Focus on the "how," not the "what": Using research to inform teaching

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Session Outline

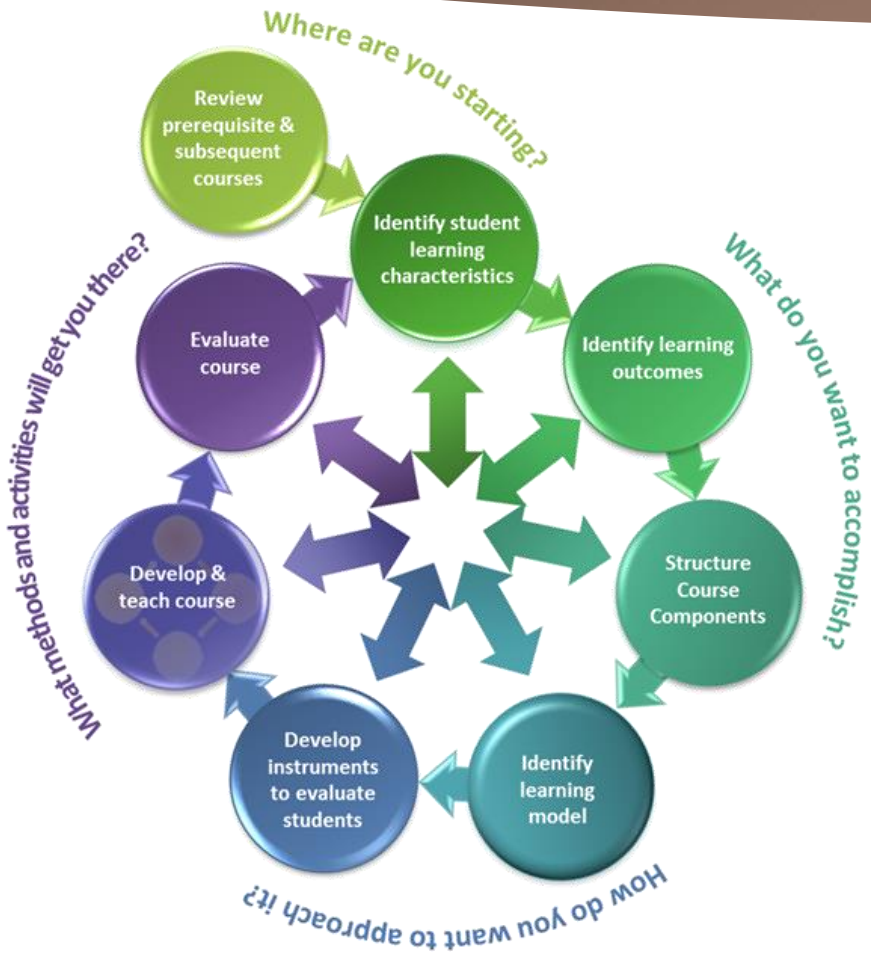
- Background on Course Transformation Program
- Data Collection
- Scholarship Examples
- Brainstorming & Discussion

Course Transformation

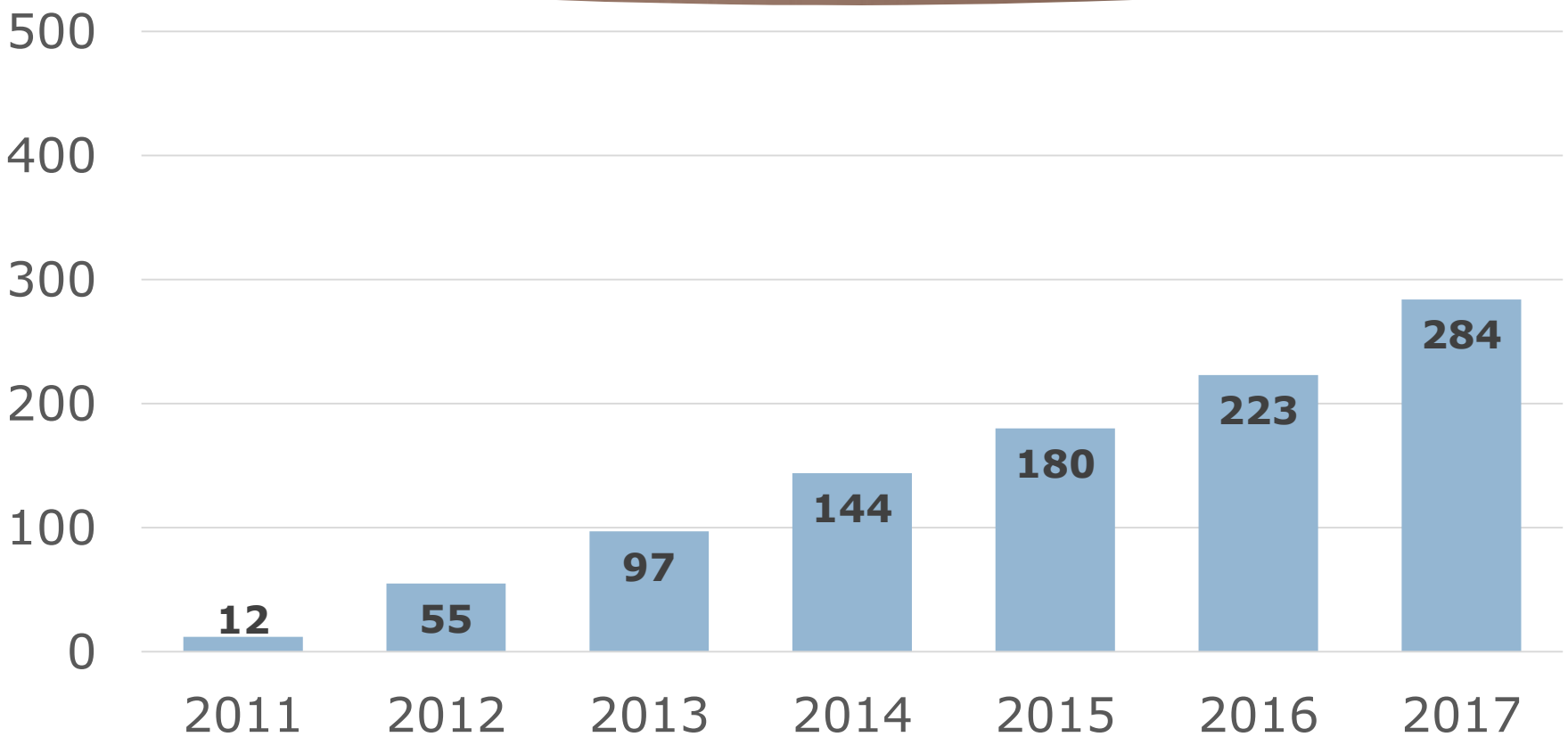
- Instruction Matters: Purdue Academic Course Transformation (IMPACT) Program
  - Semester-long course redesign program
  - Theoretical framework based on

    Self-Determination Theory

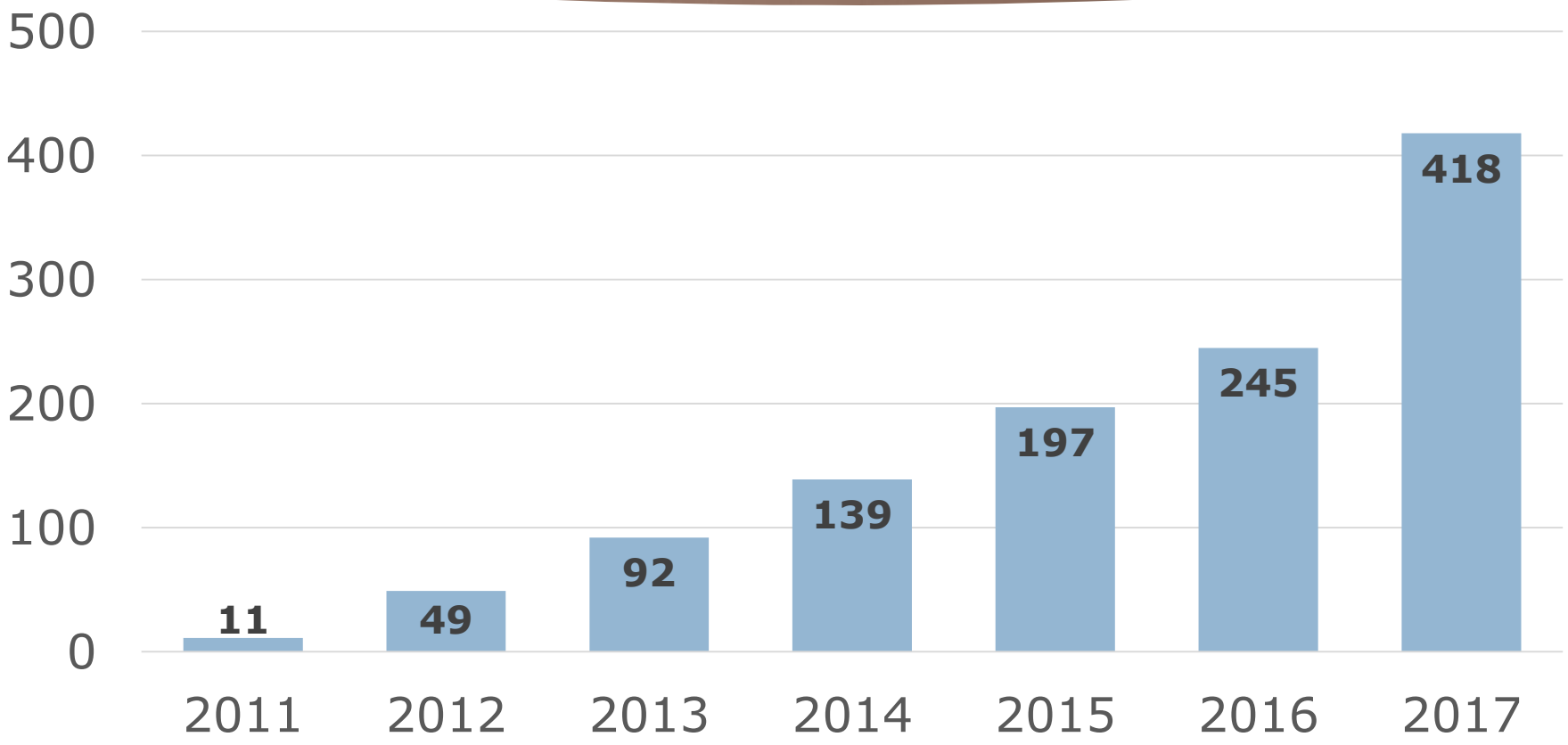
IMPACT Faculty Learning Community



IMPACT Scope – Faculty Fellows



IMPACT Scope – Course Transformations



Self-Determination Theory - Motivation

Adapted from Deci & Ryan (2000)

