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# Effects of the Flipped Classroom Model on Course Experience, Basic Need Satisfaction, and Motivation in an Undergraduate Research Methods Course

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# THE IMPACT OF THE FLIPPED CLASSROOM MODEL ON BASIC NEED SATISFACTION, MOTIVATION, ATTITUDES AND PERFORMANCE IN AN UNDERGRADUATE RESEARCH METHODS COURSE

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# BACKGROUND INFORMATION

- ▶ Using time outside of class to read and view online lectures, while class time can be spent on hands-on learning, group discussion, and question/answers sessions.
  - ▶ Gerstein (2012)
- ▶ No scripted method to flipping the classroom (Bergmann & Sams, 2012).
  - ▶ Deeper understanding of the material
  - ▶ Full flip or partial flip
- ▶ FLIP vs. FLIPPED (Chen, Wang, Kinshuk, & Chen 2014)
  - ▶ more robust model for learning in higher education

# BACKGROUND INFORMATION

- ▶ “Blended Learning” (Graham, Woodfield, & Harrison 2014)
  - ▶ effectiveness of a hybrid classroom and strategies to improve current settings
- ▶ Three stages of institutional learning (Porter, Graham, Spring, & Welch, 2014):
  - ▶ awareness / exploration
  - ▶ adoption / early implementation
  - ▶ Mature implementation / growth

# BACKGROUND INFORMATION

- ▶ FLIPPED classroom activities are perceived to be more student-oriented than traditional class activities (Kyu Kim & Mi Kim, 2014)
- ▶ Success in multi-disciplinary settings (Kyu Kim & Mi Kim, 2014)
  - ▶ 9 principles that can be broadly applied to a typical undergraduate course
- ▶ Students utilize the time in class to work through problems, advance concepts, and engage in collaborative learning (Tucker, 2012)

# BENEFITS OF FLIPPED CLASSROOM

- ▶ Brunsell & Horejsi (2013):
  - ▶ less time for recorded lectures
  - ▶ eliminates the need for the teacher to repeat content
  - ▶ strengthens student-teacher relationships
  - ▶ allows for more student to student collaboration
  - ▶ teachers are able to provide more differentiated instruction
  - ▶ potentially aligns better to how students learn
- ▶ Lujan & DiCarlo (2014):
  - ▶ student collaboration to solve and resolve problems individually and as a group
  - ▶ students seek to learn the material, rather than avoiding bad grades

# BENEFITS OF FLIPPED CLASSROOM

- ▶ Goodwin & Miller (2013):
  - ▶ improved student-teacher interaction
  - ▶ opportunities for real-time feedback
  - ▶ increased student engagement
  - ▶ self-paced learning, and more meaningful homework
- ▶ Baepler, Walker, & Driessen (2014):
  - ▶ use of Flipped space to create active learning classrooms
  - ▶ more efficient use of physical space with similar success of student outcomes and perceptions

# BARRIERS OF FLIPPED CLASSROOM

- ▶ Students lack of prep time prior to class (Bristol, 2014)
- ▶ Students may require more than a semester to adapt to the new method of instruction and to recognize its value (Roehl, Reddy, & Shannon, 2013)
- ▶ At times, students are less satisfied with how the structure of the classroom orients them to the learning tasks in the course (Strayer, 2007)



# EXAMPLES OF SUCCESSES IN COLLEGE COURSES AND CONTINUING EDUCATION

- ▶ Undergraduate Courses
  - ▶ history (Westermann, 2014)
  - ▶ statistics (Wilson, 2013)
  - ▶ intelligent tutoring system (Strayer, 2007)
  - ▶ informational technology (Davis, Dean, & Ball, 2014)
    - ▶ 3 settings: traditional, computer simulated, and a web-based flip structure

# EXAMPLES OF SUCCESSES IN COLLEGE COURSES AND CONTINUING EDUCATION

- ▶ Professional and Graduate Courses
  - ▶ dental physiology (Miller, McNear, & Metz, 2013)
  - ▶ cardiovascular, renal, and respiratory function in health and disease (Tune, Sturek, & Basile, 2014)
  - ▶ international law studies (Lemmer, 2014)
- ▶ Faculty members (See & Conry, 2014)
- ▶ Continuing education course (Burns & Schroeder, 2014)

# CURRICULUM CHOICE IN FLIPPED CLASSROOMS

- ▶ Toms & Eryilmaz (2014)
  - ▶ compared two learning software's for higher ed, distance learning classes
  - ▶ measure the perceptions and interactions of two groups:
    - ▶ OSN- online social networking vs. LMS- Traditional learning management systems
  - ▶ OSN had higher levels of perceived interactions, support, and satisfaction over the course of the study

