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THE LEONHARD CENTER

FOR THE ENHANCEMENT OF ENGINEERING EDUCATION

From Remote to Flipped: Increasing Student Engagement through Classroom Flip

Sarah Zappe
Stephanie Cutler

Meet Sarah and Stephanie!

The Leonhard Center is an endowed teaching and learning center located in the College of Engineering at Penn State. Our mission is to catalyze and support innovative teaching, learning, and assessment to ensure that Penn State delivers world-class engineering education.

Ice-breaker

Name

University and position

Prior experiences with (or perceptions of) classroom flip

After today's workshop, participants will be able to:

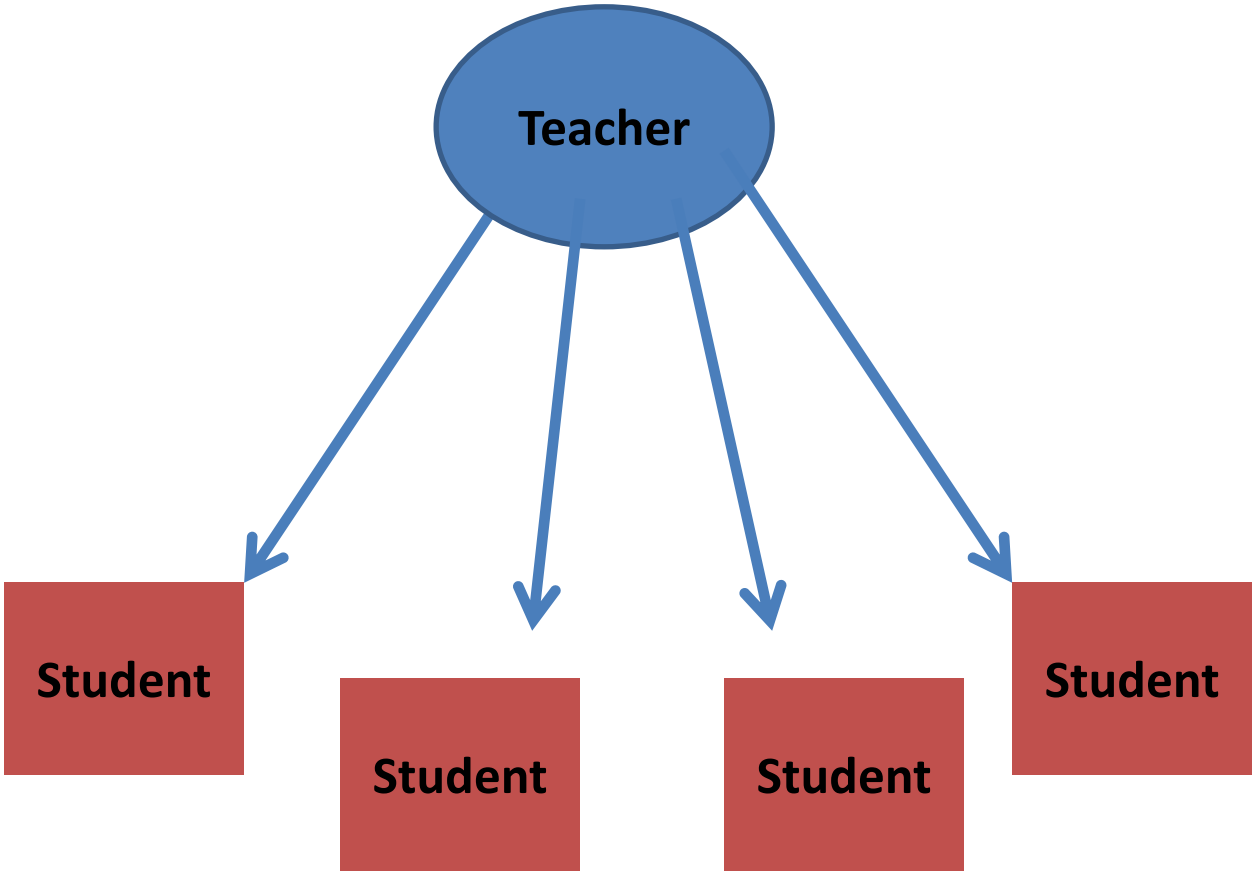
1. Identify the benefits and challenges of using the classroom flip
2. Develop an initial plan for how to flip one unit of a course
3. Explore how to use already-developed materials in the classroom flip

