Prior Education and Medical School Achievement
An Analysis of Elective Courses Impact in a Flipped Classroom

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Background

Medical school curricula have changed rapidly, moving from a purely lecture-based format in the early 20th century to today's organ system based courses, problem-based learning, and clinical correlations earlier in the medical school experience. However, the requirements for entry to medical school have not changed to keep pace. The American Association of Medical Colleges (AAMC) describes the minimum required courses for medical school to be:

- Biology (1 year)
- Physics (1 year)
- English (1 year)
- Chemistry (2 years)

Many core classes in medical school are not addressed these required courses.

Objectives

To identify differentials in student performance in both medical school anatomy coursework and standardized testing outcomes, based on students' previous educational experiences and to determine what level of previous exposure is needed to establish this differential outcome.

Methods

Students of the classes of 2020, 2021, and 2022 were stratified into groups according to their previous exposure:

| Group A | • 4+ previous courses/degree (BS, MS) |
Group B	• 2-3 previous courses
Group C	• 1 previous course
Group N	• No previous exposure

These groups were compared based on grades in multiple choice exams, lab practicals, and Step 1 score using a using one-way analysis of variance (ANOVA) to help determine if the students' experience contributed to an unusually high or low grade.

Results

343 total students between the classes of 2020, 2021, and 2020 were compared based on previous experience. In the 200+ ANOVA and Bonferroni tests that were run between various groups of individuals, separated by medical school year, very few of the results were statistically significant.

In the Class of 2021's anatomy lab practical, a group with relatively lower experience (C) scored significantly lower on average than a group with greater experience (A).

In all 3 biochemistry exams for the Class of 2020, groups with less biochemistry experience (N and C) received statistically significantly lower scores than groups with more experience (A).

Anatomy Multiple Choice Exam Results by Percentage

GROUP N 86.4 · GROUP C 86.4 · GROUP B 86.8 · GROUP A 91.8

Anatomy Experience by Group
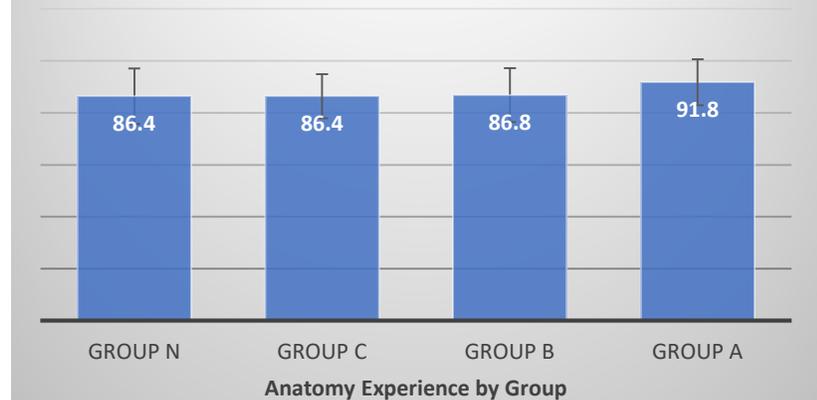
Conclusions

The lack of a reliably statistically significant differentials in medical student outcomes indicates that the flipped classroom setting is sufficient to teach motivated students the foundations of subjects as different as anatomy, microbiology, and biochemistry well enough to overcome initial differences in students' prior educational exposures.

Acknowledgements

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