



# International OBE Symposium 2022

*“Non-Conventional Teaching and Learning Activities in Engineering Education from the OBE Perspective”*

## *BOPPPS Model for Effective Class Sessions for the Undergraduate Engineering Students*

Professor Dr. Mazharul Islam, P.Eng. (Alberta, Canada)

*Director (IQAC), AUST, Bangladesh*

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*BOPPPS Model*

*1. Bridge-In*

*2. Objective or Outcome*

*3. Pre-Assessment*

*4. Participatory Learning*

*5. Post-Assessment*

*6. Summary*

*Six Common Planning Errors*

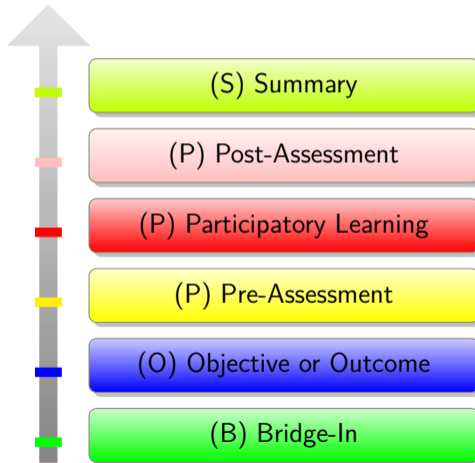
*How to Implement?*

*Concluding Remarks*

*Bibliography*

- 1 *BOPPPS Model*
- 2 *1. Bridge-In*
- 3 *2. Objective or Outcome*
- 4 *3. Pre-Assessment*
- 5 *4. Participatory Learning*
- 6 *5. Post-Assessment*
- 7 *6. Summary*
- 8 *Six Common Planning Errors*
- 9 *How to Implement?*
- 10 *Concluding Remarks*

# The BOPPPS Model



## *BOPPPS Model*

*1. Bridge-In*

*2. Objective or Outcome*

*3. Pre-Assessment*

*4. Participatory Learning*

*5. Post-Assessment*

*6. Summary*

*Six Common Planning Errors*

*How to Implement?*

*Concluding Remarks*

*Bibliography*

# Instructional Skills Workshop (ISW)

## BOPPPS Model

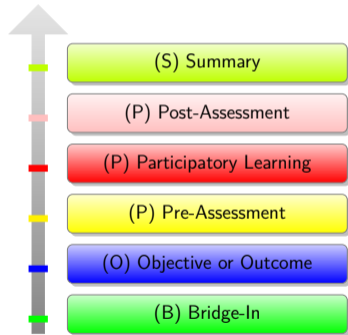
1. Bridge-In
2. Objective or Outcome
3. Pre-Assessment
4. Participatory Learning
5. Post-Assessment
6. Summary

Six Common  
Planning Errors

How to Implement?

Concluding Remarks

Bibliography



- BOPPPS is one of the critical elements of the Instructional Skills Workshop (ISW) developed in Canada (Network, nd)
- ISW has been facilitated in different parts of the world (Network, nd)

# *Research Finding from a PhD Dissertation concerning ISW*

*"the experience of these ISW participants was uniformly energizing and has had an positive impact on their teaching, how they see themselves as teachers and how they think about their students' current and future learning" (Macpherson, 2011)*

*BOPPPS Model*

*1. Bridge-In*

*2. Objective or Outcome*

*3. Pre-Assessment*

*4. Participatory Learning*

*5. Post-Assessment*

*6. Summary*

*Six Common Planning Errors*

*How to Implement?*

*Concluding Remarks*

*Bibliography*

# *Research Finding from a PhD Dissertation concerning ISW*

*"The results of this research point to the ISW encouraging transformative change in teaching practices and that this change has been manifest in a number of ways by the participants" (Macpherson, 2011)*

*BOPPPS Model*

*1. Bridge-In*

*2. Objective or Outcome*

*3. Pre-Assessment*

*4. Participatory Learning*

*5. Post-Assessment*

*6. Summary*

*Six Common Planning Errors*

*How to Implement?*

*Concluding Remarks*

*Bibliography*

## *Findings from a Research Project concerning ISW*

*"More than 100 institutions worldwide have offered the Instructional Skills Workshop (ISW) over the last 30 years to develop more student-centred, reflective instructors ..."* (Debra Dawson and McIntyre, 2014)

*BOPPPS Model*

*1. Bridge-In*

*2. Objective or Outcome*

*3. Pre-Assessment*

*4. Participatory Learning*

*5. Post-Assessment*

*6. Summary*

*Six Common Planning Errors*

*How to Implement?*

*Concluding Remarks*

*Bibliography*



## *Findings from a Research Project concerning ISW*

*"In the qualitative analysis, ISW participants frequently described replacing part of their lectures with a variety of active learning methods, reducing the instructional focus on content transmission"*  
(Debra Dawson and McIntyre, 2014)

*BOPPPS Model*

*1. Bridge-In*

*2. Objective or Outcome*

*3. Pre-Assessment*

*4. Participatory Learning*

*5. Post-Assessment*

*6. Summary*

*Six Common Planning Errors*

*How to Implement?*

*Concluding Remarks*

*Bibliography*

# *Findings from a Research Project concerning ISW*

## *BOPPPS Model*

- 1. Bridge-In*
- 2. Objective or Outcome*
- 3. Pre-Assessment*
- 4. Participatory Learning*
- 5. Post-Assessment*
- 6. Summary*

## *Six Common Planning Errors*

## *How to Implement?*

## *Concluding Remarks*

## *Bibliography*

*"... ISW appears to offer a fairly low-cost opportunity to enhance teaching skills of college and university faculty"*  
(Debra Dawson and McIntyre, 2014)

## *Findings from a Research Project concerning BOPPPS*

*"Participants reported that after taking the workshop, they were better at managing time when preparing for class and during class time itself by applying the BOPPPS structure" (Debra Dawson and McIntyre, 2014)*

*BOPPPS Model*

*1. Bridge-In*

*2. Objective or Outcome*

*3. Pre-Assessment*

*4. Participatory Learning*

*5. Post-Assessment*

*6. Summary*

*Six Common Planning Errors*

*How to Implement?*

*Concluding Remarks*

*Bibliography*

## *Findings from a Research Project concerning BOPPPS*

*" They commented that students reacted positively as they became more familiar with the model and found that the teachers' expectations were clearer"*  
(Debra Dawson and McIntyre, 2014)

### *BOPPPS Model*

*1. Bridge-In*

*2. Objective or Outcome*

*3. Pre-Assessment*

*4. Participatory Learning*

*5. Post-Assessment*

*6. Summary*

*Six Common Planning Errors*

*How to Implement?*

*Concluding Remarks*

*Bibliography*

# Personal Reflections about the ISW

## BOPPPS Model

1. Bridge-In
2. Objective or Outcome
3. Pre-Assessment
4. Participatory Learning
5. Post-Assessment
6. Summary

Six Common Planning Errors

How to Implement?

Concluding Remarks

Bibliography



- Attended in 2014 (September 30, October 2, 7, 9) at University of Calgary, Canada
- Delivered 3 Mini lessons and obtained valuable feedback
- Currently using  $\text{\LaTeX}$  Beamer slides to implement BOPPPS in the class sessions

- 1 *BOPPPS Model*
- 2 **1. Bridge-In**
- 3 2. *Objective or Outcome*
- 4 3. *Pre-Assessment*
- 5 4. *Participatory Learning*
- 6 5. *Post-Assessment*
- 7 6. *Summary*
- 8 *Six Common Planning Errors*
- 9 *How to Implement?*
- 10 *Concluding Remarks*

# *Bridge-In*

*"Begins the learning cycle, gains learner attention, builds motivation, and explains why the lesson is important"  
(Johnson, 2006)*

*BOPPPS Model*

*1. Bridge-In*

*2. Objective or Outcome*

*3. Pre-Assessment*

*4. Participatory Learning*

*5. Post-Assessment*

*6. Summary*

*Six Common Planning Errors*

*How to Implement?*

*Concluding Remarks*

*Bibliography*

# Examples

## *BOPPPS Model*

1. *Bridge-In*

2. *Objective or Outcome*

3. *Pre-Assessment*

4. *Participatory Learning*

5. *Post-Assessment*

6. *Summary*

*Six Common Planning Errors*

*How to Implement?*

*Concluding Remarks*

*Bibliography*

- Quotes
- Wordclouds
- Images
- Audios
- Videos



- 1 *BOPPPS Model*
- 2 *1. Bridge-In*
- 3 *2. Objective or Outcome*
- 4 *3. Pre-Assessment*
- 5 *4. Participatory Learning*
- 6 *5. Post-Assessment*
- 7 *6. Summary*
- 8 *Six Common Planning Errors*
- 9 *How to Implement?*
- 10 *Concluding Remarks*

