Did Online Flipped Learning Improve Through Preclass Adaptive Lessons?

Renee Clark

University of Pittsburgh

Autar Kaw

University of South Florida
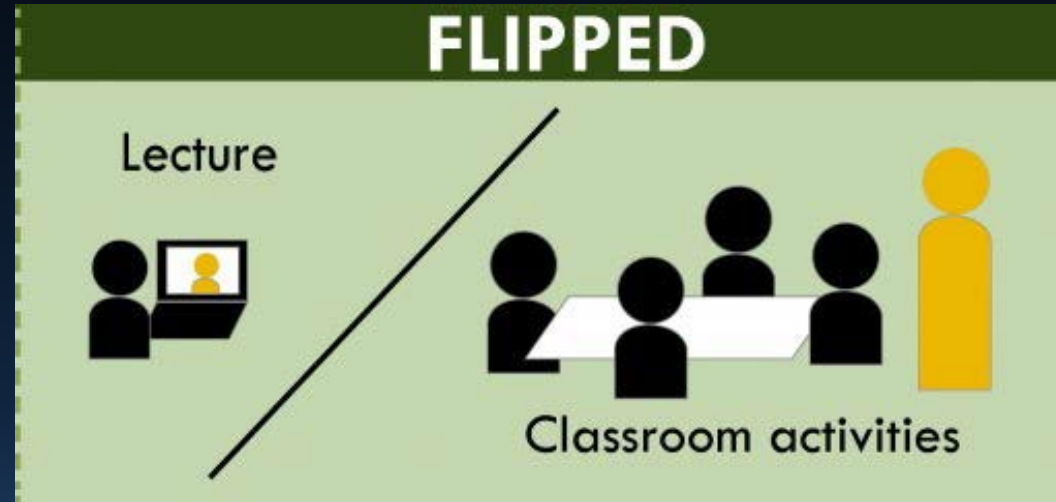
Ali Yalcin

University of South Florida

CIRCLS'21

September 2021

What is Flipped Learning?

"Flipped Learning is a pedagogical approach in which direct instruction moves from the group learning space to the individual learning space, and the resulting group space is transformed into a dynamic, interactive learning environment where the educator guides students as they apply concepts and engage creatively in the subject matter" – flippedlearning.org

Two Online Flipped Learning Modalities

Without Adaptive Learning

Pre-class
- Introductory video and textbook content, graded online LMS quizzes

In-class
- MS Forms as clickers, breakout groups, minilectures

Post-class
- Assigned problems from book, projects

With Adaptive Learning

Pre-class
- Adaptive learning platform lesson – includes videos, textbook and assessment

In-class
- MS Forms as clickers, breakout groups, minilectures

Post-class
- Assigned problems from book, projects

Classroom Environment

(College and University Classroom Environment Inventory- CUCEI)

Dimension	Meaning
Cohesiveness	Students know & help one another
Individualization	Students treated individually/differentially & can make decisions
Innovation	Novel class activities or teaching techniques
Involvement	Active student participation in class activities
Personalization	Interaction w/ instructor & concern for student welfare
Satisfaction	Enjoyment of classes
Task orientation	Organization and clarity of class activities

Classroom Environment Comparison

Dimension	Mean (s)		Univariate p	Effect Size d
	Without Adaptive	With Adaptive		
Innovation	2.71 (0.56)	3.02 (0.56)	<0.01	0.54
Involvement	2.71 (0.52)	3.02 (0.52)	0.07	0.29
Personalization	3.64 (0.82)	3.95 (0.70)	0.01	0.41
Satisfaction	3.01 (0.91)	3.40 (0.96)	<0.01	0.42

Comparison of Final Exam*

	Online Flipped Without Adaptive Modality	Online Flipped With Adaptive Modality	p-value	Effect size, d
Average (M)	56%	52%	0.033	-0.31
Standard Dev (SD)	14	16		
Sample size (n)	95	91		

* The two final exams were not the same because of their online nature (little guarantee of their integrity after the remotely proctored exam is over)

Future Research

Research Question: To what extent can data from an adaptive learning platform contribute to developing, implementing, and evaluating predictive models and interventions to maximize the likelihood of success for low-performing (expected to make DFW grades) students?

Main Conclusions

1. The classroom environment ratings increased for the online flipped with adaptive learning modality for four factors – innovation, involvement, personalization, and satisfaction. The other three dimensions stayed similar.
2. The final exam grades in the online flipped with adaptive learning modality were lower than the one without adaptive learning. This conclusion should consider that the two final exams were not the same because of their online nature and there being little guarantee of not get distributed after an exam is over.