the student experience

- That does not mean engaging in assessment is easy on a day to day basis. This is for many schools a culture change

- Campuses that make good use of their data, in that they use results to make changes to the student experience have certain common elements…

Converting CIRP Results into Action

- Advice from Institutions that make use of CIRP Results:
- Survey administration is an active, collaborative process
  - Know what you want to get out of participation
  - Examine and share the data broadly
  - Move beyond the data

CIRP

Know what you want from CIRP Results

- Where will the data be useful?
  - Culture of Evidence
  - Accreditation
  - Strategic Planning
  - Other Campus Initiatives
- Build a base of support
- Make plans for dissemination
  - Link items, CIRP Constructs, Themes to assessment plans, mission statements, strategic planning documents

CIRP

Example-Student Faculty Interaction

- CIRP Construct- overall look at extent to which students and faculty interact in relationships that foster mentorship, support and guidance…

- Indicators of quality of Student Faculty Interaction
  - Faculty provided me with feedback that helped me assess my progress in class; felt my contributions were valued in class; faculty encouraged me to ask questions and participate in discussions

- Description of types and frequency of student-faculty Interactions
  - What % of students worked with faculty members on research; Discussed ideas with faculty; challenged a professor's ideas in class; communicated regularly with professors

CIRP

Share Data Broadly

- Don't be afraid to share the data
  - Share regularly
  - Share data in small, relevant chunks
  - Invite conversation, interpretation, and involvement across campus constituencies
  - More questions than answers is OK, but remember to keep focus on how the results can be used to improve
  - Turn knowledge, even small bits of knowledge, into action—how we use this can to help our students?

CIRP

Move Beyond CIRP Data

- Connect CIRP results to other student information
- Supplement CIRP reporting with analyses specific to institutional concerns
- Qualitative information provides the "why" to survey data's "what"
- Use data to assess impact of interventions/changes/new programs

CIRP

Using CIRP Surveys to Assess and Improve the First-Year STEM Experience

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2010 IUPUI Assessment Conference
Indianapolis, October 26, 2010

Case Study: University of Michigan

- 2004 and 2005 freshman classes, highly selective, High School GPA=3.8

- CIRP Freshman Survey + admission data

- Predict 1st Year GPA & retention

- 94% freshman engineering retention

- 84% 5-year graduation rate*

* Source http://www.admissions.umich.edu/about/

Significance of Research

- Single Institution Study at a university with high graduation rates

- Comparison of Engineering to other student fields, including other STEM majors and Non-STEM majors at University of Michigan

- Interdisciplinary - combining ideas from engineering and higher education research

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Significant Results

- Showed Engineering student success follows a different model

- Close to 40% of the variation in the first year GPA for the Engineering sector was explained

- CIRP Freshman Survey variables were significant for 1st year engineering retention: including self-rating of math ability and concern over finances

- No significant difference due to URM status or gender, once significant variables are taken into account

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Presentation Take-Aways

- Framework for freshman retention using the CIRP Freshman Survey

- Research findings for freshman year at Michigan

- How engineering student success is different

- Role of assessment in a continuous improvement cycle for STEM majors

- Implications for pedagogy, curriculum and working with K12 educators

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Literature References

- Veenstra, Dey and Herrin, "A Model for Freshman Engineering Retention" *Advances in Engineering Education*, 2009

- Veenstra, Dey and Herrin, " Is Modeling of Freshman Engineering Success Different from Modeling of Non-Engineering Success?", *Journal of Engineering Education* , 2008.