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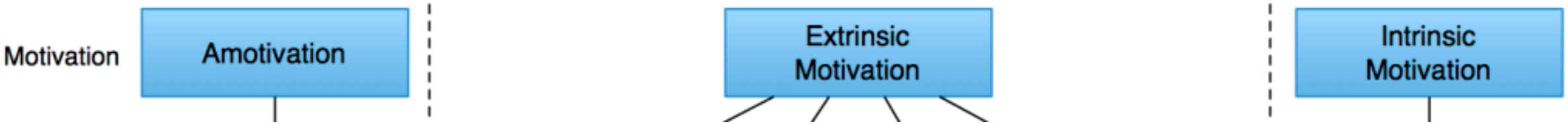

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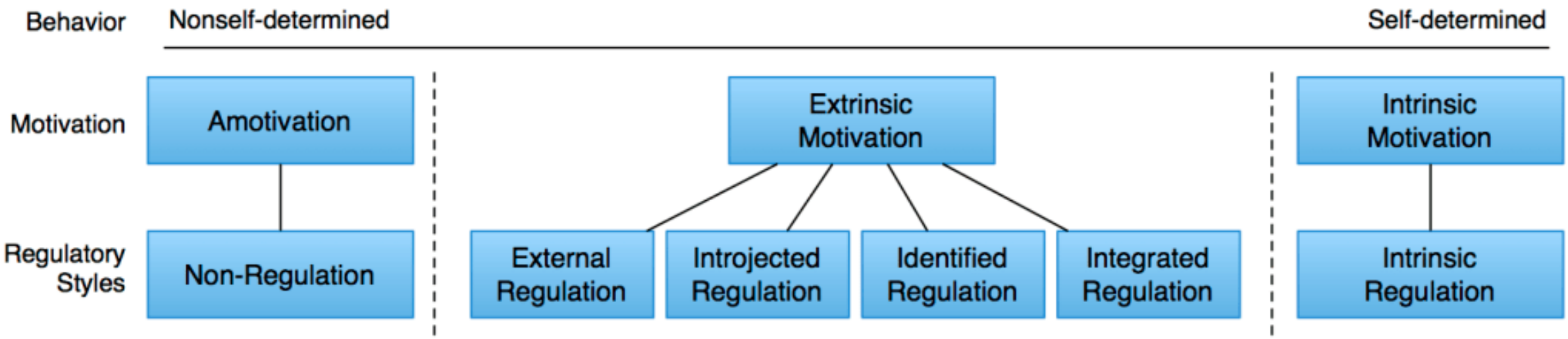
Self-Determination Theory - Motivation



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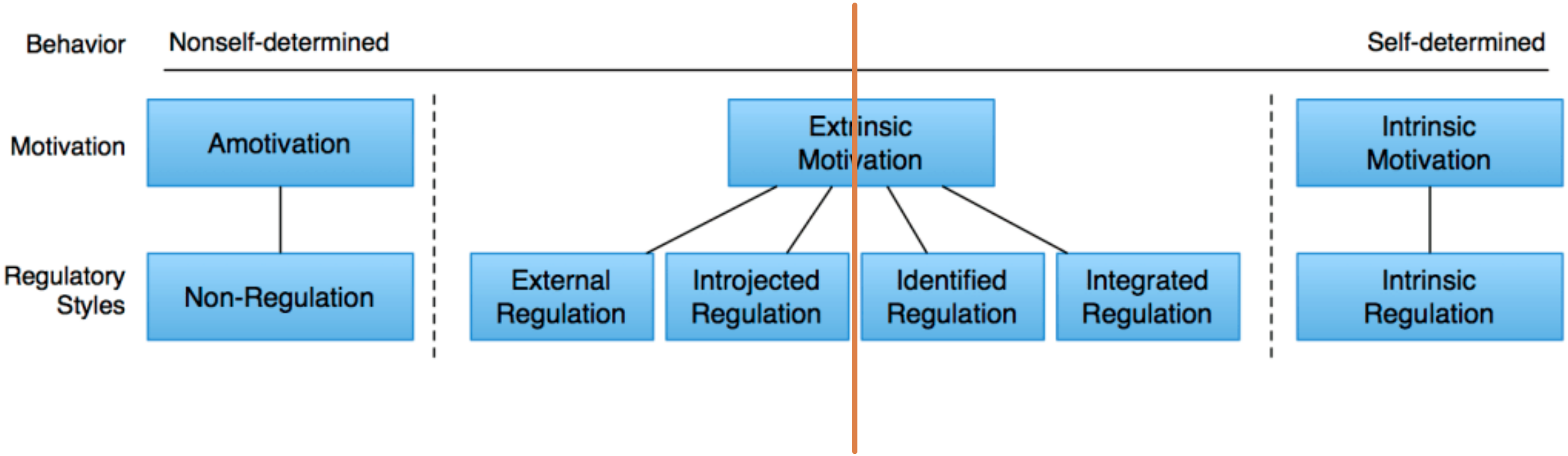

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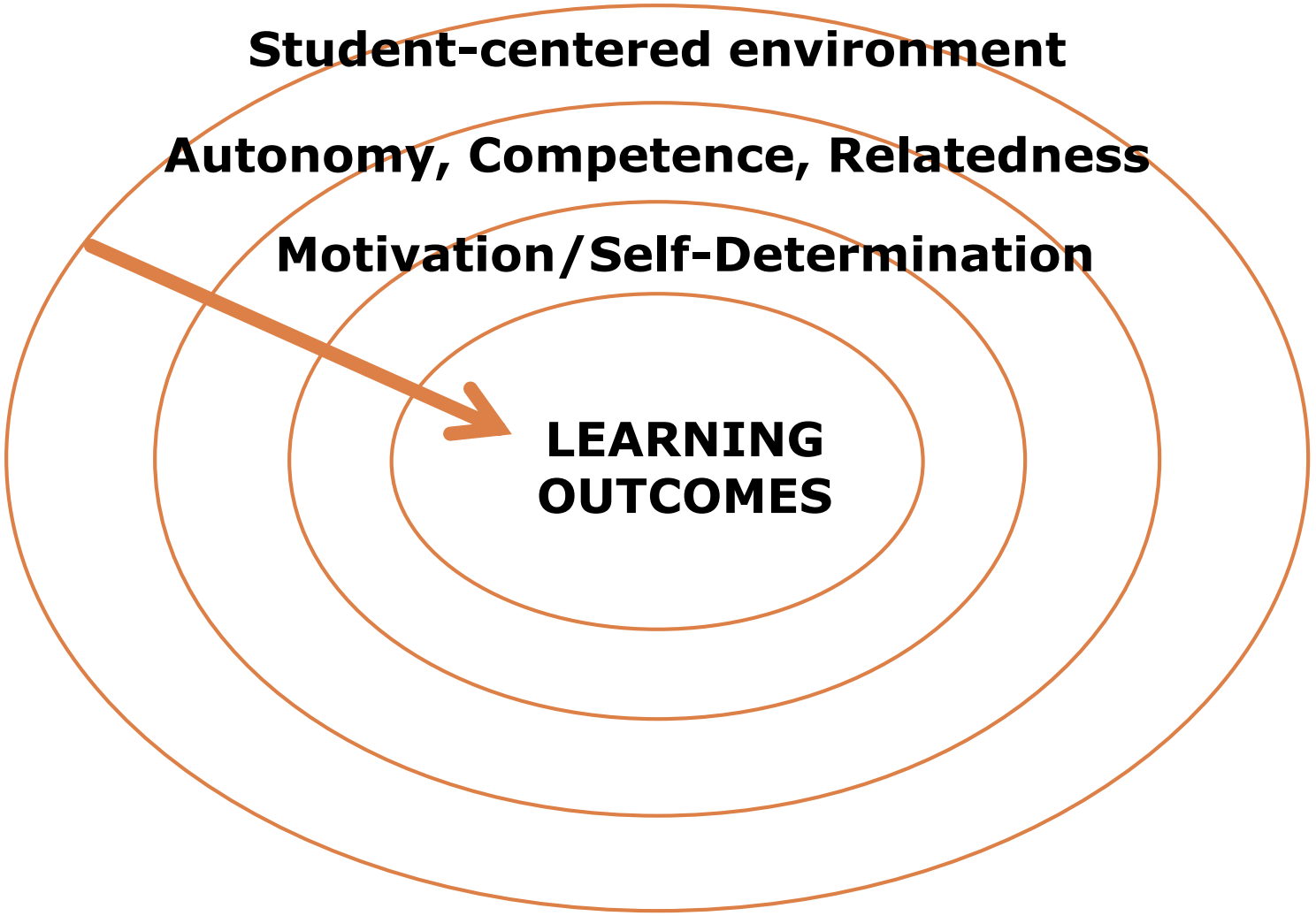
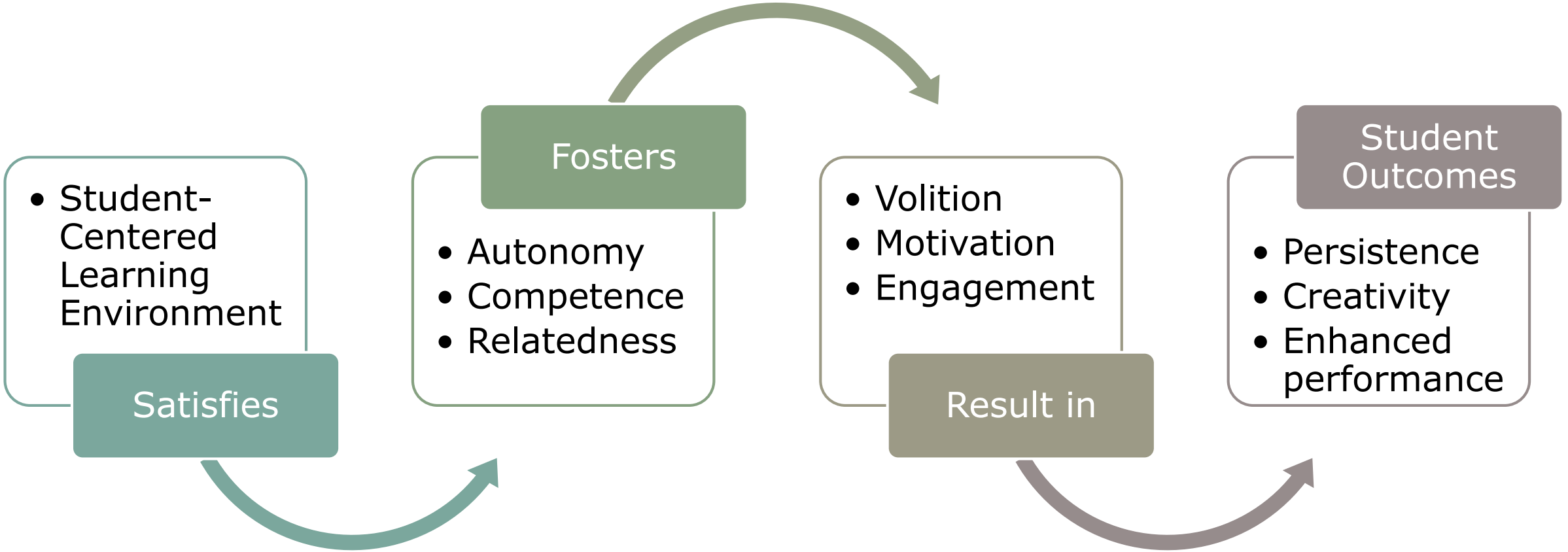
Impact on Student-Learning



Self-Determination Theory



Adapted from Eunbae Lee, Georgia Southern University

Impact Data Collection

Faculty Data

- Redesign Goal
- Assessment Map
- Course Gradebook
- Faculty Perceptions
- "Dashboard" Survey

Student Data

- Student Perceptions Survey
- Course Evaluations

Registrar Data

- Student Demographics
- Course Grades
- Student Test Scores (e.g. SAT, ACT, TOEFL)

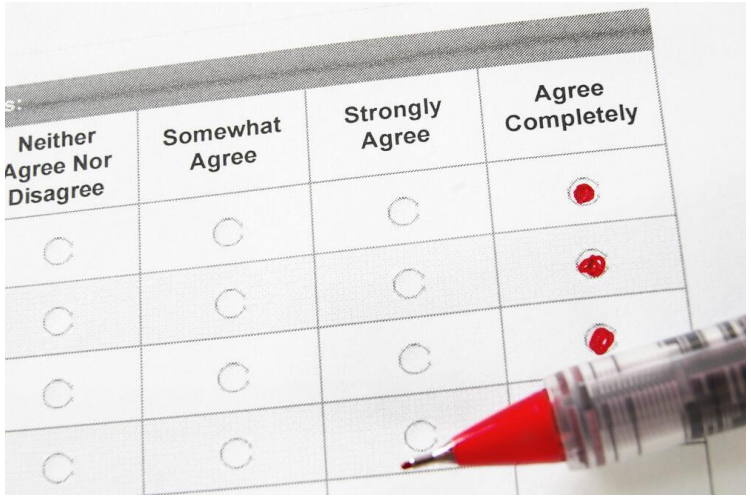
”Dashboard” Survey

- Course Structure
- Pedagogy
- Assessment Techniques
- Learning Technologies

hotseat

Student Perceptions Survey

- Learning Climate Questionnaire
- Situational Motivation Scale
- Basic Psychological Needs Scale
- Perceived Knowledge Transfer Scale



Course Evaluation Data

- Overall Course Rating
- Overall Instructor Rating
- Student Assessments of Learning Gains

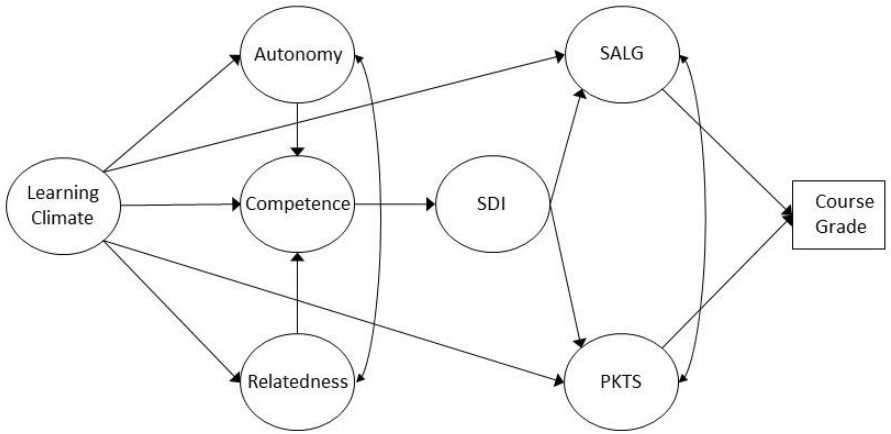
Registrar Data

- Student Demographics
- Course Grades
- Student Test Scores (e.g. SAT, ACT, TOEFL)

Types of SoTL Projects

Large-Scale Projects

- Testing a theoretical model of SDT & student outcomes
- Examining the role of gender in theories of learning and motivation
- Assessing course redesign models across a large variety of disciplines



Types of SoTL Projects

- Individual Course Projects
  - Evaluating a course redesign pre-post
  - Comparing sections of a single course with different teaching methods
  - Assessing student gains across the semester

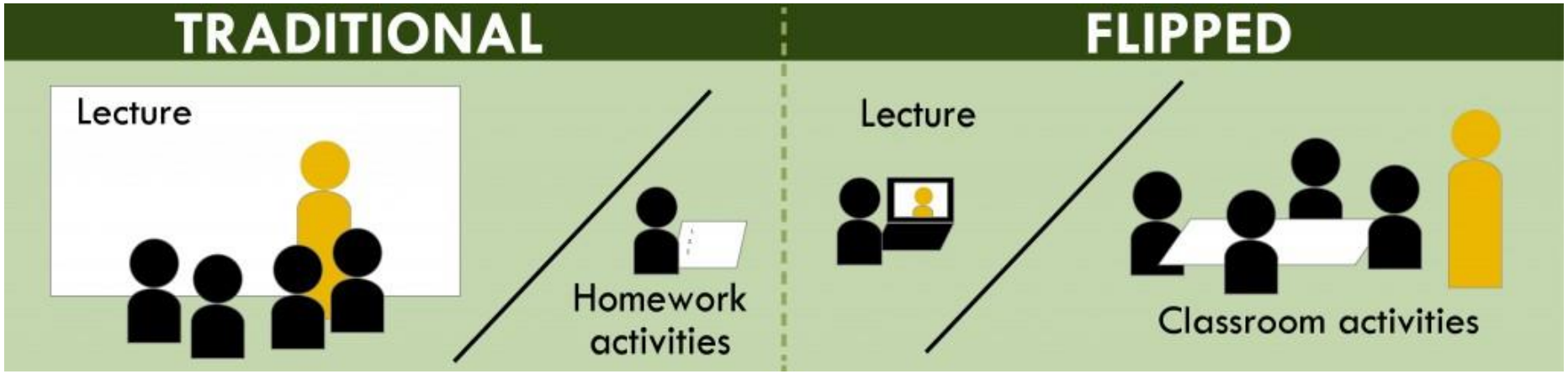
Research Designs	
Pre-IMPACT	Post-IMPACT
Control	Intervention
Start of Semester	End of Semester

Large Scale Project Example

"WHAT" VS. "HOW": EXAMINING THE EFFECTS OF LEARNING CLIMATE VERSUS INSTRUCTION MODEL

Course Redesign Approach: What is the "right" instruction model?

Supplemental → Replacement → Emporium → Fully Online → Buffet



Course Redesign Approach: There is no "right" instruction model

Contact hours

VS

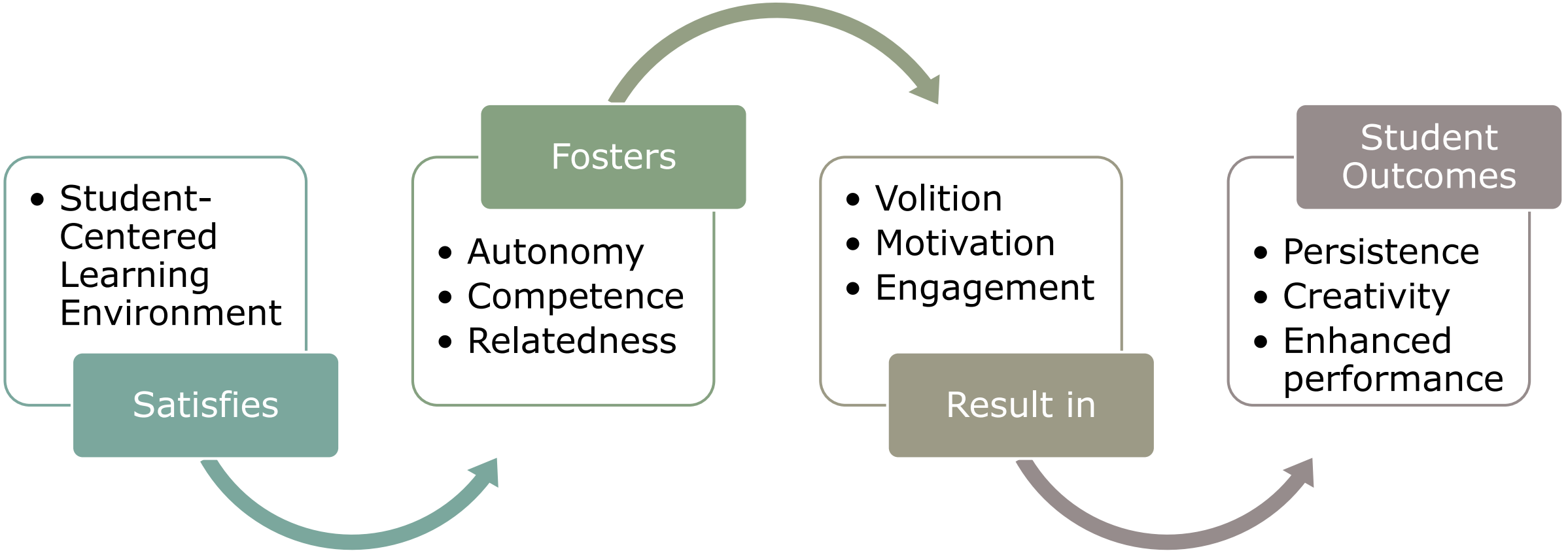
(Riffell & Sibley, 2005; Twigg, 2003; Willson, 2008; Yudko, Hirokawa, & Chi, 2006)

Active Learning

VS

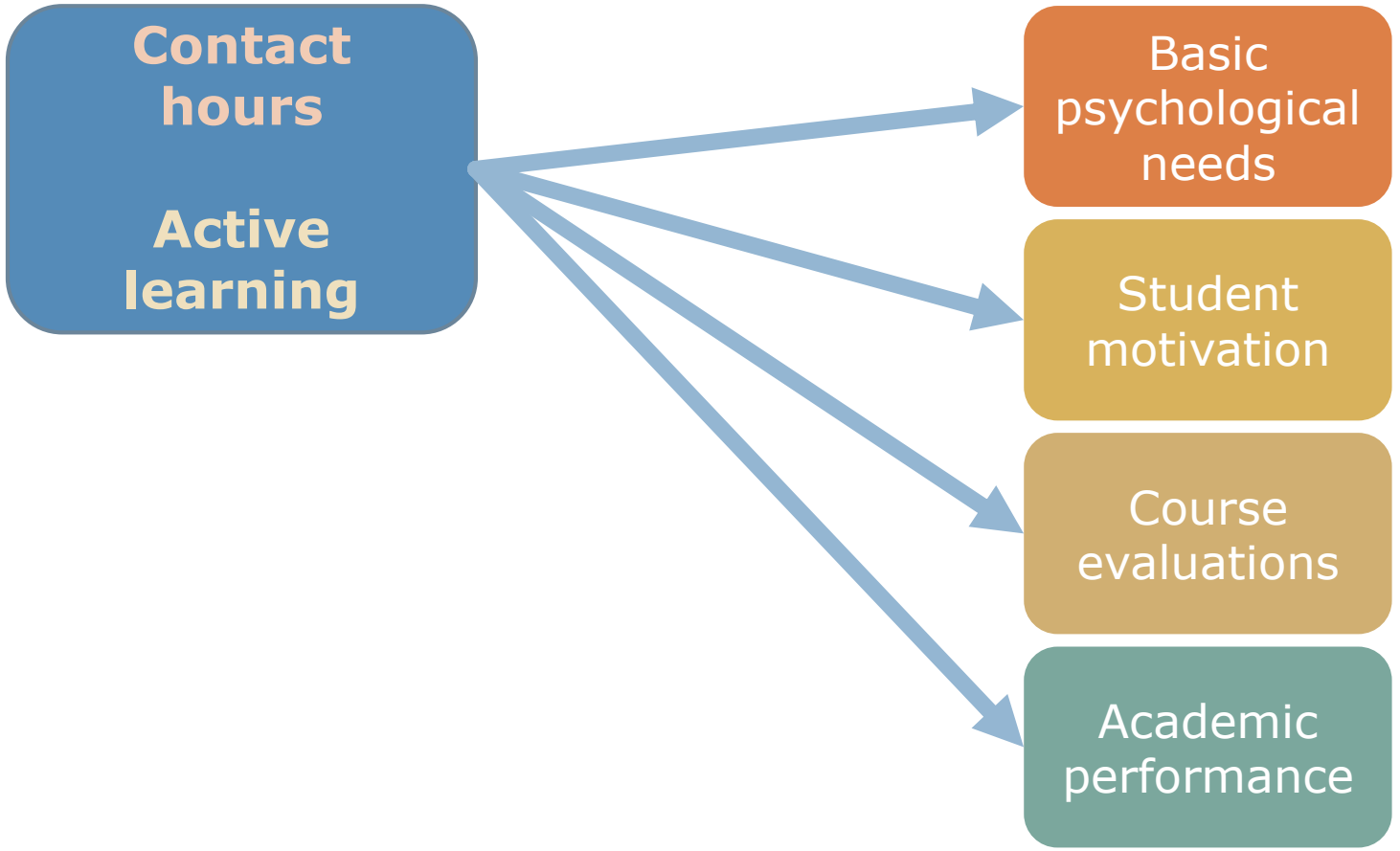
(Felder & Brent, 2016; Freedman, 2014; Seidel & Tanner, 2013; Strayer, 2012)

Course Redesign Approach: Focus on the "how" instead of the "what"



Adapted from Eunbae Lee, Georgia Southern University

Purpose of our research



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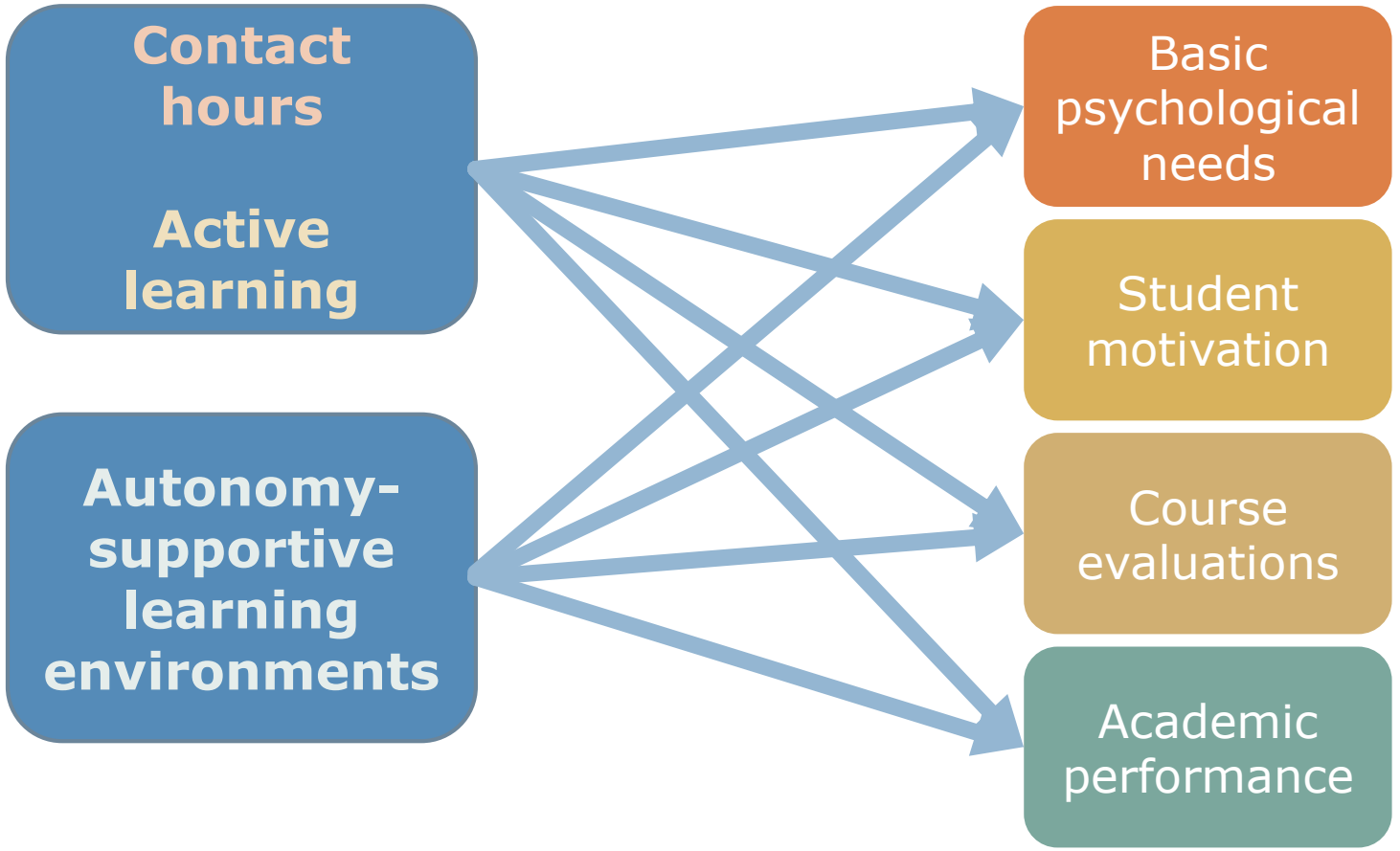
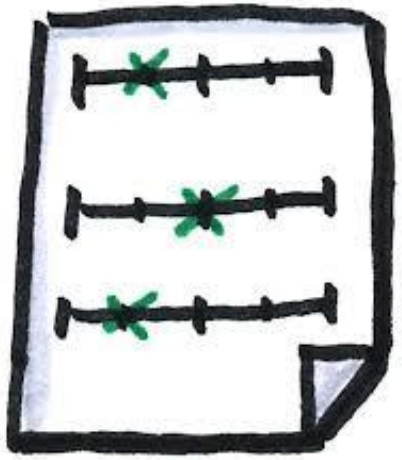


