Enhancing Students’ Critical Thinking Skill through Flipped Classroom

Thipnapa Huansuriya
Chulalongkorn University, Thailand
Research Questions

■ Can a flipped learning model enhance critical thinking skill of students in a research method class?

■ What are the relationships between students’ attitude towards flipped learning and other outcomes, i.e., their learning behaviours, perceived critical thinking skill, and score on critical thinking test?
Critical Thinking

■ The ability to actively analyse and evaluate arguments (Abrami et al., 2008)

■ Consists of 6 skills, i.e., interpretation, analysis, evaluation, inference, explanation, and self-regulation, 16 subskills, and 19 dispositions, e.g., inquisitive, open-mindedness (by American Philosophical Association – in Facione, 1990)

■ One of the essential skills for students to succeed in life and work in the 21st century (Partnership for 21st Century Learning, 2015)
Framework for 21st Century Learning

- Learning and Innovation Skills – 4Cs
  - Critical thinking
  - Communication
  - Collaboration
  - Creativity

- Life and Career Skills

- Core Subjects – 3Rs and 21st Century Themes

- Information, Media, and Technology Skills

- Standards and Assessments

- Curriculum and Instruction

- Professional Development

- Learning Environments

“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/definition
Flipped Learning

The Traditional Classroom
Teacher’s Role: Sage on the Stage

LECTURE TODAY
Homework
Reading and questions due tomorrow

The Flipped Classroom
Teacher’s Role: Guide on the Side

ACTIVITY TODAY
WATCH lecture online tonight!

(www.knewton.com)
Flipped Learning

Content Delivery

in class

Practice

at home

(Sam, 2014)
Flipped Learning

Content Delivery | Practice

in class | at home

(Sam, 2014)
Flipped Learning

Content Delivery

at home

Practice

in class

Apply

(Sam, 2014)
Flipped Learning

- Content Delivery at home
- Practice in class
- Apply in class
- Analyze in class

(Sam, 2014)
Flipped Learning

Content Delivery
Practice
Apply
Analyze
Create

at home
in class

(Sam, 2014)
Method

- Participants:
  - 85 students (59 females and 26 males) enrolled in the Fall 2014 Research Method in Psychology

- Learning Management System:
  - Blackboard
  - Facebook
Method

- Content Delivery
- Classroom Activities
- Outcome Measures
Method: Content Delivery
Method: Content Delivery

วิธีโดยเน้นการส่งผ่านเนื้อหาที่มีความถูกต้อง

3800212: Week 06 Intro to Experimental Research

Like · Comment · Share

👍 Komm Popthum and 10 others like this.

PQ Penpen บรรยายสวัสดีค่ะอาจารย์ อาจารย์ยังคงคิดหรือเปล่าคะ หลายๆ ______.
September 23, 2014 at 5:15pm · Like · 4
Method: Content Delivery

Dr. Than Suriya

November 5, 2014

This video provides insights into the topic of audience engagement and idea generation, focusing on the role of ideas as a catalyst for learning innovation. The presentation highlights strategies for effective content delivery in educational settings.

Río de la P...
Method: Classroom Activities

- **Classroom Activities:**
  - Weekly quizzes and instant feedback
  - Group discussion of case studies
  - Coming up with research projects
  - Data analysis and writing up reports
  - Peer assessment of group reports
Method: Classroom Activities

O. Dr. Thi Phyu Mya asked a question.
October 26, 2014

In the context of learning from experts, the focus of the activity is on understanding the core aspects of the educational system in this region.