- Veenstra, *Modeling of Freshman Engineering Success*, dissertation, University of Michigan, 2008

Articles available at http://www.veenstraconsulting.com/publications.php
Dissertation available at http://deepblue.lib.umich.edu/handle/2027.42/58391

The Higher the First Year Retention, the Higher the 6-year Graduation Rate

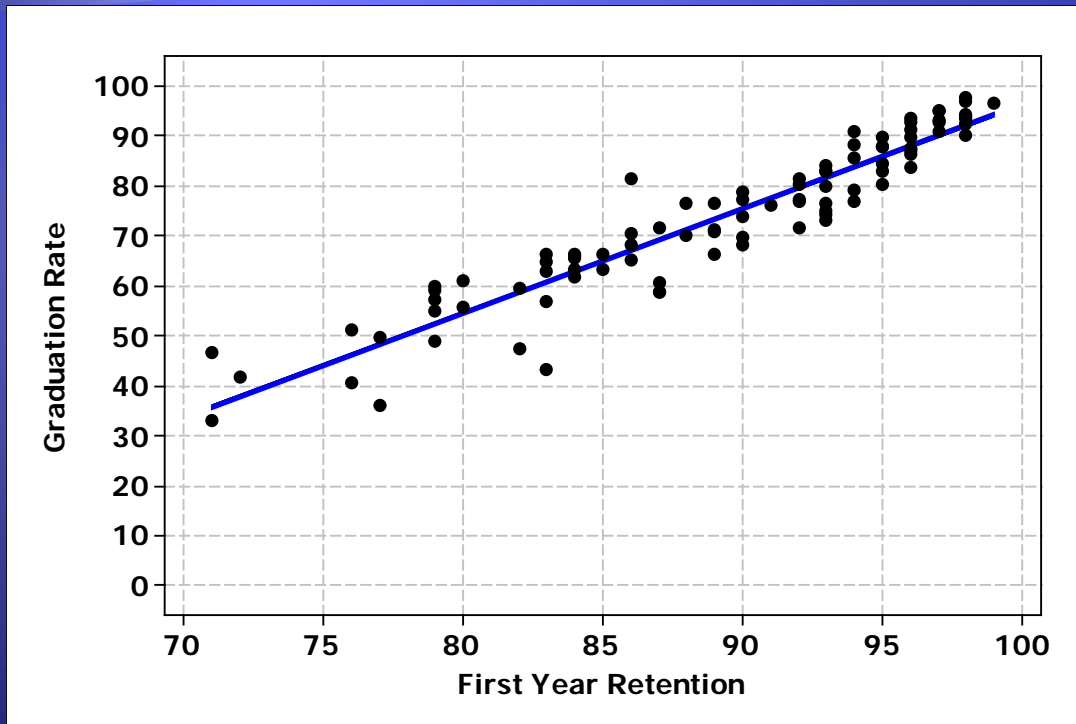Figure generated from the College Online Results Database at the Education Trust Website www.collegeresults.org Included universities are those with the Carnegie Classification of Research University-very high research activity. See *Modeling Freshman Engineering Success* 2008 for more detail.

Four Freshman Student Sectors:
No Significant Difference in First-Year University Retention

Great success with retention: Why? What are the pre-college predictors for first year GPA and retention, and especially for engineering?

2004& 2005 Freshman Classes

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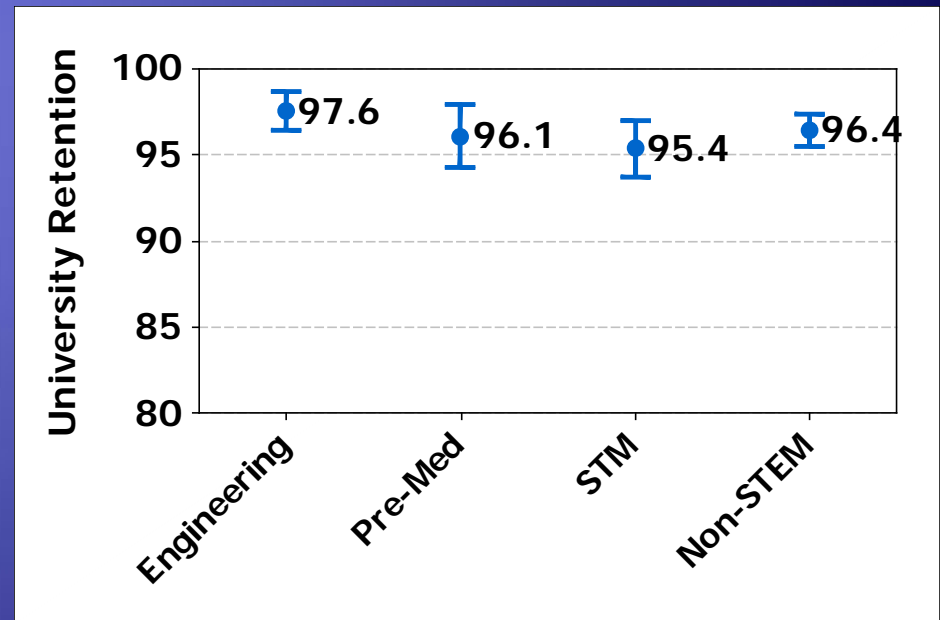
Source: *Modeling Freshman Engineering Success*