Methods

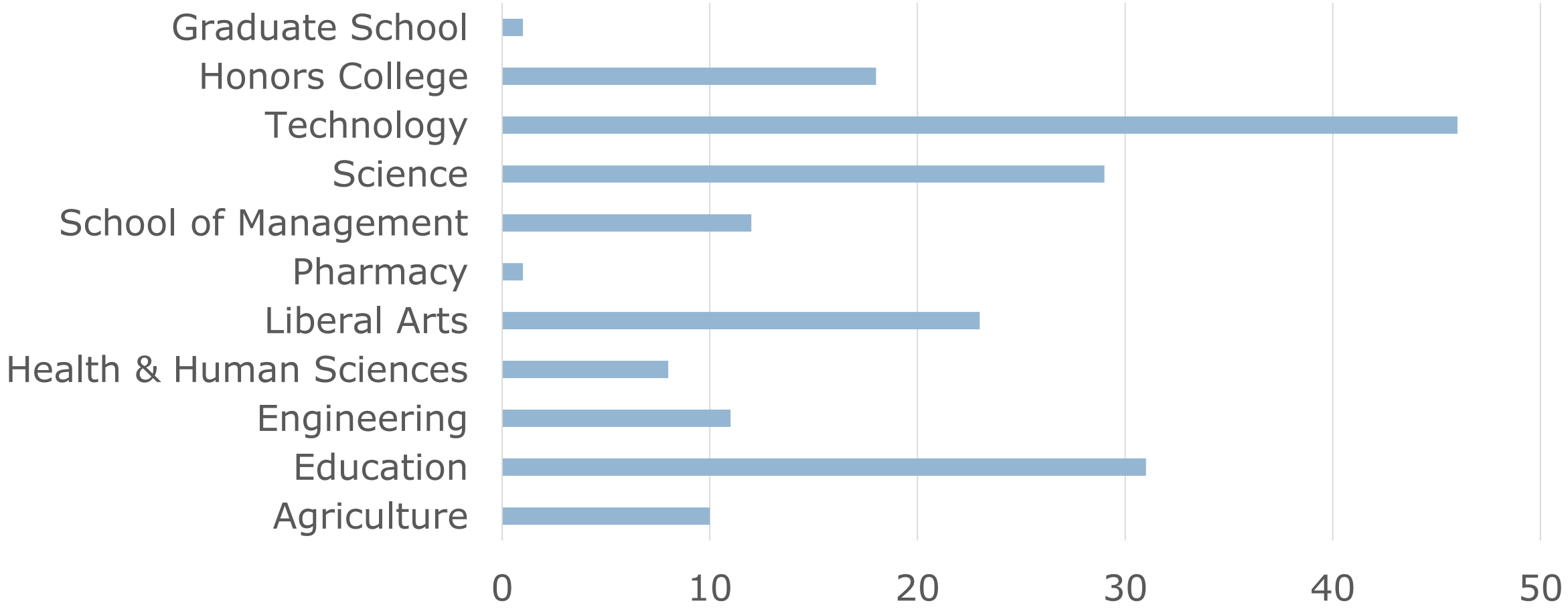
Data Collection

- Data were collected from students, faculty and the registrar across three semesters.

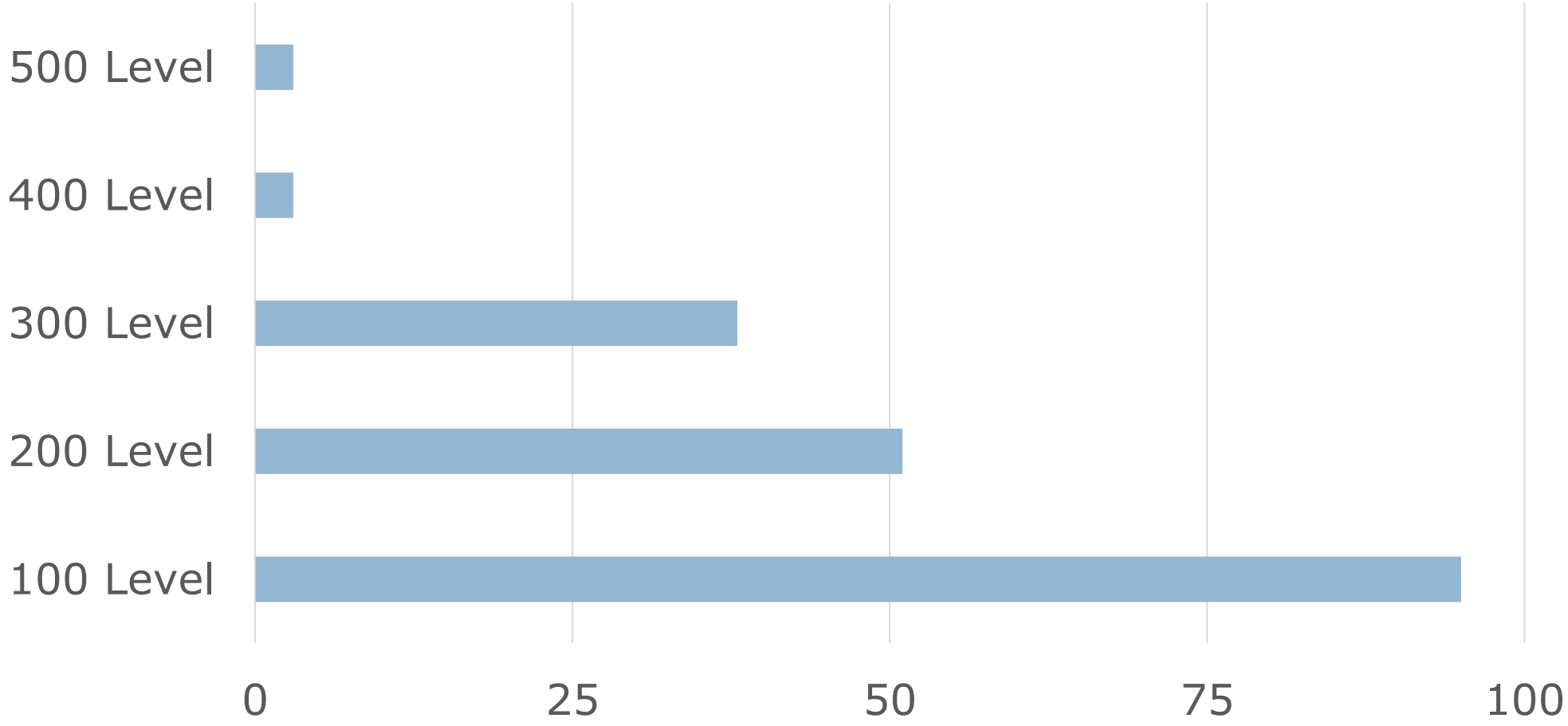


- 10,165 students from 190 course sections participated in the study.

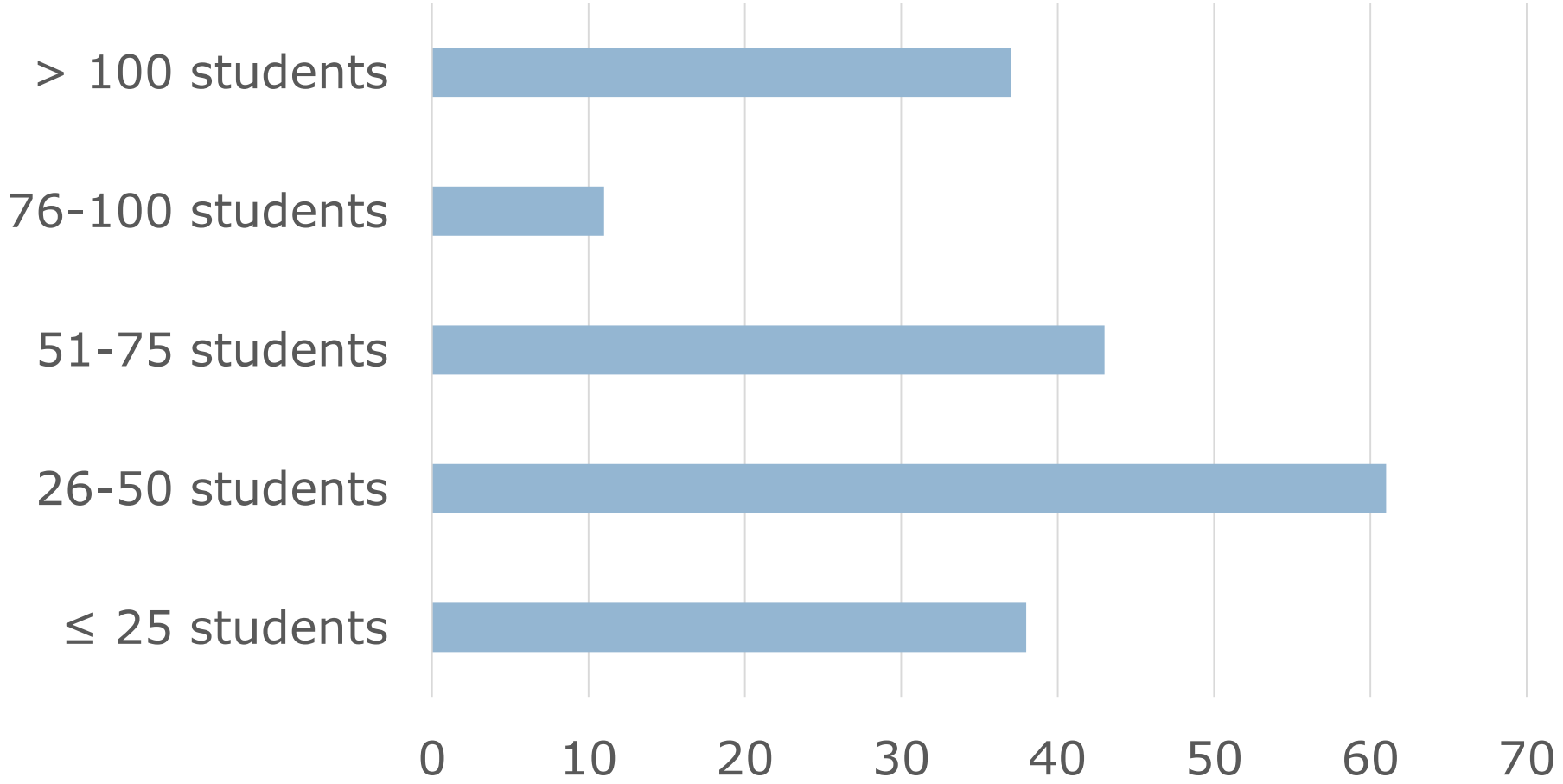
Course Characteristics - Colleges



Course Characteristics - Level



Course Characteristics – Class Size



Participants

Demographics	
Gender	45% Female, 55% Male
Age	18 to 55 (M = 19.82, SD = 2.34)
Ethnicity	66% White, 18% International, 5% Asian, 3% Black/African-American, 4% Latino/Hispanic, 4% Other
Underrepresented Minority Status	9.0% underrepresented minority
Class Level	32% Freshmen, 32% Sophomores, 20% Juniors, 14% Seniors, 2% Graduate