# RESEARCH METHODS CLASS @ GSU

- ▶ Required course of all Exercise Science Majors
- ▶ Traditional format: 2 days per week, 75 minutes per class
  - ▶ Offered in lecture classroom
- ▶ Flipped format: 1 day per week, 75 minutes per class
  - ▶ Offered in computer lab

# WHAT DOES THE FLIP LOOK LIKE?

*Online lectures for each module with in-class activities*

- ▶ Introduction to Research Methods
  - ▶ Identifying Types of Studies
- ▶ Reading and Understanding Research
  - ▶ Literature Search and Article Review
- ▶ Sampling
  - ▶ Sampling techniques
- ▶ Measurement
  - ▶ Observation techniques
- ▶ Experimental Design
  - ▶ Design a research study
- ▶ Basic Statistics
  - ▶ Answer questions via reading tables and graphs from study excerpts
- ▶ Physical Activity Epidemiology
  - ▶ Design intervention study and calculate incidence and prevalence
- ▶ **\*\*Qualitative Research and Evaluating Research**

# RATIONALE FOR THE STUDY

- ▶ Increased enrollment in major courses (more sections offered)
- ▶ Over-reliance on lecture/test teaching formats
  - ▶ Insufficient evidence of retention and application of information
  - ▶ Move to student-centered teaching
- ▶ Innovations in Technology
- ▶ Establishing rapport with students
- ▶ Little research on both the psychosocial and performance aspects of learning

# PURPOSE

- ▶ To determine the impact of the Flipped Classroom Model in an undergraduate Exercise Science Research Methods course on:
  - ▶ Basic need satisfaction (Autonomy, Competence and Relatedness)
  - ▶ Motivation
  - ▶ Course experience
  - ▶ Student performance (final grade, assignment grades, unit tests)

# MEASURES USED IN THIS STUDY

- ▶ Course Experience Questionnaire (Griffin, Coates, McInnis, & James, 2003)
  - ▶ Generic Skills
  - ▶ Appropriate Assessment
  - ▶ Appropriate Workload
  - ▶ Emphasis on Independence
  - ▶ Learning Resources
  - ▶ Course Organization
- ▶ Basic need satisfaction in relationships scale (La Guardia, Ryan, Couchman, & Deci, 2000)
  - ▶ Autonomy
  - ▶ Competence
  - ▶ Relatedness
- ▶ Academic Self-Regulation Scale (Ryan & Connell, 1989)
  - ▶ External
  - ▶ Introjected
  - ▶ Identified
  - ▶ Intrinsic



# COURSE EXPERIENCE QUESTIONNAIRE

- ▶ Griffin, Coates, McInnis, & James, 2003
- ▶ CEQ was developed with an assumption of a strong association between the quality of student learning and student perceptions of teaching.
- ▶ The items and scales are specifically tuned to obtain information on what were considered by Ramsden (1991) to be the defining elements of teaching and its organization and considers the extent to which instruction encourages deep, rather than surface, understanding of concepts and materials (McInnis, 1997)
- ▶ Example Questions:
  - ▶ It's always easy here to know the standard of work expected.
  - ▶ This course has helped me to develop my problem-solving skills.
  - ▶ There are few opportunities to choose the particular areas you want to study.
  - ▶ The instructor of this course motivates students to do their best work.
  - ▶ The workload is too heavy.
  - ▶ This course has sharpened my analytic skills.
  - ▶ The instructor frequently gives the impression they have nothing to learn from students.

# BASIC NEED SATISFACTION IN RELATIONSHIPS SCALE

- ▶ La Guardia, Ryan, Couchman, & Deci, 2000
- ▶ Autonomy, competence, and relatedness were rated among the four most important needs across three samples of U.S. college students in a predominantly White university and in one sample of South Korean college students (Sheldon, Elliot, Kim, and Kasser, 2001)
- ▶ The need for autonomy involves the desire for a sense of self-direction and feelings of volition, vitality, and initiative (Deci & Ryan, 1985, 2000; Ryan, 1993; Ryan & Deci, 2000).
- ▶ The need for competence taps a person's feelings of curiosity and desire for efficacy (Deci, 1975; Deci & Ryan, 1985, 2000; White, 1959).
- ▶ The need for relatedness concerns the tendency toward closeness to others and the desire for a feeling of connection with others (Deci & Ryan, 1985, 2000; Ryan & Deci, 2000).

