

Enhancement of the resident didactic experience through combined pre-lecture readings, case-based learning and written board style questions.

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Introduction

Didactic lectures of core specialty topics are a fundamental learning platform for graduate medical education. The Accreditation Council of Graduate Medical Education (ACGME) mandates that residency programs provide a “broad range of structured didactic activities” for the “advancement of residents’ knowledge...”⁽¹⁾ The primary objective of an effective and robust didactic curriculum is to supplement clinical education so resident physicians can become expert clinicians and provide the highest standard of care to their patients. But studies estimate that long-term retention of adult learners in traditional lectures alone can be as low as 5% (2).

The execution of a didactic curriculum varies between institutions and residency programs. Over the past five years, the Department of PM&R at UT Health- San Antonio has implemented multiple revision to its curriculum in attempting to maximize the learning environment, but has largely remained exclusively lecture-based. Traditional lecture formats as the sole and primary means to provide formalized education have been scrutinized in recent years. Alternative methods, such as case-based learning (CBL) have shown to be an effective and enjoyable method of teaching in the graduate medical setting (3, 4). Additional tactics such as pre-lecture readings and quiz-style questions one would see on the written board examination are also supplemental methods to enhance overall learning.

An additional learning and assessment tool used in physical medicine and rehabilitation is the annual Self-Assessment Exam for Residents (SAE-R) administered through the American Academy of Physical Medicine and Rehabilitation (AAPM&R). Residents in physiatry across the country participate in this examination which tests their clinical knowledge compared to their cohort. In 2017, our residency program opted out of the SAE-R which continued through 2019. The year 2020 was the first time residents from our program had taken this exam in three years. To our discouragement, but not to our surprise, the overall performance from our program was substandard. According to Moroz and Bang, the SAE-R can be helpful in predicting performance on the written board examination administered by the American Board of Physical Medicine and Rehabilitation (ABPMR), specifically in identifying at-risk residents for failure which appears to be around the 47th SAE-R percentile (5). Of those PGY-3 and PGY-4 residents from our program, 57% would be considered “high risk.” Although the first-time written board pass rate for our program during the past five years is 95%, this performance on the SAE is troubling and may reflect a need to address our didactic format.

The aim of this project was to enhance our traditional didactic format, increase overall satisfaction of the residents, ensure their success with written board preparation, and ultimately help them incorporate didactic material into their clinical practice with the implementation of three separate supplemental academic activities (pre-readings, patient cases, and quizzes). As a result of this project, we anticipated improved satisfaction with weekly lectures, increased retention in medical knowledge, and improved application of clinical principles. We also hope for improved SAE-R scores. Ultimately, we anticipate that this will serve a first step in a long-term process of incorporating adult learning theory, cognitive psychology, and active learner activities into our didactic curriculum.

Methods

In addition to our traditional lecture-based didactic format (via virtual learning due to COVID-19 precautions), the following changes were implemented from 08/01 – 12/18/2020:

- Each week, PGY-2-4 residents were given a suggested short pre-reading from primary literature, textbooks or the AAP “Essential Articles” list that related to the specific lecture topics that were delivered. These readings were chosen through collaboration with residency leadership as outlined above. Readings were encouraged to be completed prior to lecture, but were optional.
- Residents were given weekly patient cases related to the lecture topics to complete individually or in a group voluntarily sometime before lecture. These were authored by either residency leadership or faculty lecturers.
- Five-ten board-style timed questions (80 seconds per questions) were administered electronically on a weekly basis related to the assigned subject matter. Answers and explanations to the cases and questions were published, distributed and in some cases discussed.

Primary outcome measures will not be ascertained until after the conclusion of AAP which are SAE-R scores to be compared against last year’s scores. In addition, we will assess for a correlation between how well a resident does on weekly quizzes and self-report of involvement of weekly readings and cases and their SAE-R scores. This can eventually be trended to assess for overall success in the written board examination.