# 5-Step Assessment Process

1. Establish a Model for First-Year Success-included Nine pillars for student success

2. Identify CIRP and admissions variables for each pillar, including 51 CIRP variables

3. For each pillar conducted a factor analysis and developed 19 factors

4. Conduct regression analyses on First-Year GPA and First-Year retention on each sector

5. Make conclusions and improve strategies

Nine-pillar Framework for Freshman Retention Assessment
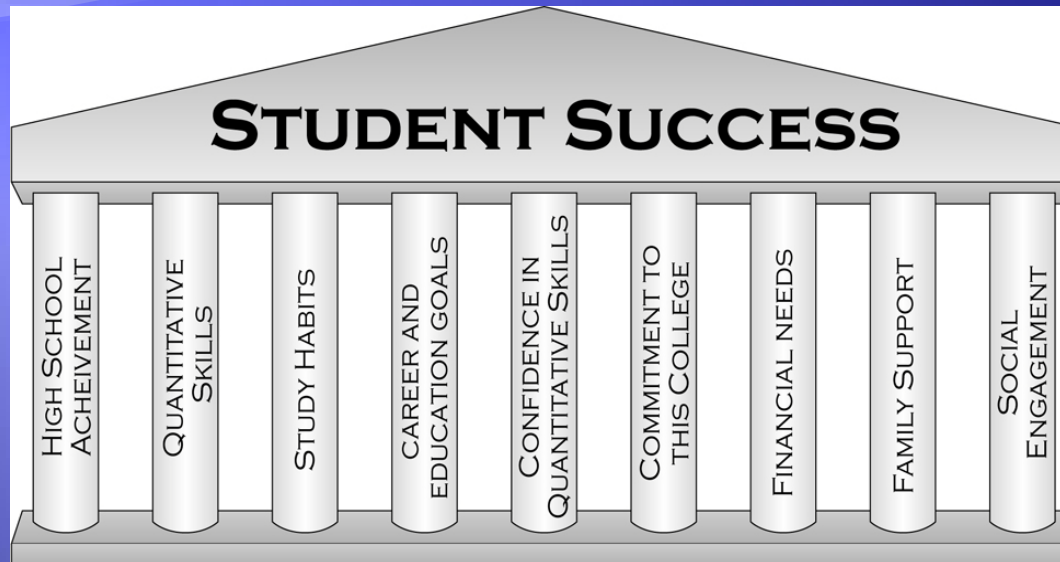
Based on research literature from higher education research and engineering education research

A Model for Freshman Engineering Retention ,
Advances in Engineering Education, http://advances.asee.org/

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Student Success Pillars

- High School Academic Achievement

- Quantitative Skills

- Study Habits

- Career and Educational Goals

- Confidence in Quantitative Skills

- Commitment to this College

- Financial Needs

- Family Support

- Social Engagement

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Predictors: Preparation

- High School Academic Achievement
  - High school GPA
  - High school class rank
  - ACT composite
  - Self-rating of academic ability
  - Self-rating of leadership ability
  - Self-rating of self-confidence (intellectual)

- Quantitative Skills
  - ACT math score
  - ACT science score
  - UM math placement test score
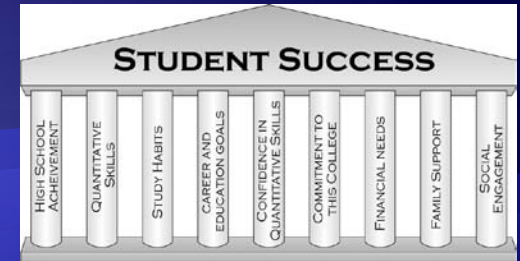 - UM chemistry placement test score

  Source: JEE 2008 paper

Predictor:
Confidence in Quantitative Skills

Self-rating of math skills

Self-rating of computer skills

(Engineering significantly higher than other sectors)

Predictor: Social Engagement

- Socializing

  Self-rating of social self-confidence

  Hours/week socializing

  Hours/week partying

  Chance will join social fraternity/sorority

- Activities

  Chance will participate in student clubs

  Chance will participate in a study abroad program

  Hours/week playing video/computer games

- Volunteer

  Hours/week in student clubs/groups

  Hours/week doing volunteer work

(Few significant differences between Engineering and other sectors, indicating engineering students are socially well-rounded)
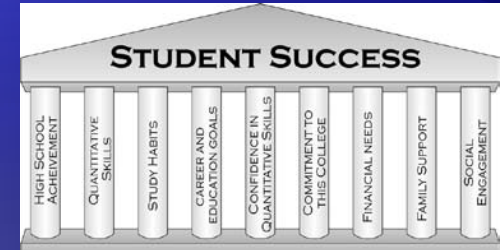
Predictors (P) of 1st-year GPA

Pillar with significant factor	Engin	Pre-Med	STM	Non-STEM
H.S. Academic Achievement	P	P	P	P
Quantitative Skills + Interaction	P			
Confidence in Quantitative Skills	P			
Career Goals	P			
Financial Needs			P	
Study Habits			P	
Social Engagement		P	P	P
Adjusted R2	0.38	0.15	0.27	0.26
Sample Size	184	100	145	206

See JEE article, 2008, Veenstra, Dey & Herrin for details   **P-significant at p<.05**

Predictors (P) of 1ˢᵗ year University Retention

Variable	Engin	Pre-Med	STM	Non-STEM
First Year GPA		**P**	**P**	
High School Rank	**P**			
Concern about Finances	**P**			
Sample size	705	433	626	1490

Based on 2004 and 2005 Freshman cohorts, University of Michigan
Source: Modeling Freshman Engineering Success , Chapter 7
http://deepblue.lib.umich.edu/handle/2027.42/58391

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Predictors of 1st year Engineering Retention (n= 694)

Engineering Retention is the percent of Freshmen matriculating in Engineering who returned to Engineering in the fall of the 2nd year.

Predictor	p-level
Self-Rating of Math Ability	0.001
HS Rank	0.007
Concern about Finances	0.007
Chance will Study Abroad	0.008

2004 & 2005 Freshman Classes at Michigan Engineering
Source: *Modeling Freshman Engineering Success*, p. 188

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Conclusions

- **No significant difference in retention rates**

- **Predictors for Engineering student success are different**

- **Non-Engineering STEM students modeled more like Non-STEM students for academic success**

- **No significant difference in ethnicity (URM vs. non-URM) or gender for GPA or retention for any sector , once model is taken into account**