# ACADEMIC SELF-REGULATION SCALE

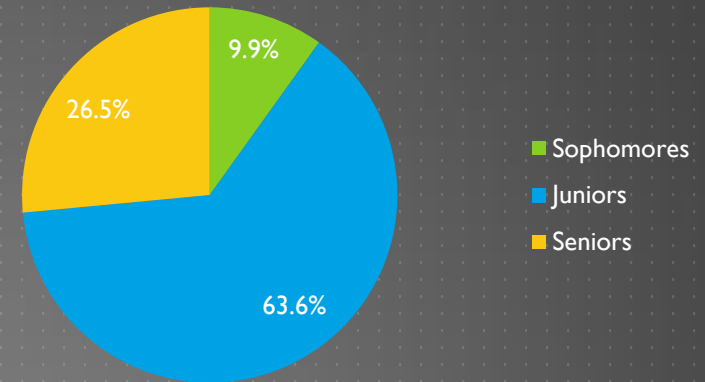
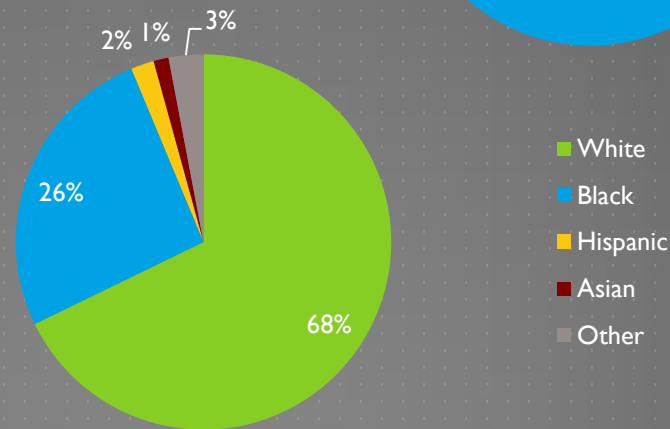
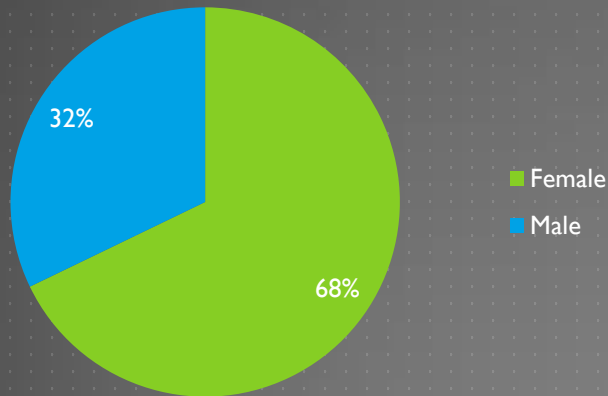
- ▶ Ryan & Connell, 1989
- ▶ The questionnaire asks why the respondent does a behavior (or class of behaviors) and then provides several possible reasons that have been preselected to represent the different styles of regulation or motivation.
- ▶ SDT: behavior is determined by three distinct psychological forces: intrinsic motivation, extrinsic motivation, and amotivation
  
- ▶ Why do I do my homework?
  1. Because I want the teacher to think I'm a good student.
  2. Because I want the other students to think I'm smart.
  3. Because my parents tell me to do so.

# PROCEDURES

- ▶ IRB approval received
- ▶ Questionnaire administered at the end of the Spring and Fall 2014 semesters
  - ▶ Took approximately 20 minutes
  - ▶ Instructor not present during administration
  - ▶ Survey was taken via paper and pencil

# PARTICIPANTS

- ▶ 53 Undergraduate Kinesiology Majors enrolled in a Research Methods Course
- ▶ All surveys returned
  - ▶ GPA: 62.5% above 3.0



# DATA ANALYSIS

- ▶ Reliability of Combined Questionnaire
  - ▶ Cronbach's alpha for subscale scores
- ▶ Descriptive Statistics
  - ▶ All subscale scores
  - ▶ Overall Grades/DFW rates
- ▶ Means Comparison
  - ▶ T-tests for all subscale scores and overall grades

# RESULTS: RELIABILITY OF SUB-SCALES

Scale	Construct	Cronbach's $\alpha$
Course Experience Questionnaire	Generic Skills	.79
	Appropriate Assessment	<b>.51</b>
	Appropriate Workload	.72
	Emphasis on Independence	<b>.65</b>
	Learning Resources	<b>.69</b>
	Course Organization	.72
	Intellectual Motivation	.87
Basic Need Satisfaction	Autonomy	<b>.49</b>
	Competence	<b>.56</b>
	Relatedness	.76
Motivation	Intrinsic: To Know	.89
	Intrinsic: To Accomplish	.82
	Intrinsic: To Experience Stimulation	.90
	Extrinsic: Identified	.86
	Extrinsic: Introjected	.82
	Extrinsic: External Regulation	.72
	Amotivation	.82