Secondary measures were ascertained using a Likert scale survey specifically assessing resident perception that these domains enhanced the lecture format before and after their implementation. Scores for quizzes and participation in cases and pre-readings were compiled and trended according to PGY-level.

Results

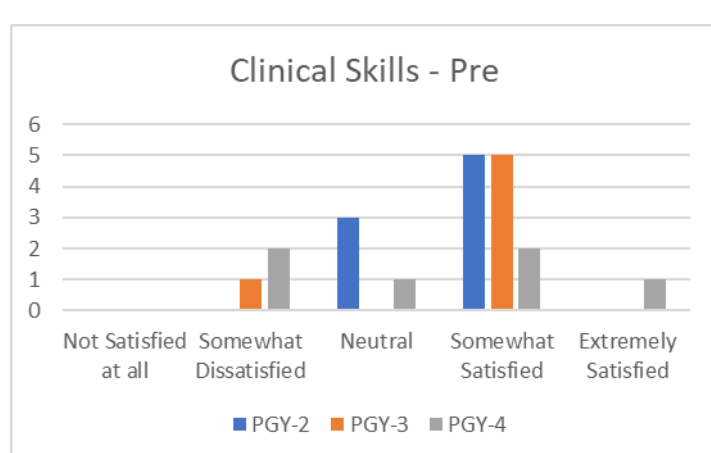


Figure 1 Assessment of how satisfied residents were pre and post-implementation that didactics aid in the improvement of clinical skills.

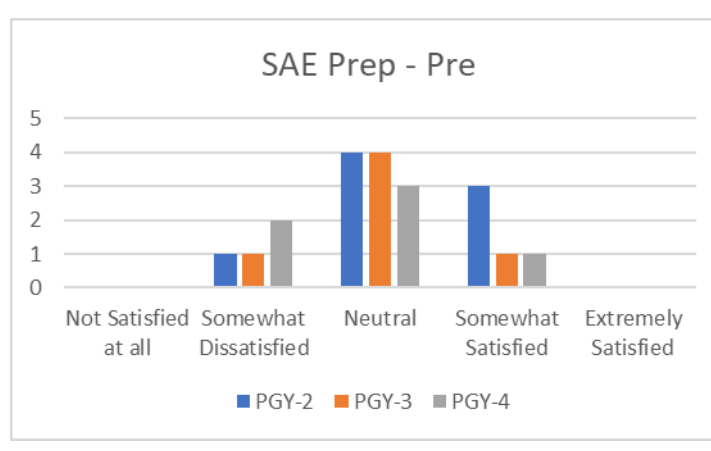
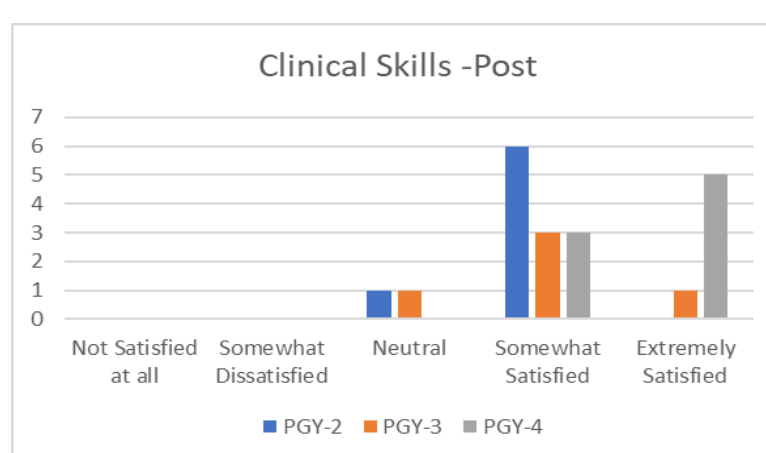


Figure 2 Assessment of how satisfied residents were pre and post-implementation that didactics provide adequate preparation for the SAE-R examination.