Pair and share: Defining the Classroom Flip

1. What is classroom flip and how does it differ than the traditionally taught classroom?

2. What are the potential benefits of classroom flip?

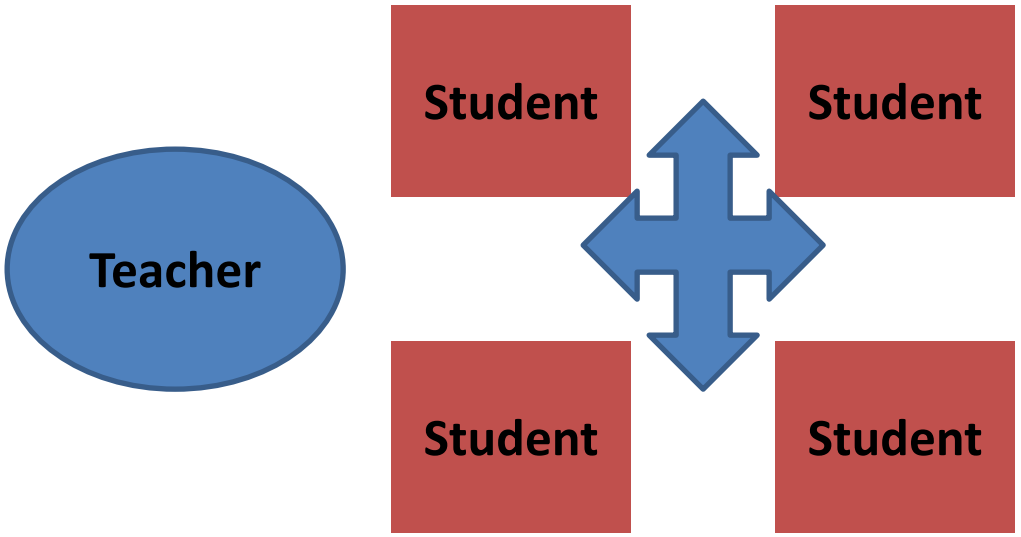
In traditional instruction, the instructor primarily covers material in class and asks students to apply their knowledge on homework assignments.



The flipped classroom is a framework that allows instructors to introduce evidence-based instructional practices and greater interactivity in a course while still maintaining the ability to cover content.

Preparation Activities

In-Class Activities



Traditional and flipped courses differ in terms of instructor and student roles as well as course activities.

Course characteristics	Traditional Lecture	Flipped
Role of instructor during class	Information provider	Guide
Role of student during class	Information recipient	Active participant in class
Out-of-class activities	Solving problems, reading textbook, projects, preparing for quizzes/exams	Watch online lecture or read assigned material (before class), complete problem sets & preparing for quizzes/ exams (after class)
In-class activities	Instructor-led lecture	Varies (i.e. problem solving, projects, discussion, brainstorming, field trips)
Role of assessment	Primarily summative in nature	Formative "gate checks" to ensure preparedness; Both formative and summative assessment

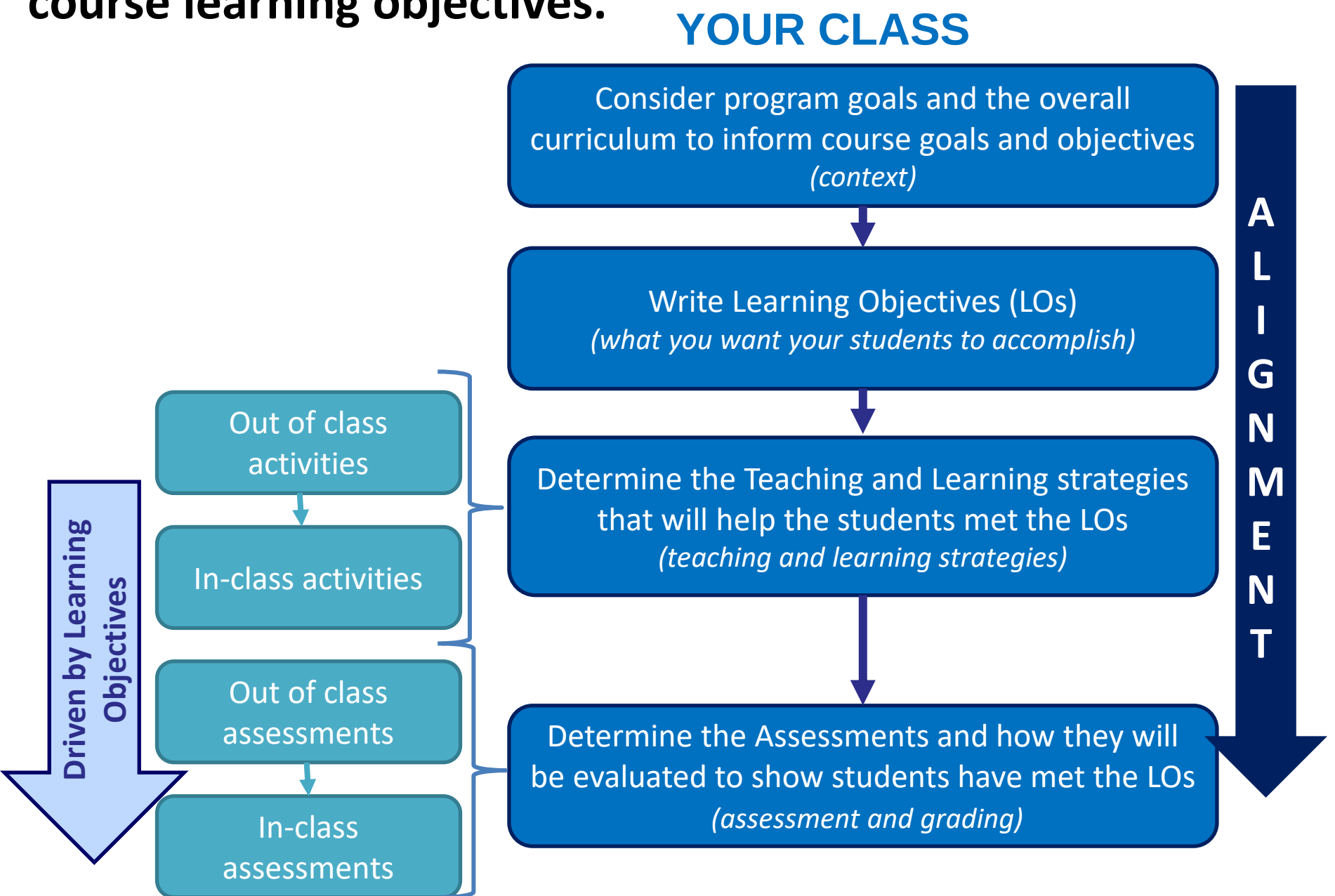
Table 1. Comparison of traditional lecture and inverted classroom in engineering.