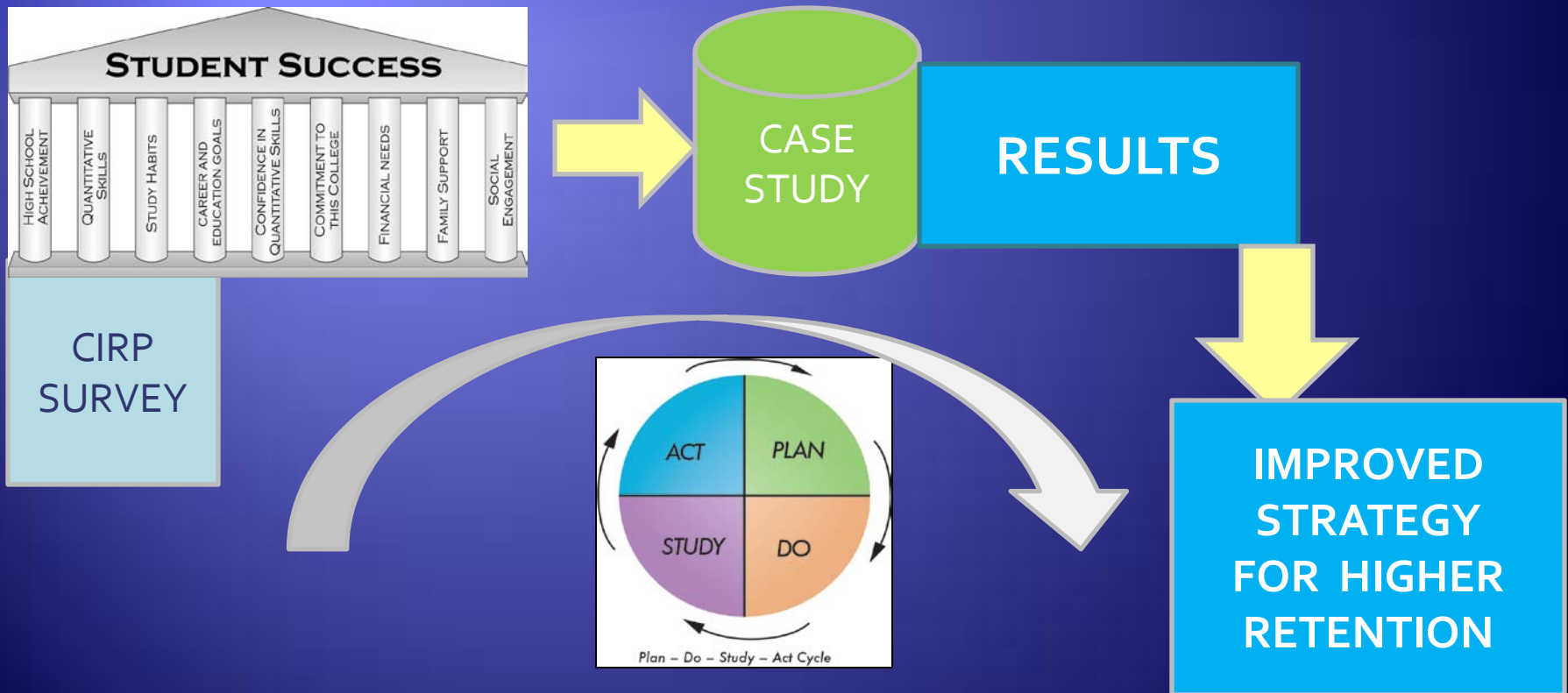Cindy Veenstra & Fernando Padro
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A Model that works for Engineering


- The CIRP Freshman Survey variables worked well for developing a statistical model for freshman engineering retention

- Since it is based on the CIRP Freshman Survey variables and common student performance measures, it is easily applied

- Institutional differences may exist

IR Strategy for Research to Practice For First-Year STEM Retention

STUDENT SUCCESS

HIGH SCHOOL ACHIEVEMENT | QUANTITATIVE SKILLS | STUDY HABITS | CAREER AND EDUCATION GOALS | CONFIDENCE IN QUANTITATIVE SKILLS | COMMITMENT TO THIS COLLEGE | FINANCIAL NEEDS | FAMILY SUPPORT | SOCIAL ENGAGEMENT

CIRP SURVEY

CASE STUDY

RESULTS

ACT | PLAN | STUDY | DO

Plan – Do – Study – Act Cycle

IMPROVED STRATEGY FOR HIGHER RETENTION

Diversity of STEM: All STEM Are Not Alike!