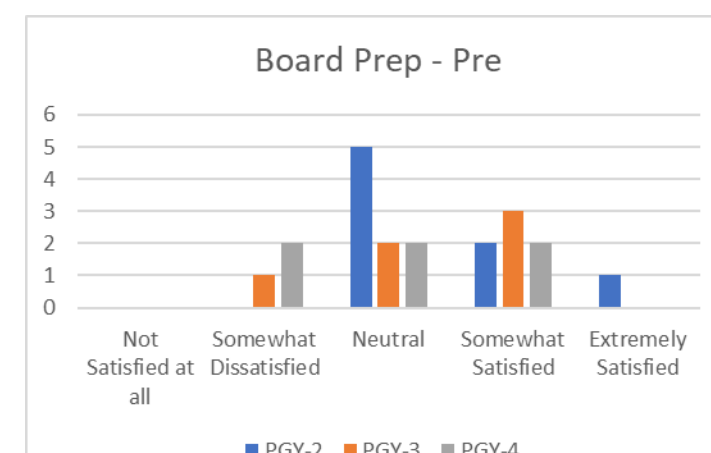
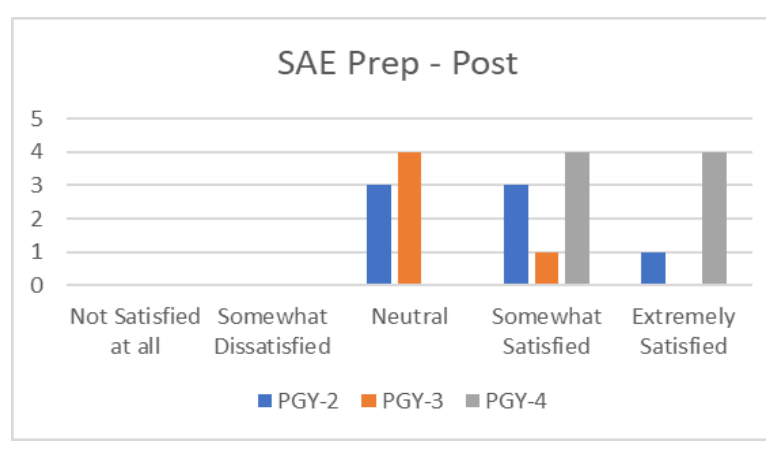


Figure 3 Assessment of how satisfied residents were pre and post-implementation that didactics provide adequate preparation for the ABPMR Part I examination.

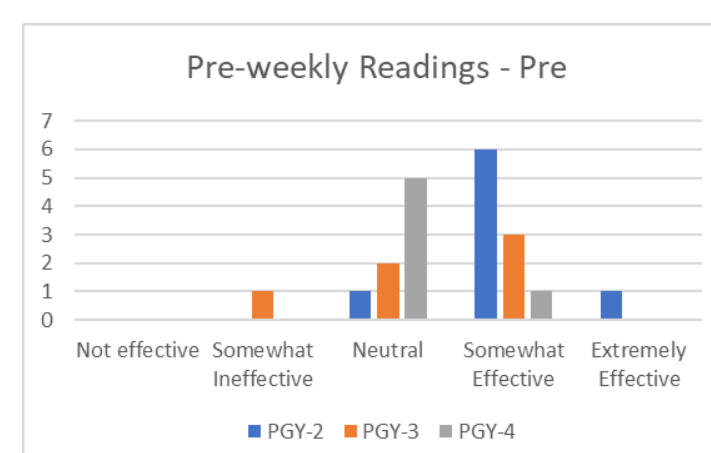
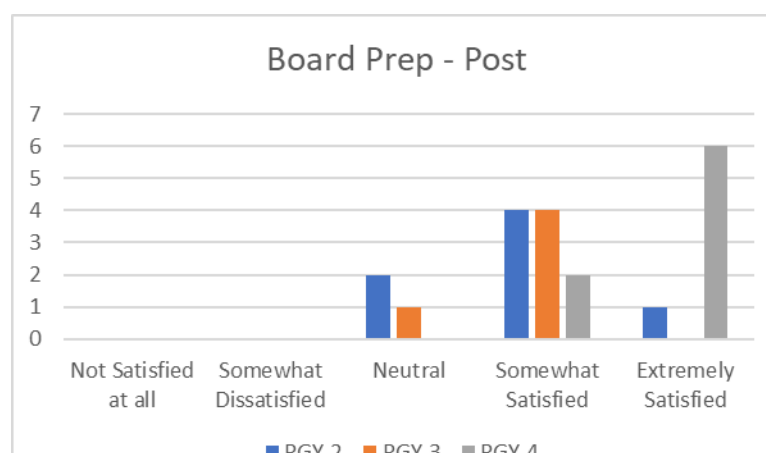


