The Flipped Classroom for Library Instruction: A Student Focused Assessment

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BYU ScholarsArchive Citation
Goates, Michael C., "The Flipped Classroom for Library Instruction: A Student Focused Assessment" (2015). All Faculty Publications. 1760.
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The Flipped Classroom for Library Instruction:
A Student Focused Assessment

Michael C. Goates
Brigham Young University
LOEX 2015
May 1, 2015
Overview

• History of the flipped classroom teaching model
• Development of a IL flipped classroom at BYU
• Assessment of a flipped classroom study
• Recommendations for future implementation
History of the Flipped Classroom

High School Beginnings
- Chemistry teachers Jonathan Bergmann and Aaron Sams - 2007
  - Pre-recorded lectures for students to view before class
  - Collaborative learning activities during class time (Bergmann & Sams, 2009)

Higher Education Applications
- “Inverted classroom” economics course (Lage et al., 2000)
- Increased interest and research in 2010’s
  - (Davies et al., 2013; Missildine et al., 2013; Tune et al., 2013)
- Flipped classroom = improved learning outcomes (generally)
  - Mixed results for student satisfaction (Missildine et al., 2013)
  - Credit bearing courses
Anderson and May (2010) incorporated a hybrid instruction model using an online tutorial in conjunction with an in-class library instruction session. They found that students performed equally as well at constructing keyword and Boolean searches in face-to-face, online, and hybrid teaching models. However, in this study, the in-class session of the hybrid model was identical to the instruction in the face-to-face model, rather than leveraging the in-class instruction time for hands-on application of concepts learned during the online tutorial. Thus, from this example, combining online tutorials with in-class instruction did not appear to improve student performance. However, it is possible that a hybrid library instruction session that allows students to participate in collaborative, hands-on application exercises will enhance student learning over traditional lecture and online only instruction methods. To date, however, little research in library instruction exists to support or refute that assumption.
Advanced Writing Course at BYU

Brief history
- General requirement for all students
  - Predominantly juniors and seniors
- Students sign-up for library workshop
  - Discipline-specific
  - One-shot, 50 minute session
  - Receive attendance points
  - Traditional lecture-based
- Looking for more student engagement
Life Sciences Library Tutorial History

Collaboration
  ◦ Instruction Librarian
  ◦ Library iLearning
  ◦ Subject Librarian

Move “point and click” instruction online
  ◦ Source evaluation
  ◦ Search strategy development

http://net.lib.byu.edu/tutorial/lifescience/
Life Sciences Library Tutorial

Multiple software tools
- Articulate Storyline
- Adobe Creative Cloud (Illustrator, After Effects, Premier Pro, SpeedGrade, and Soundbooth)

Students “walk through” developing a search in *Web of Science*

http://net.lib.byu.edu/tutorial/lifesience/
After pilot, made tutorial more directive in WoS module. Clarified worksheet.
Traditional Lecture Model

In-class session
- Covered same material as online tutorial
- Overview of peer-review process and source evaluation
- Live database search demonstration (Web of Science)
- Students complete search assignment and session evaluation
Flipped Classroom Model

Watched LS tutorial in advance
- Sent link and reminders to students

During in-person session:
- Brief recap of tutorial
- Search activity with partner (student facilitated reference interview)
- Librarian/T.A. consultations
- Group discussion of research activity
- Students complete search assignment and session evaluation
Life Sciences Library Session Assignment

1. Do you give the library permission to use your responses on this worksheet for research purposes? □ Yes □ No

2. Did you complete the online Life Sciences Library Tutorial before attending this instruction session? □ Yes □ No

If yes, when did you complete the tutorial?
Today □ 3-5 days ago □ 6-7 days ago □ More than 7 days ago □

3. Research Topic:

The impact of soft drink consumption on childhood obesity.

What defined concepts would you use to search on this topic? Are there related terms or synonyms? List each distinct concept and any relevant synonyms or related terms in the table below, as needed.