# RESULTS: ATTENDANCE, STUDY HABITS

## Flipped Sections

- ▶ 53.2% of students attended all class sessions
- ▶ Completing Readings/Lectures before due date
  - ▶ 17% every time, 6.4% almost every time, 36.2% most times, 36.2% sometimes, 4.3% hardly ever
- ▶ Time Spend Studying
  - ▶ 46.8% spent 1-3 hours per week
- ▶ Study Patterns
  - ▶ 51.9% spread out studying between tests with an increase right before the test
  - ▶ 33.3% crammed right before the test

## Traditional Sections

- ▶ 33.7% of students attended all class sessions
- ▶ Completing Readings/Lectures before due date
  - ▶ 10.5% every time, 10.5% almost every time, 26.3% most times, 34.7% sometimes, 17.9% hardly ever
- ▶ Time Spend Studying
  - ▶ 36.8% spent 1-3 hours per week
- ▶ Study Patterns
  - ▶ 51.1% spread out studying between tests with an increase right before the test
  - ▶ 29.8% crammed right before the test



# MEANS COMPARISON: COURSE EXPERIENCE

Area of Evaluation	Flipped		Traditional	
	Mean	SD	Mean	SD
Generic Skills	3.11	.62	3.12	.60
Appropriate Assessment	2.55	.54	2.60	.66
Appropriate Workload	4.83	.71	4.93	.72
Emphasis on Independence	3.79	.43	3.74	.47
Learning Resources*	3.78	.44	4.08	.54
Course Organization*	3.76	.51	4.02	.54

# MEANS COMPARISON: BASIC NEED SATISFACTION AND MOTIVATION

Motivational Construct	Flipped		Traditional	
	Mean	SD	Mean	SD
Autonomy	4.43	.62	4.47	.79
Competence*	4.65	.56	5.02	.76
Relatedness	4.64	.88	4.78	.92
Intrinsic Motivation to Know	4.73	1.35	4.75	1.44
Intrinsic Motivation to Accomplish	3.99	1.23	4.43	1.35
Intrinsic Motivation to Experience Stimulation	3.04	1.41	2.96	1.49
Extrinsic Regulation	4.79	1.49	4.76	1.56
Identified Regulation	4.17	1.71	4.27	1.86
Introjected Regulation	4.72	1.11	4.82	1.15
Amotivation	2.89	1.32	3.04	1.68

# MEANS COMPARISON: OVERALL GRADES AND MAJOR ASSIGNMENTS

Grade	Flipped		Traditional	
	Mean	SD	Mean	SD
Final Grade	87.03	12.75	87.49	9.31
Abstract Reading	7.58	2.06	7.48	2.18
Article Review*	48.04	11.77	51.54	8.40
Research Design	25.15	5.13	24.08	5.12
Understanding Statistics	19.50	2.53	19.00	3.06
Test 1	44.07	4.45	44.44	4.61
Test 2	43.12	10.33	41.61	8.89
Test 3	46.27	9.03	46.44	8.56
Test 4	44.18	8.12	43.27	8.34
Final Exam	78.99	17.54	78.19	17.56

# DISCUSSION

- ▶ Most subscales found reliable
  - ▶ Basic Need Satisfaction Scale
    - ▶ Documented issues with scale reliability
- ▶ Motivation is similar to other research in SDT
  - ▶ Higher levels of identified and introjected regulation
    - ▶ Due to controlling nature of educational settings
- ▶ Flipped classroom not harmful to basic need satisfaction, motivation, or performance in class
- ▶ Significant differences favor traditional format
  - ▶ Learning Resources
  - ▶ Course Organization
  - ▶ Competence
  - ▶ Article Review Assignment

# WHY?

- ▶ Students are more familiar with the traditional format
  - ▶ Only course students were taking under the flipped model
- ▶ Students did not prepare before class by watching lectures and reading
  - ▶ Experienced by others (Bristol, 2014)
  - ▶ Takes several semesters for students to become comfortable with the flipped classroom format (Roehl, Reddy, & Shannon, 2013)

# FUTURE RESEARCH

- ▶ Continue to compare flipped and traditional versions using more practice-based assignments.
- ▶ Determine successful teaching practices to encourage preparation prior to class.
- ▶ Teachers must be willing to experiment with alternative strategies (Roehl, Reddy, & Shannon, 2013)
  - ▶ it is important that they periodically reflect on their teaching effectiveness

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