Study Variables

Independent Variables

- ”What”
  - Contact hours
  - Active learning
- “How”
  - Learning environment

Dependent Variables

- Basic psychological needs satisfaction
- Self-determined motivation
- Course evaluations
- Student Assessment of Learning Gains
- Course grades

Results

Basic Psychological Needs: Autonomy

Dependent Variable	Independent Variable	Standardized Coefficient	Model Statistics		
			F	p	R^2
Autonomy	Contact hours	.084**	381.86	< .001	.16
	Active learning	.068**			
	Learning environment	.388**			

Basic Psychological Needs: Competence

Dependent Variable	**Independent Variable**	**Standardized Coefficient**	**Model Statistics**		
			F	p	R^2
Competence	Contact hours	.077**	214.36	< .001	.10
	Active learning	.003			
	Learning environment	.310**			

Basic Psychological Needs: Relatedness

Dependent Variable	Independent Variable	Standardized Coefficient	Model Statistics		
			F	p	R^2
Relatedness	Contact hours	.070**	159.43	< .001	.08
	Active learning	.133**			
	Learning environment	.247**			

Motivation: Self-Determination Index

Dependent Variable	**Independent Variable**	**Standardized Coefficient**	**Model Statistics**		
			F	p	R^2
Self-Determination Index	Contact hours	.188**	220.35	< .001	.10
	Active learning	.000			
	Learning environment	.274**			

Course Evaluations: Course Rating

Dependent Variable	**Independent Variable**	**Standardized Coefficient**	**Model Statistics**		
			F	p	R^2
Course Rating	Contact hours	.198**	416.99	< .001	.14
	Active learning	-.039**			
	Learning environment	.324**			

Course Evaluations: Instructor Rating

Dependent Variable	**Independent Variable**	**Standardized Coefficient**	**Model Statistics**		
			F	p	R^2
Instructor Rating	Contact hours	.005	592.80	< .001	.19
	Active learning	-.036**			
	Learning environment	.435**			

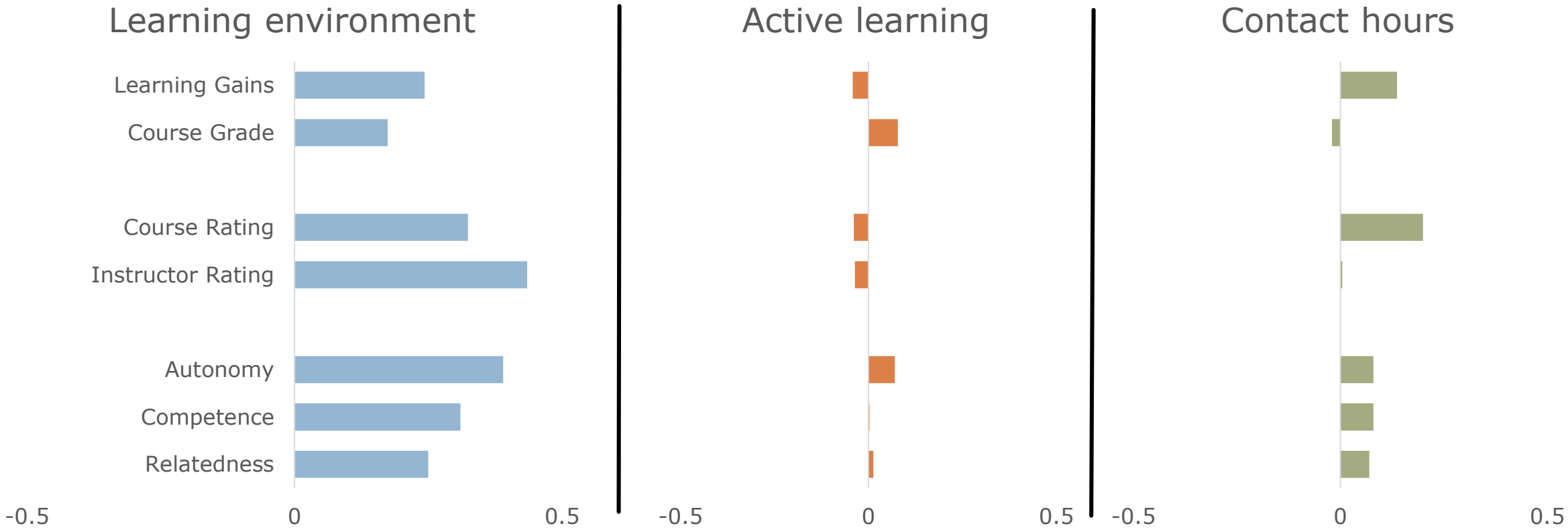
Student Assessment of Learning Gains

Dependent Variable	**Independent Variable**	**Standardized Coefficient**	**Model Statistics**		
			F	p	R^2
Student Assessment of Learning Gains	Contact hours	.137**	200.35	< .001	.08
	Active learning	-.042**			
	Learning environment	.243**			

Academic Achievement: Course Grade

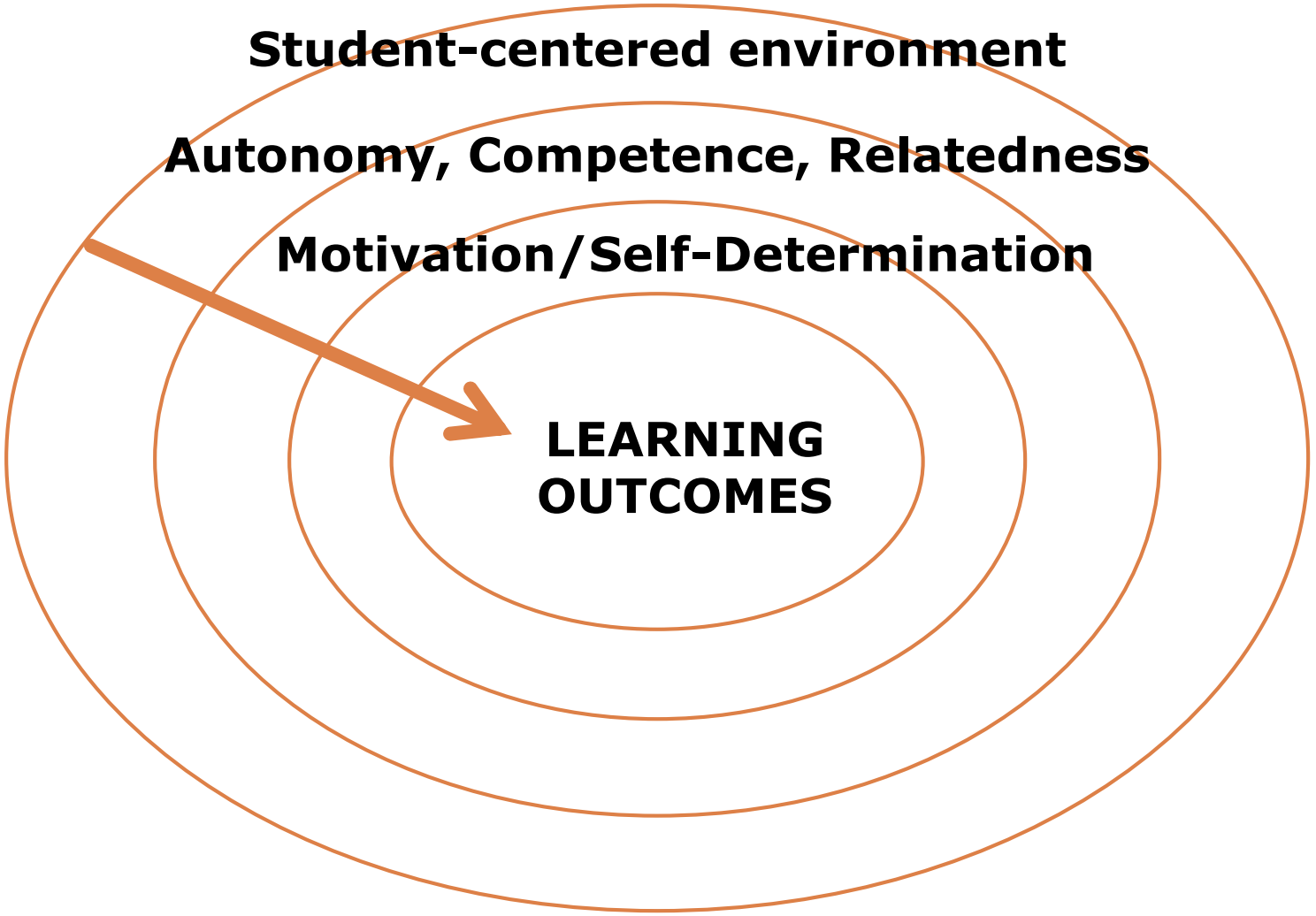
Dependent Variable	**Independent Variable**	**Standardized Coefficient**	**Model Statistics**		
			F	p	R^2
Course Grade	Contact hours	-.020*	207.72	< .001	.04
	Active learning	.078**			
	Learning environment	.174**			

Learning environment had the greatest positive influence on all variables, with moderate to large effect sizes.