- Teaching the educational system in different countries
- Understanding the educational system in Thailand
- Understanding the educational system in different countries

2 More...

Like · Comment

👍 Chawallanat Laopoonpat and 4 others like this.
Method: Classroom Activities
Method: Classroom Activities
Method: Classroom Activities
Method: Classroom Activities

- **Learn helplessness**
- **R x E Factorial Designs**

- **IV.1.** = ระหว่าง (between subject, subject variable)
- **IV.2.** = ระหว่าง (between subject, manipulated variable)
- **DV.** = Learn helplessness

- Notation 2 x 2 factorial
  - 2 IVs, one with 2 levels, one with 2 levels
  - 4 total conditions

- **Matrix**

<table>
<thead>
<tr>
<th>A</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>D</td>
</tr>
</tbody>
</table>
Method: Classroom Activities
Method: Outcome Measures

- Critical thinking skill test
- Perceived critical thinking skill
- Self-reported learning behaviours
- Attitudes towards flipped classroom
Method: Outcome Measures

- **Critical thinking skill test**
  - Measured three times during the semester
  - Consisted of five dimensions:
    - inferences
    - recognition of assumptions
    - deductions
    - Interpretations
    - evaluation of arguments
Method: Outcome Measures

- **Critical thinking skill test:** Sample Questions

  **Evaluation of arguments**

  “Should the government provide ‘baby grants’ to help support each dependent child in a family so that the family standard of living is not lowered by having children?”

  - Yes; many families who cannot now afford it would then provide better childcare, and this would greatly improve the general health of the nation. (Strong or Weak argument?)

  - No; government provision of ‘baby grants’ would involve additional public expenditure of money. (Strong or Weak argument?)

  (Watson, & Glaser, 2002)
Method: **Outcome Measures**

- **Perceived Critical Thinking Skill**
  - Four items on a 0 – 4 scale

  "Please evaluate yourself on each of the following skills before and after taking this class"  

1. analysing incoming information with critical mind  
2. selecting appropriate statistics for each research design  
3. analysing the strengths and weaknesses of a research study  
4. understanding the importance of research in psychology

(none) 0 1 2 3 4 (proficient)
Method: **Outcome Measures**

- **Self-reported learning behaviours**
  - Four items on a 0 – 5 scale

  “How often did you engage in each of these behaviours in this class?”

1. watching all the videos before coming to class
2. taking notes while watching the lectures
3. attending class
4. participating and fully engaging in classroom activities

(never) 0 1 2 3 4 5 (almost all the time)
Method: Outcome Measures

- Attitude towards Flipped Classroom
  - One item on a 0 – 5 scale

“What do you think of the flipped classroom model?”
(do not like at all) 0 1 2 3 4 5 (like it very much)
Results

■ Can a flipped learning model enhance critical thinking skill of students in a research method class?

■ Time 1 -- $M_1 = 2.91, SD_1 = 0.54$
■ Time 2 -- $M_2 = 3.24, SD_2 = 0.47$
■ Time 3 -- $M_3 = 3.21, SD_3 = 0.54$
Results

Figure 1. Mean critical thinking scores
(N = 85)
Results

■ Can a flipped learning model enhance critical thinking skill of students in a research method class?

■ Time 1 -- $M_1 = 2.91, SD_1 = 0.54$
■ Time 2 -- $M_2 = 3.24, SD_2 = 0.47$
■ Time 3 -- $M_3 = 3.21, SD_2 = 0.54$

■ Wilks’ Lambda = .809, $F(2, 83) = 9.80, p < .001$
  ■ $M$ Difference $2-1 = 0.33, SE = 0.08, p < .001$
  ■ $M$ Difference $3-1 = 0.30, SE = 0.08, p < .001$
  ■ $M$ Difference $2-3 = 0.03, SE = 0.07, p = 1.00$
Results

Figure 2. The distribution of critical thinking scores at Time 1 and Time 3

\[ M_1 = 2.91 \]
\[ SD_1 = 0.54 \]

\[ M_3 = 3.21 \]
\[ SD_3 = 0.54 \]
Results

Figure 3. The distribution of students’ perceived critical thinking skill before and after taking the class

Before

After

$t(84) = 28.00, p < .001$

$M = 1.26$
$SD = 0.49$

$M = 2.79$
$SD = 0.43$
Results

What are the relationships between students’ attitude towards flipped learning and other outcomes, i.e., their learning behaviors, perceived critical thinking skill, and score on critical thinking test?
Results