- Each STEM sector may have different needs and different student support issues

- Important to include rational STEM groupings in assessments
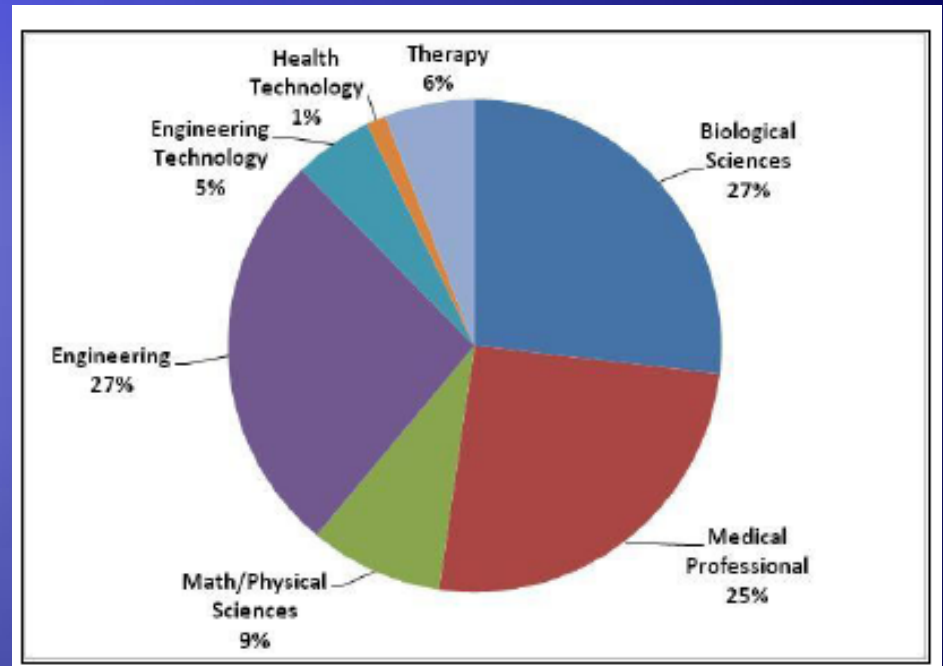
"The Diversity of STEM Majors", 2010, www.veenstraconsulting.com and "The American Freshmen National Norms", HERI, 2009.

Continuous Improvement

Would the STEM graduation rate increase if we systematically practiced Plan-Do-Study-Act Continuous Improvement at all universities?

What are some ideas we should be considering to improve STEM graduation rates?

Plan – Do – Study – Act Cycle

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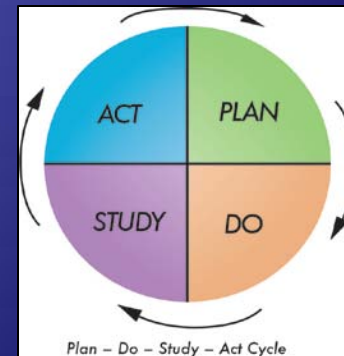
Using CIRP Surveys to Assess and Enhance the Student Experience:

Focus on the Core Curriculum at Butler University

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Butler University

At the Core of Our Changing World

Students *build the capacity to think critically* **and** *develop enthusiasm for the life of the mind*

Students *gain both depth and breadth of knowledge and experience*
on their way to becoming a liberally-educated person

Students to *think about cultural diversity* **and the ways they are** *members of both this community and the world*

Students *develop the capacity for clear, effective, and critical communication*

Students *come to appreciate beauty* **in disciplines focused on nature, society, and aesthetics**

Students *develop both the capacity and the desire to continue learning*

Overview of Butler's Core Curriculum

- **The common Core elements:**

  * The First Year Seminar: Self, Community, and World (6 credit hours)
  * The Sophomore Requirement: Global and Historical Studies (6 credit hours)