<table>
<thead>
<tr>
<th>Distinct Concept</th>
<th>Synonym</th>
<th>Synonym</th>
<th>Synonym</th>
<th>Synonym</th>
</tr>
</thead>
</table>

4. Construct an effective search strategy within the Web of Science database: (http://www.elsevier.com/wol) to find relevant journal articles on this topic. Use the OR, AND, and NOT operators and any necessary limiters (date range, title search, truncation, document types, etc.) to refine your results.

a. Write your final search statement:

b. List any limiters used to refine the results:

c. Total number of articles in final search:

---

Life Sciences Library Session Worksheet Rubric

<table>
<thead>
<tr>
<th>Worksheet Section</th>
<th>Points Value</th>
<th>Example</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sr. Distinct concept</td>
<td>□ 1 point for each relevant concept or related concept to 5 points total</td>
<td>Soft drinks</td>
<td>Concepts do not need to be these terms, but should be related. Students may also develop more than 5 distinct concepts. Ungrouped concepts can be awarded 1 point. Complete listing is required.</td>
</tr>
<tr>
<td>Mr. Synonym</td>
<td>□ 1 point for each relevant synonym or related concept</td>
<td>Blood, circulatory system</td>
<td>None</td>
</tr>
<tr>
<td>Ms. Thesaurus</td>
<td>□ 5 points for appropriate use of OR operator</td>
<td>OR operator OR operator OR operator (Note: assign 5 points for each synonym and/or synonym, up to 5 points)</td>
<td>None</td>
</tr>
<tr>
<td>Ms. Relevant search statement</td>
<td>□ 5 points for appropriate use of AND operator</td>
<td>AND operator AND operator AND operator AND operator (Note: assign 5 points for each synonym AND operator)</td>
<td>None</td>
</tr>
<tr>
<td>Ms. Limiters/Filterers</td>
<td>□ 1 point for appropriate use of date range operator or date range.</td>
<td>Date range = 2001-2014</td>
<td>None</td>
</tr>
<tr>
<td>Ms. Total number of articles in final search</td>
<td>□ 0 to 5 points</td>
<td>-5 points if search is not relevant to the question and includes more than 5 distinct concepts.</td>
<td>None</td>
</tr>
</tbody>
</table>

*Purchased from Elsevier to refine search results, i.e., “genetic” gene, genotype, but also genetic, genetics, do not assign any points that are points.*
Study Hypotheses

Three distinct groups of students
- Students in flipped group who watched tutorial (Flipped/Yes)
- Students in flipped group who did not watch tutorial (Flipped/No)
- Students in lecture group (Lecture)

Anticipated results on Final Search Statements
- Flipped/Yes > Lecture > Flipped/No
- Timing of tutorial viewing will impact performance
- Strong student preference for interactivity of flipped session
Conducted One-way ANOVA with Tukey-Kramer Post-Hoc comparison

Lecture scored significantly higher than flipped/Yes and Flipped/No

Flipped/Yes scored significantly higher than Flipped/No
Results- Timing of Tutorial Viewing

Timing of tutorial viewing and mean score
- Day of session, $n = 22$; $\bar{x} = 7.16$
- 1 to 3 days prior, $n = 24$; $\bar{x} = 7.53$
- 4 to 7 days prior, $n = 2$; $\bar{x} = 5.75$
- More than 7 days prior, $n = 5$; $\bar{x} = 5.5$
- No significant difference on score and timing of tutorial viewing

<table>
<thead>
<tr>
<th>Viewing Date Before Session</th>
<th>Mean Difference ($\overline{d}$)</th>
<th>Std. Error</th>
<th>Sig.</th>
<th>Lower Bound</th>
<th>Upper Bound</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 days</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-3 days</td>
<td>-1.3721</td>
<td>1.0909</td>
<td>.30</td>
<td>-2.786</td>
<td>0.0439</td>
</tr>
<tr>
<td>4-7 days</td>
<td>1.4090</td>
<td>1.7943</td>
<td>.35</td>
<td>-1.158</td>
<td>4.1541</td>
</tr>
<tr>
<td>&gt; 7 days</td>
<td>1.5859</td>
<td>1.1269</td>
<td>.10</td>
<td>-1.354</td>
<td>3.5429</td>
</tr>
<tr>
<td>1-3 days</td>
<td>-2.321</td>
<td>1.7768</td>
<td>.38</td>
<td>-5.193</td>
<td>0.5508</td>
</tr>
<tr>
<td>1-5 days</td>
<td>2.0312</td>
<td>1.1876</td>
<td>.30</td>
<td>-1.372</td>
<td>5.1897</td>
</tr>
<tr>
<td>&gt; 7 days</td>
<td>2.0500</td>
<td>2.0212</td>
<td>.39</td>
<td>-5.5254</td>
<td>5.1254</td>
</tr>
<tr>
<td>7 days</td>
<td>-1.8509</td>
<td>1.0969</td>
<td>.30</td>
<td>-2.786</td>
<td>0.0439</td>
</tr>
<tr>
<td>1-3 days</td>
<td>-2.0312</td>
<td>1.1876</td>
<td>.38</td>
<td>-5.193</td>
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<tr>
<td>1-5 days</td>
<td>-2.0312</td>
<td>2.0212</td>
<td>.39</td>
<td>-5.5254</td>
<td>5.1254</td>
</tr>
</tbody>
</table>