Figure 4. The distribution of attitude towards flipped classroom and Self-report learning behaviours

- **Attitude towards Flipped Classroom**
  - $M = 3.66$
  - $SD = 1.16$

- **Self-reported learning behaviours**
  - $M = 4.15$
  - $SD = 0.70$
Results

Correlations between variables (N = 85)

- \( r = 0.215, p < 0.05 \)

- \( r = 0.402, p < 0.001 \)
Results

Correlations between variables \((N = 85)\)

- Attitude towards Flipped Classroom vs. Learning Behaviours: \(r = .235, p < .05\)
- Perceived Critical Thinking Skill (After) vs. Learning Behaviours: \(r = .228, p < .05\)
Results

Means, Standard Deviations, and correlations among Variables

\( N = 85 \)

<table>
<thead>
<tr>
<th>Variables</th>
<th>M</th>
<th>SD</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Critical thinking score Time 1</td>
<td>2.91</td>
<td>0.54</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 Critical thinking score Time 2</td>
<td>3.24</td>
<td>0.47</td>
<td>-0.031</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 Critical thinking score Time 3</td>
<td>3.21</td>
<td>0.54</td>
<td>0.086</td>
<td>0.304*</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 Perceived CT skills – before class</td>
<td>1.26</td>
<td>0.49</td>
<td>0.122</td>
<td>0.001</td>
<td>-0.020</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 Perceived CT skills – after class</td>
<td>2.79</td>
<td>0.43</td>
<td>0.022</td>
<td>-0.041</td>
<td>0.071</td>
<td>0.399***</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 Self-reported learning behaviors</td>
<td>4.15</td>
<td>0.70</td>
<td>-0.024</td>
<td>0.024</td>
<td>-0.071</td>
<td>0.075</td>
<td>0.228*</td>
<td></td>
</tr>
<tr>
<td>7 Attitude towards flipped classroom</td>
<td>3.66</td>
<td>1.16</td>
<td>0.113</td>
<td>-0.003</td>
<td>0.215*</td>
<td>-0.035</td>
<td>0.402***</td>
<td>0.235*</td>
</tr>
</tbody>
</table>

Note: * \( p < .05 \), ** \( p < .01 \), *** \( p < .001 \)
Students’ comments

70% of the comments were positive. Students like flipped classroom because they:

- can go back and review the lecture videos anytime
- gain new perspectives from classmates during the discussion
- have opportunities to practice applying what they have learned
- gain deeper understanding of the materials through practice
Students’ comments

- 30% of the comments were neutral or negative. Students don’t like flipped classroom because they:

  - think the workload is much more than traditional classroom
  - prefer live lecture in traditional classroom
  - still don’t understand the purpose of flipped classroom
Students’ Suggestions

- More dynamic videos with better-quality sound
- More exciting in-class activities, e.g., a debate, role play
- Videos should be posted at least one week ahead of time so they have enough time to watch and learn before coming to class
- Online discussion board where they can leave questions or comments anonymously
Next Steps

- Improve the quality of the lecture videos
- Integrating quiz questions into the videos
- More and better designed classroom activities
- Smaller class size, quicker and more thorough feedback
- Better measures of outcome variables
- Better research design
What Aristotle and Joshua Bell can teach us about persuasion - Conor Neill

Let’s Begin…

Imagine you are one of the world’s greatest violin players, and you decide to conduct an experiment: play inside a subway station and see if anyone stops to appreciate when you are stripped of a concert hall and name recognition. Joshua Bell did this, and Conor Neill channels Aristotle to understand why the context mattered.

What ensures that you build credibility and connection?

A. Always make sure that you develop your idea
B. Ensure that you have thought about ethos, pathos, and logos
C. Both A and B
D. None of the above

Watch
Think
Dig Deeper
References


Q&A
THANK YOU