## *Objective or Outcome*

*"Clarifies and specifies the learning intention: clarifies what the learner should know, think, value or do by the end of the lesson, under what conditions and how well" (Johnson, 2006)*

*BOPPPS Model*

*1. Bridge-In*

*2. Objective or Outcome*

*3. Pre-Assessment*

*4. Participatory Learning*

*5. Post-Assessment*

*6. Summary*

*Six Common Planning Errors*

*How to Implement?*

*Concluding Remarks*

*Bibliography*

## *Expanded Meaning of OBE Spady et al. (2018)*

# Outcome Based Education

```
graph TD; A[Outcome Based Education] --> B["Culminating Demonstration of Learning (Spady et al. 2018)"]; A --> C["Defined by, Focused on, Designed around, Organized around (Spady et al. 2018)"];
```

***“Culminating  
Demonstration  
of Learning”  
(Spady et al.  
2018)***

***“Defined by”  
“Focused on”  
“Designed around”  
“Organized around”  
(Spady et al. 2018)***

Adapted from (Spady, 1994)

*BOPPPS Model*

*1. Bridge-In*

*2. Objective or  
Outcome*

*3. Pre-Assessment*

*4. Participatory  
Learning*

*5. Post-Assessment*

*6. Summary*

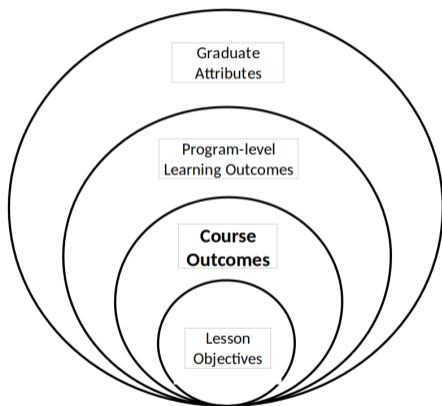
*Six Common  
Planning Errors*

*How to Implement?*

*Concluding Remarks*

*Bibliography*

# The Big Picture



Adapted from Figure of (Dyjur, 2018)

*BOPPPS Model*

1. *Bridge-In*

2. *Objective or Outcome*

3. *Pre-Assessment*

4. *Participatory Learning*

5. *Post-Assessment*

6. *Summary*

*Six Common Planning Errors*

*How to Implement?*

*Concluding Remarks*

*Bibliography*

## *Verbs to Avoid (Dyjur et al., 2014)*

- *"Know"* (Felder and Brent, 2016; Dyjur et al., 2014)
- *"Appreciate"* (Felder and Brent, 2016; Dyjur, 2018)
- *"Learn"* (Felder and Brent, 2016)
- *"Understand"* (Felder and Brent, 2016; Dyjur et al., 2014)
- *"Gain an appreciation for"* (Dyjur, 2018)
- *"Have an awareness of"* (Dyjur et al., 2014)
- *"Perceive"* (Dyjur et al., 2014)
- *"Become familiar with"* (Dyjur, 2018)

*BOPPPS Model*

*1. Bridge-In*

*2. Objective or Outcome*

*3. Pre-Assessment*

*4. Participatory Learning*

*5. Post-Assessment*

*6. Summary*

*Six Common Planning Errors*

*How to Implement?*

*Concluding Remarks*

*Bibliography*

- 1 *BOPPPS Model*
- 2 *1. Bridge-In*
- 3 *2. Objective or Outcome*
- 4 *3. Pre-Assessment*
- 5 *4. Participatory Learning*
- 6 *5. Post-Assessment*
- 7 *6. Summary*
- 8 *Six Common Planning Errors*
- 9 *How to Implement?*
- 10 *Concluding Remarks*

