Peer-Led Learning in Neuroscience Anatomy Curriculum

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RATIONALE/NEED

Previously, a peer-led and team-based mock practical examination was successfully employed at the Brody School of Medicine in the gross anatomy course. This strategy can be implemented to supplement the gross neuroanatomy component of the neuroscience course.

Peer-led learning:
- Characterized by role taking of students as tutors or tutees with a focus on curriculum content
- Used to improve learning quality for both tutors and tutees
- Reduces faculty burden
- Increases student preparedness and intrinsic motivation
- Offers supplemental educational opportunities for students

Team-based learning:
- Approach to pedagogy that promotes active learning
- Shows improved student performance,
- Positive student perceptions regardless of grades
- May provide additional benefit to at-risk students

METHODS

Population: consenting medical and graduate students in the neuroscience curriculum 2017-2018 in intervention group; students who did not attend in control group

Intervention: Mock Practical Examination (MPE)
- Consulting faculty to establish question type and distribution for exam
- Distribution of topics for question creation by tutors
- Scheduling of MPE after delivery of new lab material and a cumulative MPE before the exam
- Structuring questions identical to exam format
- Facilitation of group discussion after MPE (team-based learning)
- Distribution of answers to participants and provision of question-based explanations from facilitators
- Collection of participant self-assessments measuring confidence in preparedness before and after each MPE

Data collection:
- Self report survey data on confidence level and independent study time
- De-identified, coded course exam grades

Data analysis:
- T-Test- intervention vs control group exam averages
- Pre-post changes in self confidence
- Correlation between independent study and grades

RESULTS

Preliminary results from 4 MPE interventions and 3 examinations have been analyzed with promising results.
- On average, 25% of students chose to participate in MPE
- Students who attended at least one MPE prior to examinations show significantly higher average exam scores (Table 1, Figure 1, $p \leq 0.05$)
- Lower percentage of students who attend the MPE received a failing exam grade (Table 2)
- Smaller range of exam scores (Table 2) was seen in the intervention group with a higher median score (Table 2)
- Independent study time not significantly correlated with improved exam performance in the intervention group (Figure 2, R=0.022)
- Increased confidence in course material by an average of 0.6 points on a scale from 1-5 (Figure 3)

Table 1: Results of T-Test comparing exam averages between groups

Group	Intervention*	Control
N	95	160
Mean exam score	85.42	83.28
Std deviation	8.03	8.78
Variance	64.47	76.99

T-Test P= 0.054
* Intervention group attended at least 1 MPE before exam

Table 2: Differences in grade distributions between groups

Group	Intervention	Control
Min. score	66	58.9
Max. score	98.7	100
Median score	86.3	83.7
# Failed	3	10
% Failed	3.16%	6.25%

CONCLUSIONS

Preliminary results of the neuroscience anatomy curriculum suggest that this intervention might improve student performance in the neuroscience anatomy curriculum.

Limitations to this study include the small sample of data points and lack of data from the control group. There is no information on independent study time for the control group, so it is impossible to completely determine whether this factor is responsible for the difference in exam averages.

Future analyses will investigate written neuroscience exam grades in both intervention and control groups to determine effects of confounding variables on results.

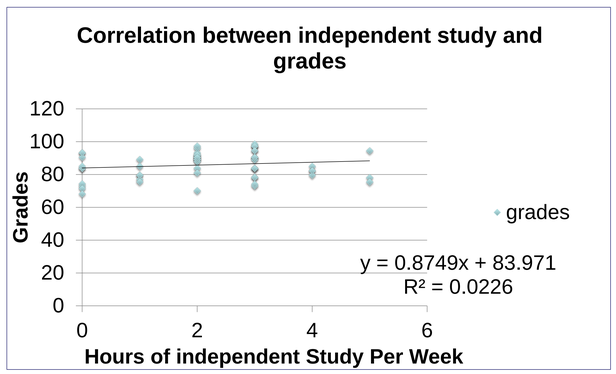

Figure 2: Correlation between independent study time as a potential confounding factor and grades was determined

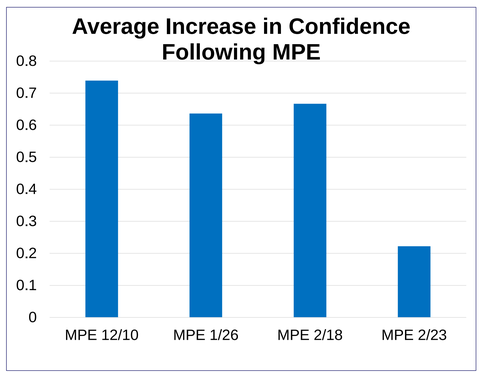

Figure 3: Increase in Confidence from comparison of post-pre self confidence scores

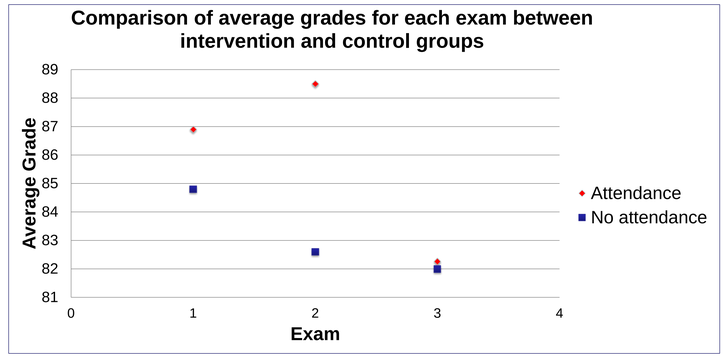

Figure 1: Comparison of each exam averages between intervention and control group

IMPACT

The success of this intervention could greatly benefit students in the neuroscience curriculum.

The MPEs have been developed to allow for reproduction in future years through:
- Development of protocol for administration of MPE
- Establishing a question bank of images and question types that have been considered essential material by MPE facilitators and peers
- Consideration of feedback and observations during MPEs

Examples of observations that have improved MPE implementation include trends of attendance and group discussion. The cumulative MPEs before exams have the highest attendance. Provision of answers to questions after MPE rather than during yields more discussion.

This protocol and these resources will be distributed to selected leaders in the Class of 2022. This will enable longitudinal data collection and a positive supplemental learning experience for the MPE attendees in future classes.

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