- **The general Core elements:**

  * Analytic Reasoning (3 credit hours)
  * The Natural World (5 credit hours; includes lab component)
  * Perspectives in the Creative Arts (3 credit hours)
  * Physical Well-Being (1 credit hour)
  * The Social World (3 credit hours)
  * Texts and Ideas (3 credit hours)

- **In addition to the common and general Core elements:**

  * Butler Cultural Requirement (8 events)
  * Indianapolis Community Requirement (1 course)
  * Speaking Across the Curriculum Requirement (1 course)
  *Writing Across the Curriculum Requirement (1 course)

At the Core of Our Changing World

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Analytic Reasoning (Computer Science, Mathematics, Philosophy)

Learning Objectives:
- To develop capacities for quantitative and analytic reasoning.
- To understand the centrality of these capacities to the natural and social sciences.
- To recognize the applications of such capacities to matters of personal and public life.

Codes & Secret Messages   *Win, Lose or Draw*   *Robot Programming*

Physical Well Being (Physical Education, Dance)

Learning Objectives
- To develop life-long habits of good health and physical activity.
- To increase awareness of the centrality of health and wellness for pursuit of a good life.

Israeli Dancing   *T'ai Chi*   *Wagging, Walking, and Wellness*   *Race, Ethnicity, and Society*

The Natural World (Biology, Chemistry, Physics, Psychology)

Learning Objectives
- To gain awareness of some significant scientific theories and achievements, and to recognize how they are related both to other areas of science and to our understanding of broader societal issues.
- To develop an understanding of the methods of natural science and a capacity to reason scientifically.
- To experience first-hand the scientific process method through discovery-based learning.

Biology and Society   *Food: Pasture, Table, Body &Mind*   *The World of Plants*   *Genetics & Evolution*

Perspectives in the Creative Arts (Art History, English, Music)

Learning Objectives

•To develop cognitive and affective appreciation for the process and products of artistic creation.

•To participate actively in the creation of an artistic product.

•To reflect on the nature and sources of aesthetic value.

•To develop habits of participation in artistic and cultural events that will lead to lifelong engagement within the creative arts.

Introduction to Visual Art   *Latin Dances, African Roots*   *Music in Action*   *Aesthetics and Design*

The Social World (Economics, Psychology, Sociology, International Studies, Communication Studies)

Learning Objectives

•To study selected questions about human beings and the social, cultural, economic and political world in which they are embedded.

•To develop an understanding of the variety of quantitative and qualitative research methods social scientists use to study the social world.

•To develop the ability to discern the social, scientific and ethical dimensions of issues in the social world, and to understand the interaction between a society's values and its definition of social problems.

Intersections of Identity   *The Mexican Revolution*

Texts & Ideas (English, History, Education, Pharmacy)

Learning Objectives

•To engage in reading, writing and discussion about important ideas drawn from the study of important texts in a variety of areas - including, among others, literary texts, dramatic texts, sacred texts, historical texts, philosophical texts and scientific texts.

•To develop capacities for argument, interpretation and aesthetic appreciation through engagement with these texts and ideas.
        .

Roman Perspectives   *Knowledge and Reality*   *Ethics, The Good Life,& Society*

Given the structure of our new Core curriculum, what are our challenges?

1. Assessment of previous Core curriculum is lacking

2. We are starting from scratch:
> -- rubrics
> -- timing and scheduling of assessments
> -- discussion of what counts as evidence
> -- determination of what is student learning in these areas

3. We are assessing a variety of courses taught from a variety of disciplines all within the same area in our Core.

> **e.g.: Analytic Reasoning: Computer Science, Mathematics, Philosophy**

> Learning Objectives:
> * To develop capacities for quantitative and analytic reasoning.
> * To understand the centrality of these capacities to the natural and social sciences.
> * To recognize the applications of such capacities to matters of personal and public life.

BUTLER UNIVERSITY

Given the structure of our new Core curriculum, what are our opportunities?