Implications

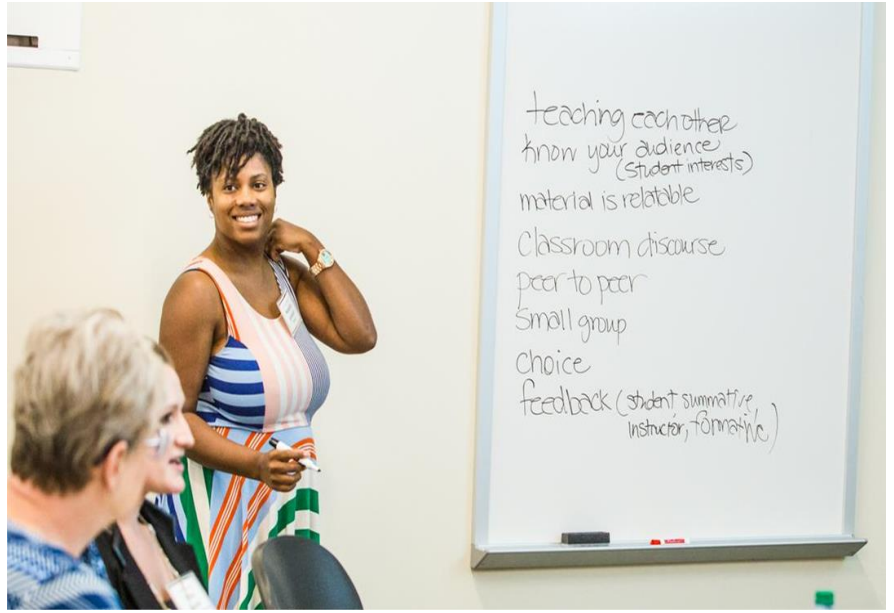
Impact on Student-Learning



Making your classroom student-centered

Fostering Autonomy:

- Give students a voice in classroom policy
- Provide options on assignments
- Explain rationale for using active learning on first day of class



Making your classroom student-centered

Fostering Competence:

- Low and high-stakes assessments that require reflection
- Provide feedback to all students, frequently
- Describe how learning is assessed, use rubrics

Making your classroom student-centered

Fostering Relatedness:

- Include get-to-know-you activities
- Share personal anecdotes
- Encourage students to talk to each other, not just the instructor

Future Directions

Interviews:
Uncover strategies from faculty who were rated high on learning environment

Student reports:
Collect student reports on face-to-face class time and amount of active learning

Course observations:
Verify student and instructor reports

Individual Course Project

REDESIGN OF AN INTRODUCTORY MACROECONOMIC COURSE TO EMPHASIZE HIGHER-ORDER LEARNING

Economics Course

- Mostly First Years and Sophomores
- Face to face enrollment 250 to 350 each semester
- Satisfies a social science requirement for most majors on campus
- IMPACT redesign for Fall 2013

IMPACT Epiphany

- Don’t ask what you want your students to *know* after taking your course, ask what you want them to *be able to do*.

Learning Outcomes Before IMPACT

- You will *learn* about the causes of inflation and unemployment, why economies grow or decline, and what government policy can (and cannot) do to help.
- You'll *learn* about the history of how we've tried to keep the economy stable and growing.
- You'll *learn* about the effects of war on the economy.
- You'll *learn* how the emerging global economy affects incomes, prices and your job prospects here in the U.S.

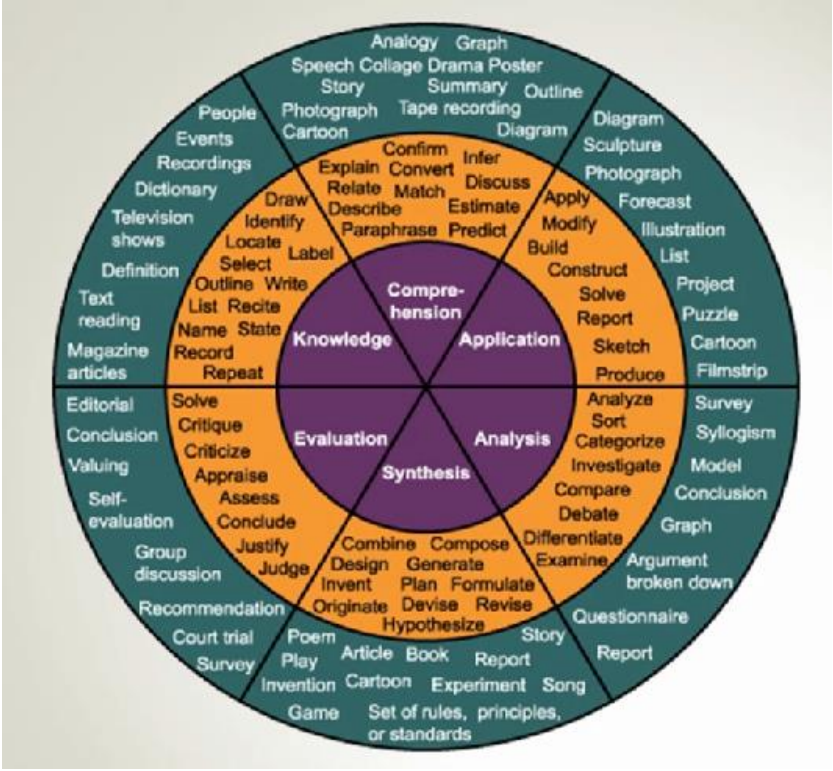
"You will recognize economics when you see it."

Learning Outcomes During IMPACT

Drafting Exercise

*Write **8 key skills or activities** students should be able to perform after completing the course*

*Write **8 key content understandings** students should have after completing the course*



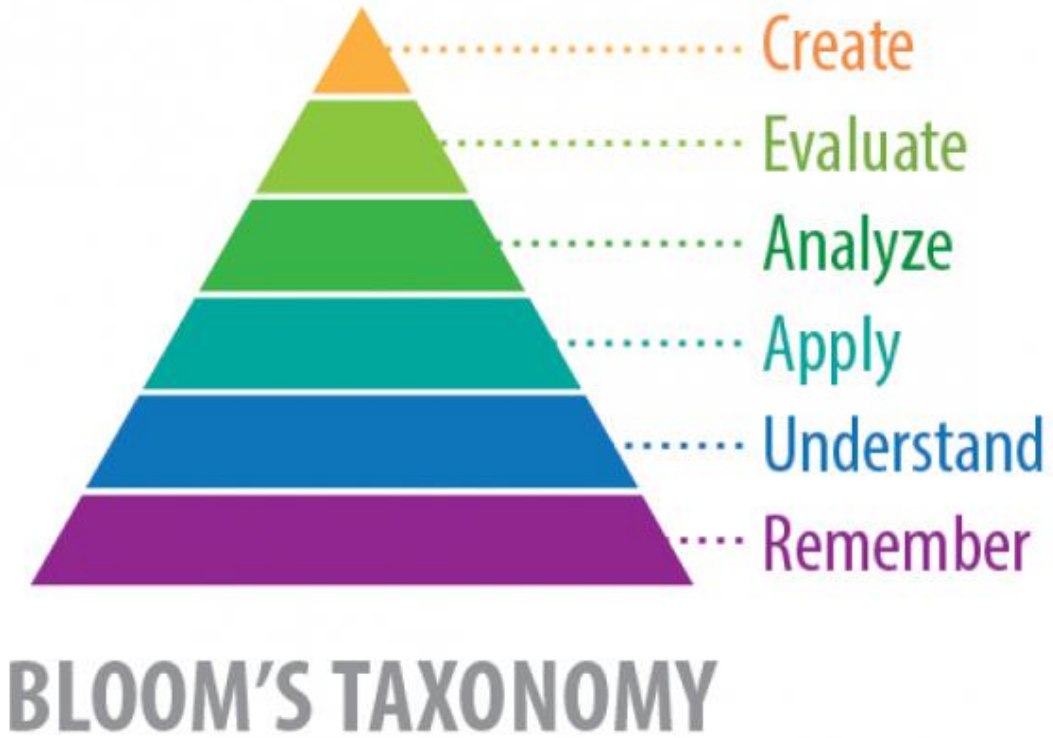
Learning Outcomes After IMPACT

- **Analyze** the important economic policy issues facing the U.S. using the macroeconomic model and the main economic measurements, such as budget deficits, monetary expansion, health care costs, Social Security finance, recovery from Great Recession, or relations with Europe and China.
- **Describe** the condition of the economy using the main economic measurements: gross domestic product, inflation, unemployment, exchange rates, and interest rates.
- **Predict** the results of economic events or policy changes on the outlook for the economy, using a macroeconomic model.
- **Analyze** the important events in U.S. economic policy history using the macroeconomic model and the main economic measurements, such as bimetallism, the founding of the Fed, the Great Depression, the New Deal, World War II, the Great Inflation, or the Great Recession.
- **Predict** changes in prices and quantities in a market using demand and supply analysis

Overarching Goal After IMPACT

- After taking this course, you will be able to ***apply*** knowledge of economic measurement, the economic model and the history of U.S. economic policy to ***analyze*** economic events, both personal and global, which occur during the rest of your life.