## *Pre-Assessment*

*"Answers the question, "What does the learner already know about the subject of the lesson?"" (Johnson, 2006)*

*"Allow learners to express their needs for review or clarification" (Johnson, 2006, p. 28)*

*"Help the instructor adjust the lesson for depth and pace to better fit a particular group of learners" (Johnson, 2006, p. 28)*

*BOPPPS Model*

*1. Bridge-In*

*2. Objective or Outcome*

*3. Pre-Assessment*

*4. Participatory Learning*

*5. Post-Assessment*

*6. Summary*

*Six Common Planning Errors*

*How to Implement?*

*Concluding Remarks*

*Bibliography*

## *Examples*

- Open-ended question(s) (Johnson, 2006, p. 28)
- Face-to-face Brain-storming
- Minute-paper
- Online Word cloud poll (available in slido)
- Online Open text (available in slido)
- Online game-based quiz (available in Kahoot)
- and more...

*BOPPPS Model*

*1. Bridge-In*

*2. Objective or Outcome*

*3. Pre-Assessment*

*4. Participatory Learning*

*5. Post-Assessment*

*6. Summary*

*Six Common Planning Errors*

*How to Implement?*

*Concluding Remarks*

*Bibliography*



- 1 *BOPPPS Model*
- 2 *1. Bridge-In*
- 3 *2. Objective or Outcome*
- 4 *3. Pre-Assessment*
- 5 **4. Participatory Learning**
- 6 *5. Post-Assessment*
- 7 *6. Summary*
- 8 *Six Common Planning Errors*
- 9 *How to Implement?*
- 10 *Concluding Remarks*

# *Participatory Learning*

*"This is the body of the lesson, where learners are involved as actively in the learning process as possible"  
(Johnson, 2006)*

*"There is an intentional sequence of activities or learning events that will help the learner achieve the specified objective or desired outcome" (Johnson, 2006)*

*BOPPPS Model*

*1. Bridge-In*

*2. Objective or Outcome*

*3. Pre-Assessment*

*4. Participatory Learning*

*5. Post-Assessment*

*6. Summary*

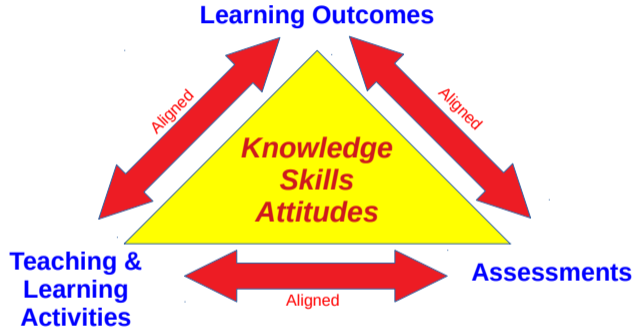
*Six Common Planning Errors*

*How to Implement?*

*Concluding Remarks*

*Bibliography*

# "Constructive Alignment" (Biggs, nd) - Crux of the Matter



*"In constructive alignment, we start with the outcomes we intend students to learn, and align teaching and assessment to those outcomes" (Biggs, nd)*

*BOPPPS Model*

*1. Bridge-In*

*2. Objective or Outcome*

*3. Pre-Assessment*

*4. Participatory Learning*

*5. Post-Assessment*

*6. Summary*

*Six Common Planning Errors*

*How to Implement?*

*Concluding Remarks*

*Bibliography*

*Origin (Biggs, 2014)*

# Constructive Alignment

- "the model is based on the psychology of constructivism"  
- "knowledge is constructed through the activities of the learner" (Biggs, 2014)

- "both teaching and assessment need to be aligned to the intended learning outcomes" (Biggs, 2014)

*BOPPPS Model*

*1. Bridge-In*

*2. Objective or Outcome*

*3. Pre-Assessment*

*4. Participatory Learning*

*5. Post-Assessment*

*6. Summary*

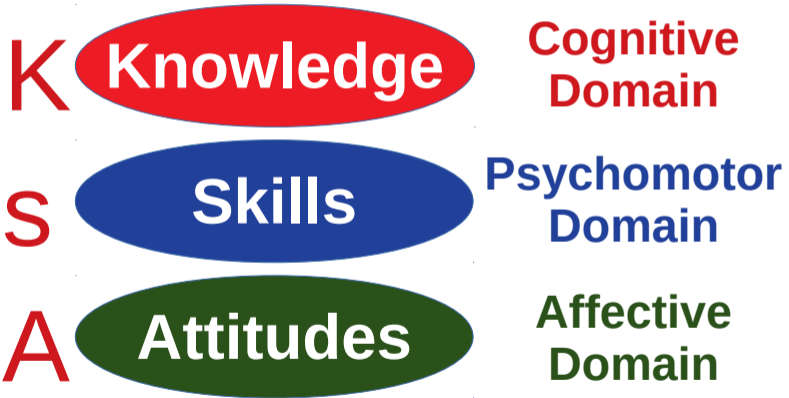
*Six Common Planning Errors*

*How to Implement?*

*Concluding Remarks*

*Bibliography*

# *Knowledge - Skill - Attitude*



*BOPPPS Model*

*1. Bridge-In*

*2. Objective or Outcome*

*3. Pre-Assessment*

*4. Participatory Learning*

*5. Post-Assessment*

*6. Summary*

*Six Common Planning Errors*

*How to Implement?*

*Concluding Remarks*

*Bibliography*

## *Teaching & Learning-related Resources*

- *"Active Learning"* (Felder and Brent, 2016, pp. 111 to 129)
- *"Nontechnological Alternatives to Lecture"* (Wankat and Oreovicz, 2015, pp. 114 to 142)
- Brainstorming (Johnson, 2006, p. 71)
- Think-Pair-Share (Johnson, 2006, p. 69)
- Case Study (Johnson, 2006, p. 72)
- Group Discussion (Johnson, 2006, p. 75)

*BOPPPS Model*

*1. Bridge-In*

*2. Objective or Outcome*

*3. Pre-Assessment*

*4. Participatory Learning*

*5. Post-Assessment*

*6. Summary*

*Six Common Planning Errors*

*How to Implement?*

*Concluding Remarks*

*Bibliography*

- 1 *BOPPPS Model*
- 2 *1. Bridge-In*
- 3 *2. Objective or Outcome*
- 4 *3. Pre-Assessment*
- 5 *4. Participatory Learning*
- 6 ***5. Post-Assessment***
- 7 *6. Summary*
- 8 *Six Common Planning Errors*
- 9 *How to Implement?*
- 10 *Concluding Remarks*

# *Post-Assessment*

*"Formally or informally demonstrates if the learner has indeed learned and is linked directly with the objective or outcome" (Johnson, 2006)*

*BOPPPS Model*

*1. Bridge-In*

*2. Objective or Outcome*

*3. Pre-Assessment*

*4. Participatory Learning*

*5. Post-Assessment*

*6. Summary*

*Six Common Planning Errors*

*How to Implement?*

*Concluding Remarks*

*Bibliography*



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- Online game-based quiz (available in Kahoot)
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*BOPPPS Model*

*1. Bridge-In*

*2. Objective or Outcome*

*3. Pre-Assessment*

*4. Participatory Learning*

*5. Post-Assessment*

*6. Summary*

*Six Common Planning Errors*

*How to Implement?*

*Concluding Remarks*

*Bibliography*

- 1 *BOPPPS Model*
- 2 *1. Bridge-In*
- 3 *2. Objective or Outcome*
- 4 *3. Pre-Assessment*
- 5 *4. Participatory Learning*
- 6 *5. Post-Assessment*
- 7 *6. Summary*
- 8 *Six Common Planning Errors*
- 9 *How to Implement?*
- 10 *Concluding Remarks*

# Summary

*"Provides an opportunity for the learners to reflect briefly and integrate the learning during the closing of the learning cycle" (Johnson, 2006)*

*BOPPPS Model*

*1. Bridge-In*

*2. Objective or Outcome*

*3. Pre-Assessment*

*4. Participatory Learning*

*5. Post-Assessment*

*6. Summary*

*Six Common Planning Errors*

*How to Implement?*

*Concluding Remarks*

*Bibliography*

- 1 *BOPPPS Model*
- 2 *1. Bridge-In*
- 3 *2. Objective or Outcome*
- 4 *3. Pre-Assessment*
- 5 *4. Participatory Learning*
- 6 *5. Post-Assessment*
- 7 *6. Summary*
- 8 *Six Common Planning Errors*
- 9 *How to Implement?*
- 10 *Concluding Remarks*

# *Six Common Planning Errors (Felder and Brent, 2016, pp. 68)*

- ❶ *"Trying to cover too much content"*
- ❷ *"Overestimating what students know and can do"*
- ❸ *"Filling most class sessions with Bloom Level 1 content students can only memorize and repeat"*
- ❹ *"Putting theory and derivations before applications and providing insufficient examples"*
- ❺ *"Showing long procedures without focusing on the reasoning behind difficult steps."*
- ❻ *"Failing to include enough questions and activities in class sessions"*

*BOPPPS Model*

- 1. Bridge-In*
- 2. Objective or Outcome*
- 3. Pre-Assessment*
- 4. Participatory Learning*
- 5. Post-Assessment*
- 6. Summary*

*Six Common Planning Errors*

*How to Implement?*

*Concluding Remarks*

*Bibliography*

## *Error # 1 (Felder and Brent, 2016, pp. 68)*

*"Trying to cover too much content"*

### **Consequence**

*"Instructors have to race to cover everything. The students have few opportunities for practice and feedback in class"*

### **Suggestion**

*"Link content tightly to learning objectives, focusing on need-to-know material and minimizing nice-to-know material"*

*BOPPPS Model*

*1. Bridge-In*

*2. Objective or Outcome*

*3. Pre-Assessment*

*4. Participatory Learning*

*5. Post-Assessment*

*6. Summary*

*Six Common Planning Errors*

*How to Implement?*

*Concluding Remarks*

*Bibliography*

## *Error # 2 (Felder and Brent, 2016, pp. 68)*

*"Overestimating what students know and can do"*

### **Consequence**

*"Course content and assessments are too advanced, and qualified students do poorly or drop the class"*

### **Suggestion**

*"Give an early test on course prerequisites"*

*BOPPPS Model*

*1. Bridge-In*

*2. Objective or Outcome*

*3. Pre-Assessment*

*4. Participatory Learning*

*5. Post-Assessment*

*6. Summary*

*Six Common Planning Errors*

*How to Implement?*

*Concluding Remarks*

*Bibliography*

## *Error # 3 (Felder and Brent, 2016, pp. 68)*

*"Filling most class sessions with Bloom Level 1 content students can only memorize and repeat"*

### **Consequence**

*"Students acquire few high-level skills and little deep conceptual understanding"*

### **Suggestion**

*"Give students with handouts with material you want them to memorize, and focus class time on higher-level objectives."*

*BOPPPS Model*

*1. Bridge-In*

*2. Objective or Outcome*

*3. Pre-Assessment*

*4. Participatory Learning*

*5. Post-Assessment*

*6. Summary*

*Six Common Planning Errors*

*How to Implement?*

*Concluding Remarks*

*Bibliography*



## *Error # 4 (Felder and Brent, 2016, pp. 68)*

*"Putting theory and derivations before applications and providing insufficient examples"*

### **Consequence**

*"Most students can't relate the material to their prior knowledge, needs, and interests, and do poorly on tests."*

### **Suggestion**

*"Provide examples and applications for every important concept and method. Introduce applications before theory"*

*BOPPPS Model*

*1. Bridge-In*

*2. Objective or Outcome*

*3. Pre-Assessment*

*4. Participatory Learning*

*5. Post-Assessment*

*6. Summary*

*Six Common Planning Errors*

*How to Implement?*

*Concluding Remarks*

*Bibliography*

## *Error # 5 (Felder and Brent, 2016, pp. 68)*

*"Showing long procedures without focusing on the reasoning behind difficult steps."*

### **Consequence**

*"Everything looks logical in class, but students can't carry out similar procedures on their own."*

### **Suggestion**

*"Make complex procedures the subject of in-class activities or omit them if they don't directly address learning objectives."*

*BOPPPS Model*

*1. Bridge-In*

*2. Objective or Outcome*

*3. Pre-Assessment*

*4. Participatory Learning*

*5. Post-Assessment*

*6. Summary*

*Six Common Planning Errors*

*How to Implement?*

*Concluding Remarks*

*Bibliography*

## *Error # 6 (Felder and Brent, 2016, pp. 68)*

*"Failing to include enough questions and activities in class sessions"*

### **Consequence**

*"Students get insufficient practice and feedback, and the instructor can't tell where they need help."*

### **Suggestion**

*"Build good questions and activities into every session plan."*

*BOPPPS Model*

*1. Bridge-In*

*2. Objective or Outcome*

*3. Pre-Assessment*

*4. Participatory Learning*

*5. Post-Assessment*

*6. Summary*

*Six Common Planning Errors*

*How to Implement?*

*Concluding Remarks*

*Bibliography*

- 1 *BOPPPS Model*
- 2 *1. Bridge-In*
- 3 *2. Objective or Outcome*
- 4 *3. Pre-Assessment*
- 5 *4. Participatory Learning*
- 6 *5. Post-Assessment*
- 7 *6. Summary*
- 8 *Six Common Planning Errors*
- 9 *How to Implement?*
- 10 *Concluding Remarks*

# *How to Implement the BOPPPS Model in the Class Sessions?*

- Critically study the ISW Manual, especially the BOPPPS Model (Johnson, 2006, pp. 19-32)
- Prepare Session Plans based on BOPPPS Model for the intended class sessions avoiding the Six Common Planning Errors (Felder and Brent, 2016, pp. 68)
- Design Lecture Slides for Class Sessions in structured manner considering the six components of BOPPPS
- Conduct the class sessions based on the detailed session plans

*BOPPPS Model*

*1. Bridge-In*

*2. Objective or Outcome*

*3. Pre-Assessment*

*4. Participatory Learning*

*5. Post-Assessment*

*6. Summary*

*Six Common Planning Errors*

*How to Implement?*

*Concluding Remarks*

*Bibliography*

# A Session Plan Template

A Template for a Class Session using the BOPPPS Model

Date:	Resources		Time
Title:			Duration (minutes)
1. Bridge-in			
2. Objectives /Outcomes			
3. Pre-assessment			
4. Participatory Learning:	Topic	Instructor Activities	Learner Activities
5. Post-assessment: Q&A Session			
6. Summary / Closure			
<b>Total</b>			0
Comments about the class session / future modifications			

Please consult the ISW Manual (Johnson, 2006, pp. 35-42) for more templates

*BOPPPS Model*

*1. Bridge-In*

*2. Objective or Outcome*

*3. Pre-Assessment*

*4. Participatory Learning*

*5. Post-Assessment*

*6. Summary*

*Six Common Planning Errors*

*How to Implement?*

*Concluding Remarks*

*Bibliography*

# *Exemplars*

## *BOPPPS Model*

- 1. Bridge-In*
- 2. Objective or Outcome*
- 3. Pre-Assessment*
- 4. Participatory Learning*
- 5. Post-Assessment*
- 6. Summary*

## *Six Common Planning Errors*

## *How to Implement?*

## *Concluding Remarks*

## *Bibliography*

- A Session Plan based on BOPPPS Model
- Lecture Slides for Class Sessions

## Concluding Remarks

### BOPPPS Model

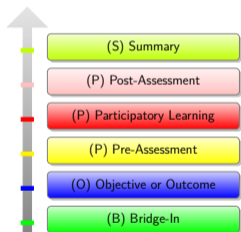
1. Bridge-In
2. Objective or Outcome
3. Pre-Assessment
4. Participatory Learning
5. Post-Assessment
6. Summary

### Six Common Planning Errors

### How to Implement?

### Concluding Remarks

### Bibliography



- Class sessions should be meticulously planned and properly executed.
- Engineering instructors should constantly focus on Constructive Alignment
- BOPPPS model can be used to effectively design class sessions.



## References

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2. *Objective or Outcome*

3. *Pre-Assessment*

4. *Participatory Learning*

5. *Post-Assessment*

6. *Summary*

*Six Common Planning Errors*

*How to Implement?*

*Concluding Remarks*

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*Six Common Planning Errors*

*How to Implement?*

*Concluding Remarks*

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*Six Common Planning Errors*

*How to Implement?*

*Concluding Remarks*

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