1. As a University, we have University Learning Outcomes.

2. As a Core curriculum, we have student learning objectives for each areas.

3. As a faculty, we have been submitting assessment reports annually for the last several years—so, there is a knowledge of assessment on campus.

4. We can create and build a system that works for this Core at this time with this faculty

5. **We have data! that we can use to compare and triangulate the assessment that is occurring in our Core classes, namely, the various surveys of students—CIRP, NSSE, alumni—that we have administered for years.**

   CIRP Freshman Survey since 1989
   NSSE since 2000
   Alumni surveys

What do we have and what are we using and what do we know?

CIRP

Academic Self-Concept: Butler students assessed themselves higher in academic ability, drive to achieve, and mathematical ability than students who attended comparable private universities.

Pluralistic Orientation: Butler students scored lower in their perceived abilities to work cooperatively with diverse people, to be tolerant of others with different beliefs, to be open to having their views challenged, to discuss and negotiate controversial issues, and to see the world from someone else's perspective.

Wellness Perspectives: Butler students more frequently felt overwhelmed by all they had to do and felt depressed as compared to students in peer institutions. Contrastingly, a higher rate of Butler students reported that their physical health was above average or better.

Alumni surveys

Our lowest scoring items on 2008 survey:

Enhanced understanding of international issues
Increased awareness of political and social issue
Appreciation of different cultures
Cultivated responsibility as a citizen
Understood one's interaction with the environment

Rubrics for each of the our Core areas

Focus On: First Year Seminar

Learning Objectives

•To reflect on "big questions" about themselves, their community and their world.

•To develop the capacity to read and think critically.

•To develop the capacity to write clear and persuasive expository and argumentative essays, with an emphasis on thesis formation and development.

•To develop the capacity for effective oral communication and gain an understanding of basic principles of oral communication as they apply to discussion.

•To understand the liberal arts as a vital and evolving tradition and to see themselves as agents within that tradition.

•To develop capacities for careful and open reflection on questions of values and norms.

•To develop the ability to carry out research for the purpose of inquiry and to support claims.

CIRP "Habits of Mind"

•Ask questions in class

•Support your opinions with a logical argument

•Seek solutions to problems and explain them to others

•Revise your papers to improve your writing

•Evaluate the quality and reliability of information you received

•Take a risk because you felt you had more to gain

•Seek alternate solutions to a problem

•Look up scientific research articles and resources

•Explore topics on your own even though it was not required for a class

•Accept failure as part of the learning process

•Seek feedback on your academic work

Focus On: Indianapolis Community Requirement

Student Learning Objectives

* To have an active learning experience that integrates classroom knowledge with activities in the Indianapolis community.
* To use an experience in Indianapolis to further understanding of the nature of community and the relation to self.
* To assist the University in furthering its commitment expressed in its mission statement of "providing intellectual, cultural, and artistic opportunities and leadership to Indianapolis and the surrounding areas."

Specific rubrics for the experiences

+

CIRP: For the activities listed below, indicate which ones you did during the past year (frequently, occasionally, not at all)
Performed volunteer work
Performed community service as part of a class

NSSE: In your experience at your institution during the current school year, about how often have you done each of the following?
1k—Participated in a community-based project (service learning) as part of a regular course

Which of the following have you done or do you plan to do before you graduate from your institution?
7b—Community service or volunteer work

+

Alumni Survey
Enhanced understanding of international issues
Increased awareness of political and social issue
Appreciation of different cultures
Cultivated responsibility as a citizen
Understood one's interaction with the environment

Next Steps for Butler

1. Create rubrics for the areas of the Core

2. Develop pre- and post-tests for some of the areas, First Year Seminar, for example

3. Agree to three-year assessment cycle of the areas

4. Once we begin assessing our Core, create database of specific CIRP and NSSE results that tie in most directly to our Core curriculum so that we can examine the Core's effectiveness over time

5. Revise our Alumni Survey so that it can better reflect specific outcomes associated with our Core curriculum

6. Revise, redefine, rework, rethink

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