Patricia Murthy

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Final Writing Assignment

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Introduction

This study will determine whether inductive or deductive lessons affect learning when delivered in the *flipped classroom* approach. The study will consist of two Regents Biology student groups at each of three similar high schools on Long Island. One group will receive inductive lessons and the other, deductive lessons on cell biology prepared by the teachers. The lessons will take place over a six-week period, delivered online, in a technology-based format accessed outside the classroom (that is video, podcast, animated demonstration). A pretest will be used as a baseline for topic understanding and after the course; mastery will be measured by a summative post-test. The subgroup's results will be compared.

Sampling/Design

This study will be in three similar Long Island high schools with Regents Biology students whose teachers already flip the instructional delivery. The teacher in each school will test two classes, one receiving the information using deductive lessons and the other inductive. Sub-group I will receive the deductive lessons and Sub-group II, the inductive lessons. The pools of students in each class are similar: both Regents level Biology. During the six-week course,

the science teacher will deliver the lessons to the classes of about 23 students each, by flipping the classroom (using media-based on-line tools.). The total sample for each sub-group when combined with the other high schools will be n=69, and a normal distribution will be assumed.

Differences in post-test and pretest scores will be calculated and the results for each subgroup analysed. A future mixed method approach may be possible to include a questionnaire for both teachers and students on preference of lesson type.

Instrumentation

The assessments for the unit are Regents practice items on Cell Biology, prepared by the teachers. A pretest of content knowledge on Cell Biology will be administered in class before the course. Both the deductive and inductive lessons (the sub-groups) will be delivered over a six-week period and include a final class review session. A possible mixed method approach may be possible to include a questionnaire for both teachers and students on preference of lesson type. An item analysis and the dimensions of the instrument may be included.

Reliability/Validation

Whenever new instructional formats become the focus for increasing student engagement and achievement, there is a need to examine it for reliability. In this case, the summative assessment would need to be a reliable tool for measuring student growth. There may be a necessity to have independent sources review the plan.

Research Questions/Analytic techniques

The primary research question is to determine what impact inductive or deductive lessons will have on student learning when delivered in a flipped classroom. This would be a very straight forward pretest/posttest student achievement study, with a focus on determining which lesson type, deductive or inductive has the greater impact when delivered outside the classroom. An ANOVA would statistically test the hypothesis and test the statistical significance of the study.

Limitations

The delivery of lessons and preparation of online instructional media will vary between teachers, in both their previous experience with flipping as well as effectiveness. One challenge will be keeping as close to a similar program as possible while limiting the impact individual differences will have on the study.