Figure 4 Assessment of resident perception pre and post-implementation that pre-lecture readings coupled with didactics improve one’s ability to retain the information in lecture.

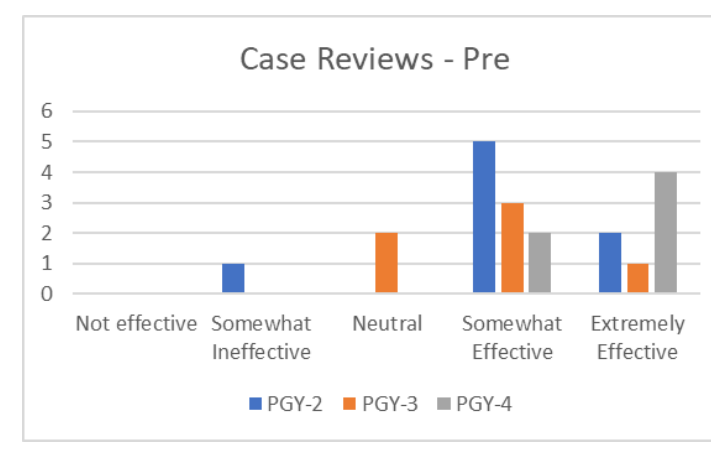
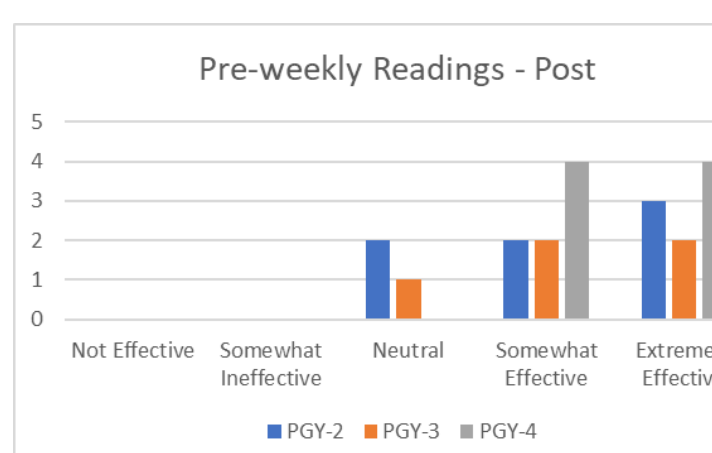


Figure 5 Assessment of resident perception pre and post-implementation that case reviews coupled with didactics improve one’s ability to retain the information in lecture.

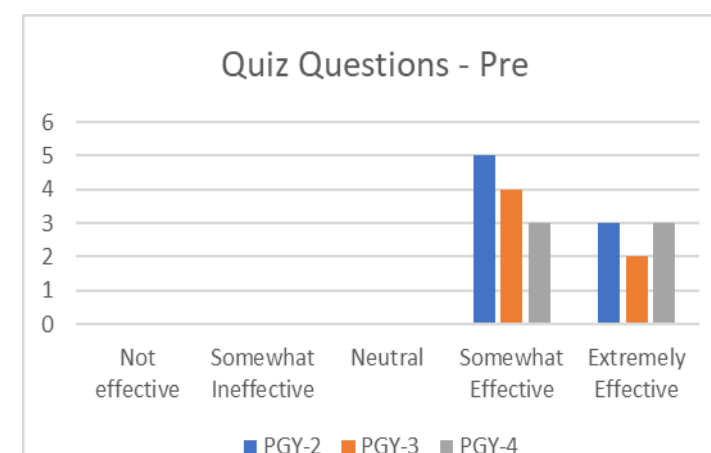
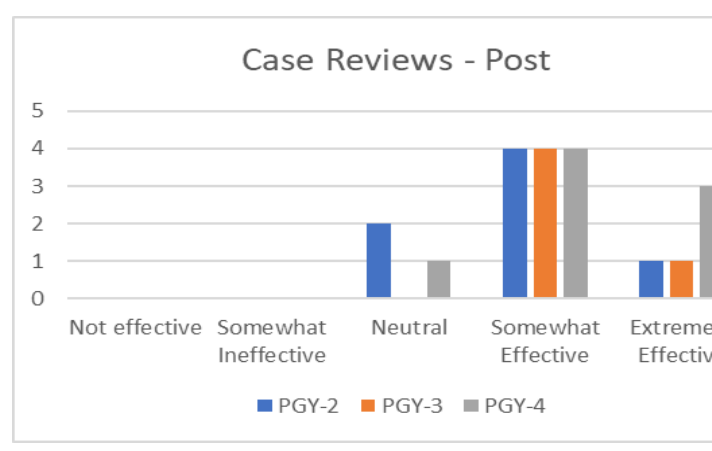
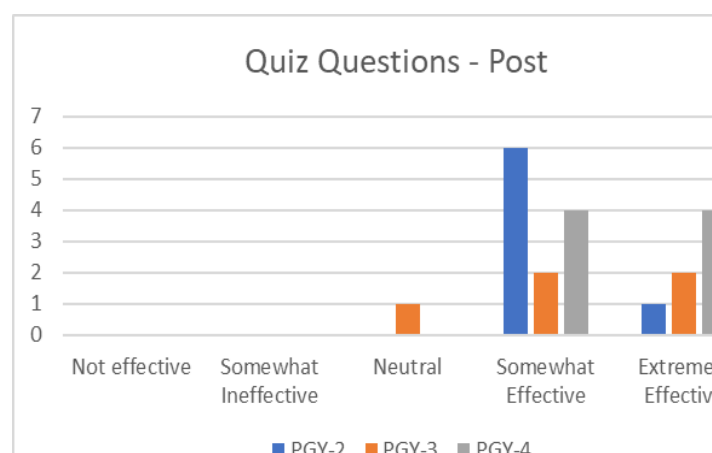


Figure 6 Assessment of resident perception pre and post-implementation that written board style quiz questions improve one’s ability to retain the information in lecture.



Resident Class	% Cases Completed	% Readings Completed	Average Test Score
PGY-2	45%	42%	52.4%
PGY-3	58%	56%	59.1%
PGY-4	85%	71%	71.5%

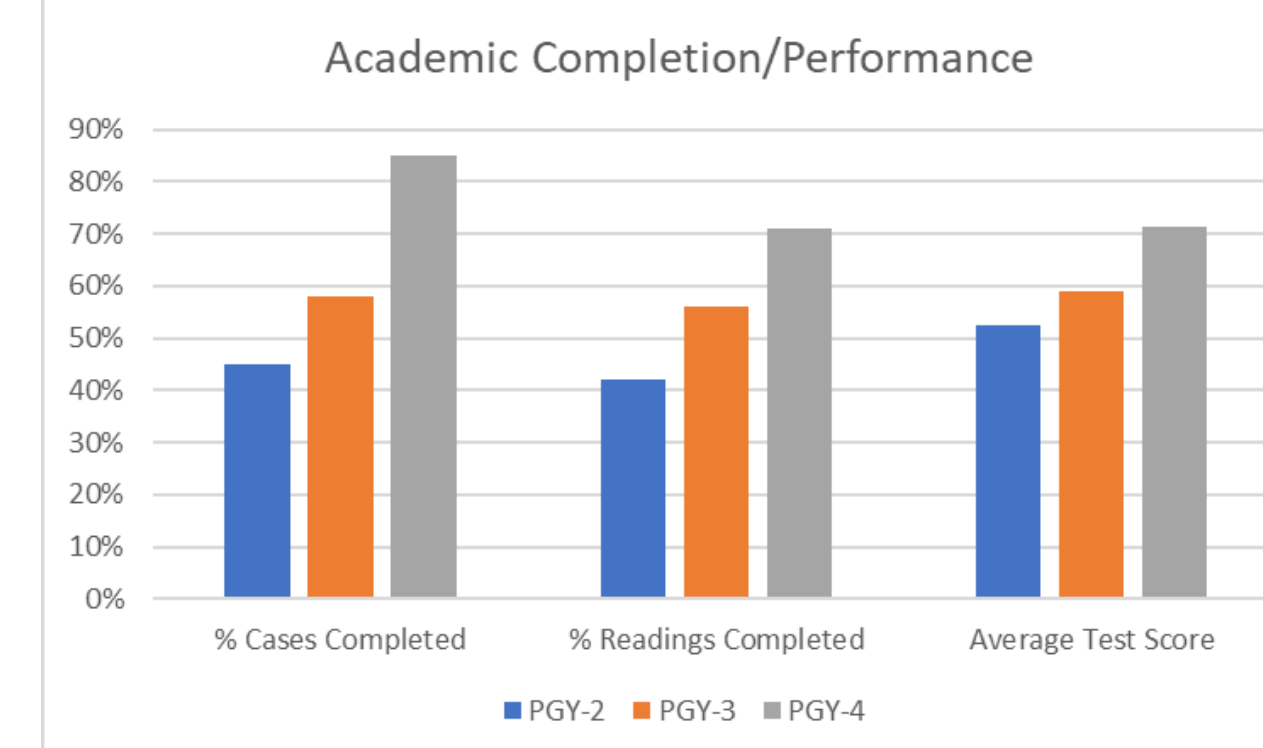


Figure 7 Depiction of percentages of total cases and pre-readings completed per residency class as well as average weekly test scores per resident per class.

Discussion

The hypothesis was that implementing these supplemental activities of pre-lecture reading assignments, case reviews, and board-style quiz questions will not only improve the perceived lecture experience and result in better SAE-R scores, but most importantly aid in making better physicians. Implementation of these activities has overall improved resident perception that they are being better prepared in clinical skill development, SAE-R preparation, written board preparation.

We also found that participation in these supplemental activities seems related to PGY level, with PGY-4s completing more cases and reading assignments. They also average a higher quiz score, but causality between higher scores and higher rates of completion of cases/readings cannot be determined as PGY-4 residents have acquired more knowledge inherent to their seniority. The reasons why PGY-2s and PGY-3s do not participate as much PGY-4s may be related to the fact that they are typically on busier services and are generally not as motivated to study as PGY-4s who are more actively preparing for the written board exam. Once the SAE-R has been completed, we will be able to take a specific individual’s performance and assess that against their participation in these readings/cases as well as their performance on weekly quizzes to see which activity enhances learning the most.

Conclusion

Voluntary involvement in academic activities meant to supplement traditional lectures, such as case reviews, suggested readings and quizzes can improve perception that information retention is improved. This has been a uniquely challenging year with COVID-19 restriction in delivering quality didactics to our residency. But hopefully these measures will prove to show improved SAE-R scores and continued improved satisfaction with didactics that will lead to expanded and more innovative ways in delivering education.

References

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