From Velegol, Zappe, & Mahone, 2015

The classroom flip technique provides several advantages for students and instructors.

1. **Shifts instruction from passive to more active**
2. **Allows the instructor to include active learning elements while still covering necessary material**
3. **Provides greater opportunities for integrating higher order cognitive skills in the classroom**
4. **Structures students' out-of-class time**
5. **Students can do online instruction in their own time and at their own pace**
6. **Students receive help from the instructor as a guide during critical periods of learning**
7. **The model is flexible to many teaching styles.**

In-class and out-of-class activities should be driven by course learning objectives.



The classroom flip is a framework that allows for a variety of activities in the classroom.

- Problem solving
- Case studies
- Group work
- Projects
- Field trips
- Think-aloud-paired problem solving
- Hands-on activities
- Experiments
- Discussion
- Student-led discussion
- Guest speakers
- Problem-based learning (PBL)

The techniques you use in class should map to the course goals and objectives.

Out-of-class activities can take various forms.

- Instructor created videos
- Assigned readings
- Assigned activities (simulations, demonstrations, problems, etc.)
- Videos created by others (Khan Academy, YouTube, etc.)

What online/remote learning materials have you already developed that could be used for out-of-class materials?

Recommendations for out-of-class materials

1. Use existing resources if they align to your objectives.
2. Avoid using videos of actual in-person class proceedings.
3. Chunk videos into short segments.
4. Include activities other than just watching videos.
5. If creating videos, plan, write, or storyboard content.
6. Try to keep out-of-class activities interesting and engaging.

Students should participate in an activity (or gate-check) that helps to ensure they will be prepared for in-class activities.

- Online quizzes
- Clickers
- Quizzes at the start of class
- Online discussion boards
- Other activities?

Activity: Create a plan for flipping one section of your course.

1. What unit or section of your course would you like to flip?
2. What are the learning objectives for this unit?
3. What are your current in-class and out-of-class activities?
4. What would you do in a flipped version of the course?

Course to be flipped:			
Course unit to be flipped:			
Learning objectives: • • •			
Current In-Class Activities	**Current Out-of-Class Activities**	**Flipped In-Class Activities**	**Flipped Out-of-Class Activities**

Challenges to be aware of with Classroom Flip

According to instructors, the biggest challenges associated with classroom flip are…

Code	Definition
Student preparation	Students do not complete assignments and/or are not prepared to participate in in-class activities
Time consuming	Creation of materials for class activities is time consuming
Physical space	Physical characteristics of a classroom environment hinders ability to conduct activities
Student attention	Students lack necessary attention to complete out-of-class activities (such as watching videos)
Need for quality materials	High-quality materials are necessary and difficult to develop/obtain

Not all student feedback on classroom flip is bad….

“Especially in STEM fields, having the opportunity to work problems with ‘booster’ help when needed, or immediate feedback from an instructor, makes me more confident in what I am doing. This is opposed to struggling for hours on my own, stuck on the same…problems without insight into common missteps.”

Not all student feedback on classroom flip is bad….

"I think that being in a 'flipped classroom' would be an interesting experience because it allows more communication between students and the instructor. I think that it adds an additional aspect of learning. In reality, some students may not be able to work on problems with other students because of class times. So by doing the questions in class, they may be able to make closer friendships while also learning. Lectures, in my opinion, can be done at in a dorm room rather easily."

Not all student feedback on classroom flip is bad….

"Lectures are boring and a waste of time. The information is available in the textbook or other sources, so why waste class time on it?"

Thanks so much! Please feel free to contact us with questions or comments!

Contact:

Sarah Zappe – ser163@psu.edu

Stephanie Cutler – slc5822@psu.edu