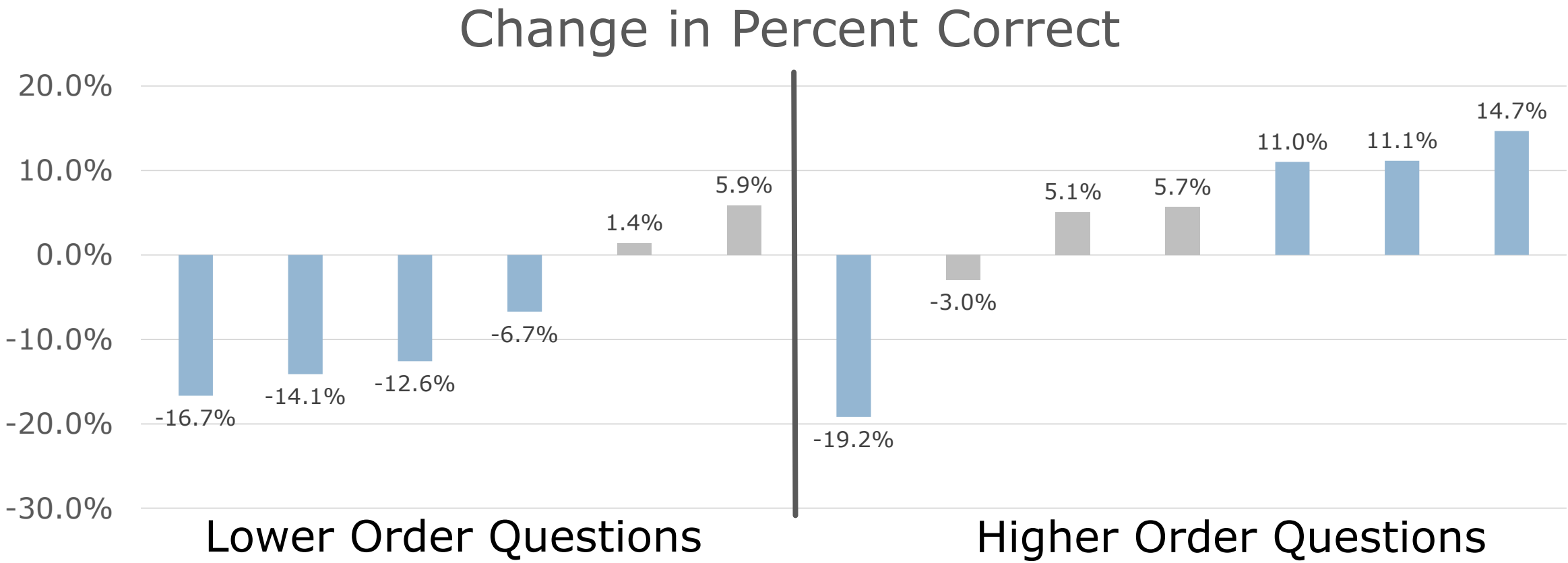
Final Exam Questions



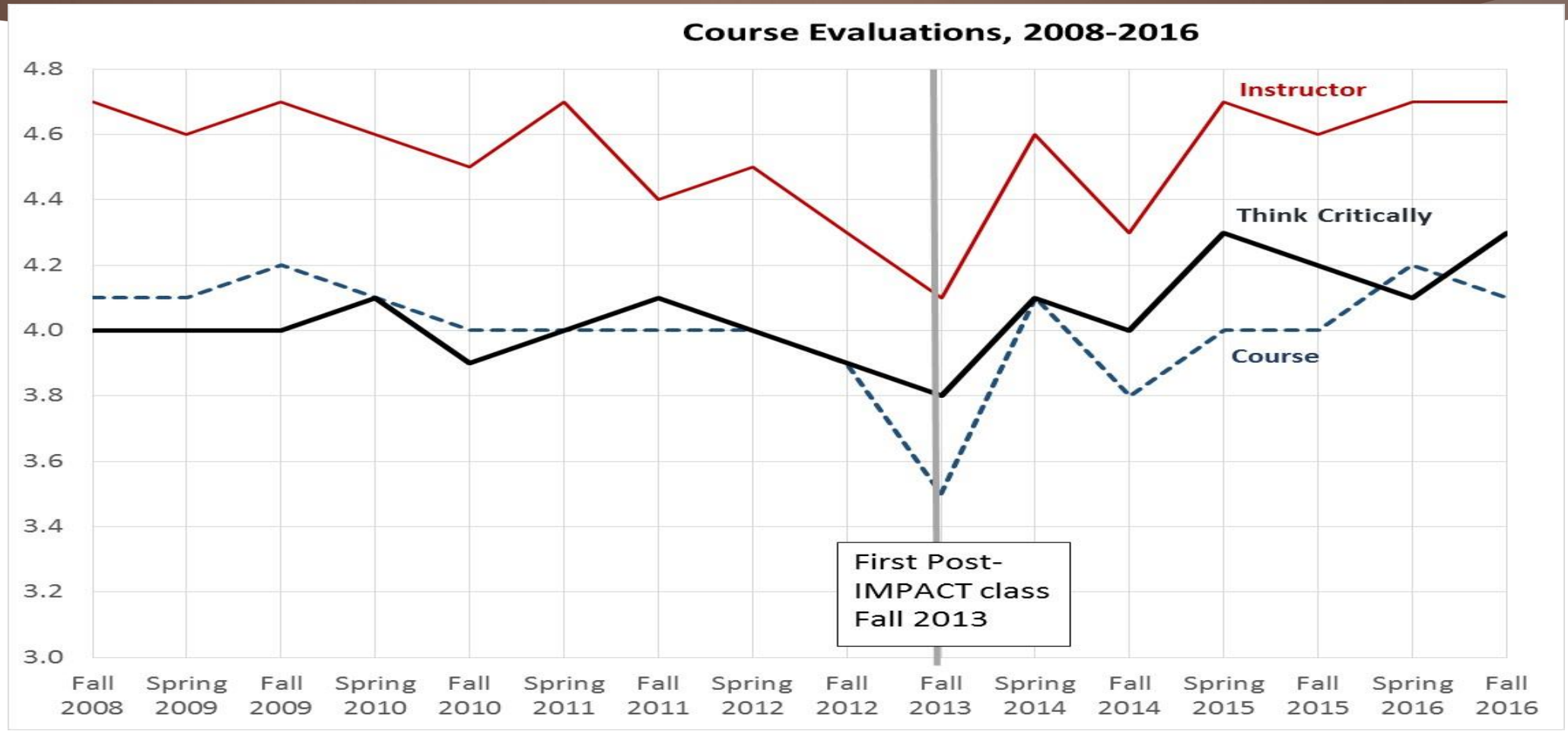
Final Exam Questions

Question Taxonomy	2012 Spring	2012 Fall	2013 Fall	2014 Spring	2014 Fall
1 and 2	68%	68%	48%	48%	38%
3 and 4	32%	32%	52%	52%	62%
Articles (3/4)	2%	0%	18%	30%	34%

Final Exam Performance Data

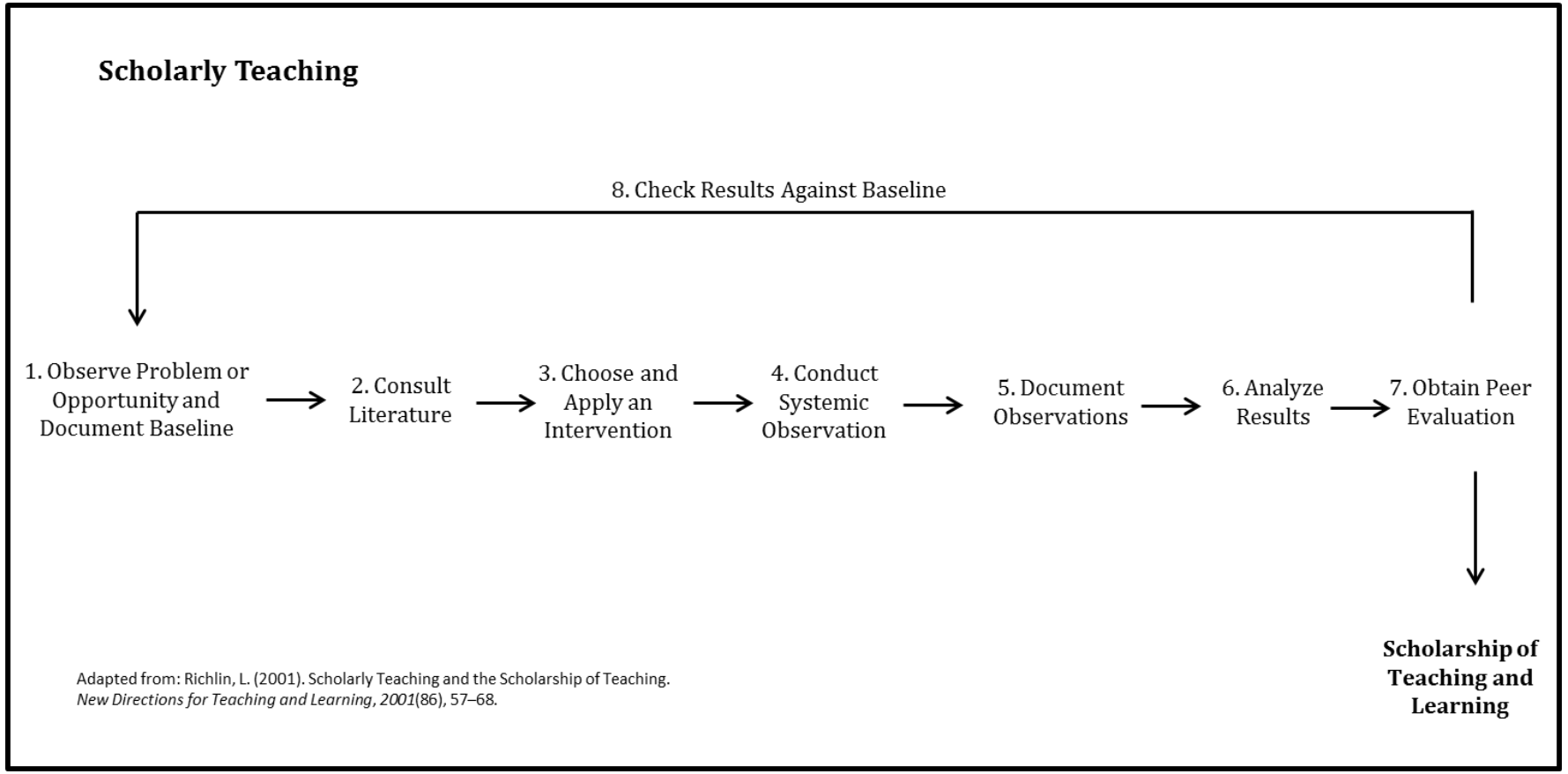


Course Evaluations



Course Redesign Scholarship

The Process of Scholarly Teaching



Taken from MinneSoTL: https://wcispe.wordpress.com/2015/09/24/introducing-the-scholarly-teaching-series/

Table Discussions

- What is a potential research question/inquiry that you would be interested in investigating in your teaching?

Table Discussions

- What data could you use/collect in order to answer your question?

Table Discussions

- What are some potential challenges to pursuing this research question/inquiry?

Table Discussions

- What are some potential resources that you could use to address your challenges?