No significant difference on score and timing of tutorial viewing, though relatively few students watched the tutorial more than 3 days before schedules library session.
## Results- Student Evaluations (Lecture)

<table>
<thead>
<tr>
<th>Lecture Top Positive Responses</th>
<th>Lecture Top Negative Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Learning search strategies</td>
<td>Time consuming/already knew information</td>
</tr>
<tr>
<td>Discovering library databases/resources</td>
<td>More instruction on search strategies/databases</td>
</tr>
<tr>
<td>Demonstrating search process</td>
<td>More interaction/one-on-one help/smaller class size</td>
</tr>
<tr>
<td>Practicing searches</td>
<td>Research own topic</td>
</tr>
<tr>
<td></td>
<td>More time for student practice</td>
</tr>
</tbody>
</table>
### Results - Student Evaluations (Flipped)

#### Flipped Top Positive Responses

<table>
<thead>
<tr>
<th>Activity</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Learning search strategies</td>
<td>42</td>
</tr>
<tr>
<td>Discovering library databases/resources</td>
<td>16</td>
</tr>
<tr>
<td>Researching own topic</td>
<td>12</td>
</tr>
<tr>
<td>Time for student practice/hands-on learning</td>
<td>12</td>
</tr>
<tr>
<td>One-on-one librarian help</td>
<td>8</td>
</tr>
<tr>
<td>Online tutorial</td>
<td>5</td>
</tr>
</tbody>
</table>

#### Flipped Top Negative Responses

<table>
<thead>
<tr>
<th>Issue</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demonstrate more search strategies</td>
<td>14</td>
</tr>
<tr>
<td>No research topic/assignment correlated to library session</td>
<td>8</td>
</tr>
<tr>
<td>More one-on-one help/more T.A.s/smaller class size</td>
<td>8</td>
</tr>
<tr>
<td>More time to explore other databases/resources</td>
<td>5</td>
</tr>
<tr>
<td>Time consuming/make entirely online</td>
<td>5</td>
</tr>
</tbody>
</table>
Discussion - Limitations

Limitation
- Narrow research focus - search strategies
- Study participants - juniors and seniors
- No incentive for participants to perform well
- Artificial search assignment
This really hurt for me. I like teaching the flipped model and I hoped students would do better.

Discussion- Student Performance

Why didn’t student perform better in the flipped session?
- Immediacy of lecture instruction
- Casual completion of tutorial
- Human component to lecture
- Difficult implementation for one-shot

While performance differed significantly, were these differences important?
- 3 vs. 7.11 vs. 4.70

Need to also consider student preference
Student preferences appear to incorporate elements from both traditional lecture and flipped classroom teaching models.
Should we only use a flipped model in credit-bearing, semester-long instruction? My response is NO. Flipping can be an important tool, even in a one-shot.

Own Assessment- Start of small- simple open-ended student evaluations “What was the most helpful about this session? How could this session be improved?” Good idea to try this out any time you implement something new in your instruction. Good to get direct feedback from students. If you have more time and are feeling adventurous, try developing way to gather measures of student performance. Sometimes hard to get end product to evaluate. Collaborate with teaching faculty on graded assignment. Greater student buy-in and interesting to compare grades/results.
Take Home

- Human component to library instruction
- Casual completion of tutorial
- Flipped works better over multiple sessions
- Must connect out-of-class material to in-class activity
- Utility of blending lecture and flipped instruction
- Student accountability critical in flipped environment
- Student preferences are as important as student performance
References


References (cont.)


