Flipped-Out: Learning Outcomes and Responses to a Flipped-Classroom Medical Embryology Course

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Results

The flipped classroom (FC) is a pedagogical innovation with increasingly broad adoption among medical schools. The effectiveness of this pedagogy is poorly understood beyond student satisfaction and exam scores. Evaluation should focus on what about the design and the implementation worked and did not work that might help understand how to positively impact future learning. This implementation took place during the first course of medical student embryology curriculum.

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Objective:
1. To explore the efficacy of a Flipped Classroom model within a medical student embryology curriculum.

Methods

This mixed-methods, retrospective study engaged layered analysis for a Fall 2019 FC implementation.

Background & Rationale

• Flipped classroom (FC) is a pedagogical innovation with increasingly broad adoption among medical schools.
• The effectiveness of this pedagogy is poorly understood beyond student satisfaction and exam scores.
• Evaluation should focus on what about the design and the implementation worked and did not work that might help understand how to positively impact future learning.

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Table 1. Comparison of didactic (2018) vs flipped-classroom (2019) average IRT ability scores with two-sample t-test statistical analysis.

<table>
<thead>
<tr>
<th></th>
<th>Average Score</th>
<th>Average IRT Ability</th>
<th>Ability Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exam</td>
<td>2018</td>
<td>2019</td>
<td>2018</td>
</tr>
<tr>
<td>1</td>
<td>91%</td>
<td>91%</td>
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<tr>
<td>2</td>
<td>86%</td>
<td>84%</td>
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<tr>
<td>4</td>
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<td>88%</td>
<td>2.43</td>
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</table>

Finding #1: The 2019, flipped-classroom cohort demonstrated higher average embryology ability levels on all four exams, compared to the 2018 cohort.

Finding #2a: Post-course survey revealed that students perceived the pre-work videos positively, though they preferred didactic lectures.

Finding #2b: Students perceived the instructor as effective, preferred supplemental use of pre-work videos and expect deeper in-class teaching.

Finding #3: Layered analysis revealed the following major themes:

- Learner frustration with change
- Minimal introduction to FC
- Discrepancy in instructor evals
- Learner disengagement
- FC takes more time
- Pedagogical competition
- Efficiency vs learning

Discussion

Conclusions & Next Steps

FC yielded improved learning outcomes and students did not perceive it to be beneficial.

Emphasis should be placed on providing effective introduction to FC.

Next Steps:

- Consider appropriate means of introduction to FC learning experiences
- Longitudinal study could determine if creating consistent learning experiences reduces negative student perception of FC.

References & Acknowledgements

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• Students variably accept FC and vary in their perception of learning efficacy

References: