



# Considerations and Cautions for Teaching in Higher Education in the Era of Distance Learning

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## INTRODUCTION

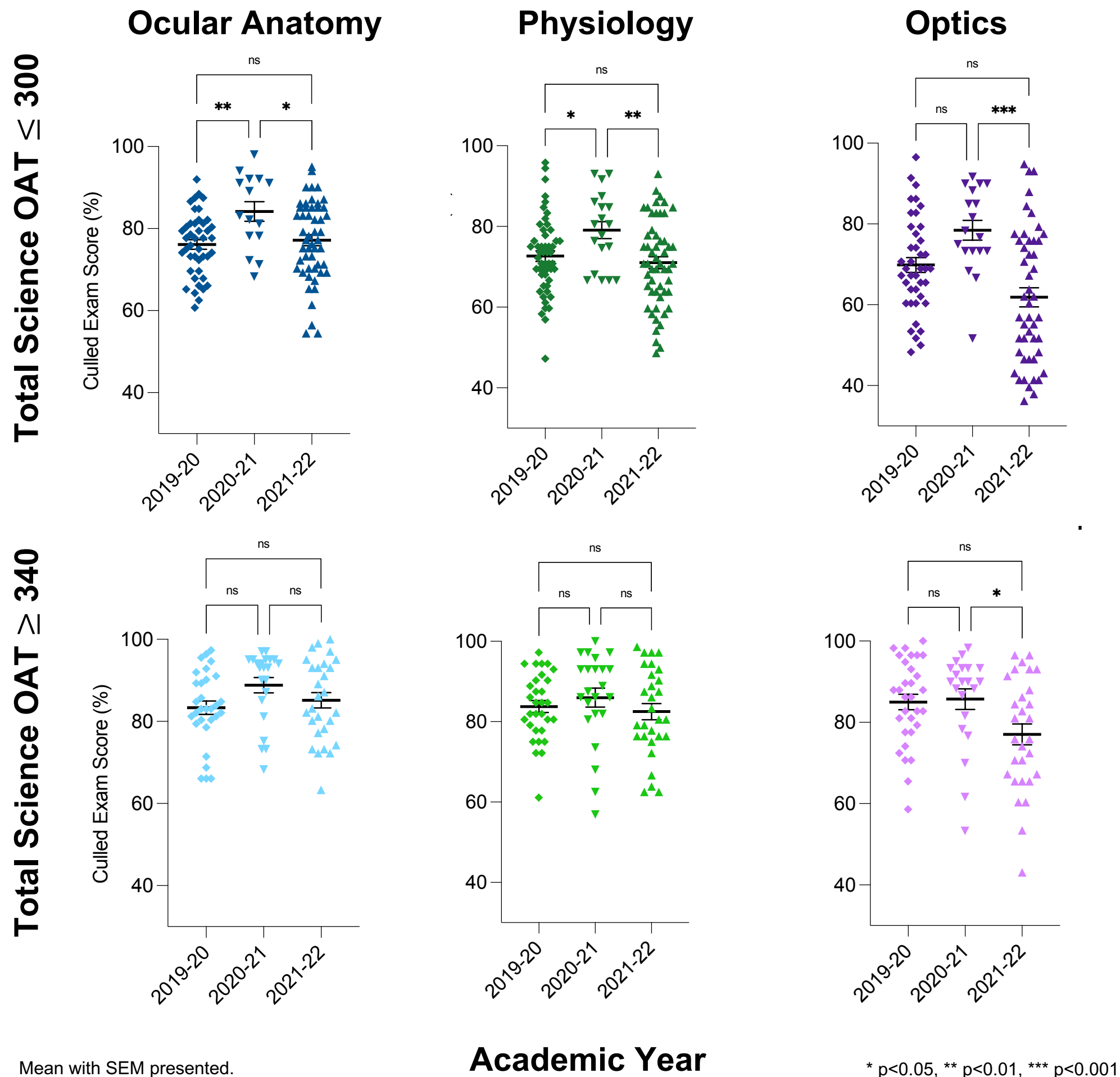
Distance learning (DL) continues in optometric education as students desire flexibility, efficiency, and self-paced learning. In this new era, designing an online course and supplemental activities to facilitate student success becomes critical. Students may lack accountability with a flexible schedule, which can lead to poor time management, superficial understanding, and inferior academic outcomes. This study examines the performance of first-year optometry students in 3 didactic courses across 3 years, in the context of their Optometry Admission Test (OAT) scores. The study aims to determine if students who earned a total science (TS) OAT  $\leq 300$  and students who earned a TS OAT  $\geq 340$  are achieving similar academic success in DL courses, and if their DL performance is noninferior to traditional lecture format. The results may highlight the need for purposefully-designed course assignments should DL formats continue for all learners.

## METHODS

The courses examined were Human Physiology II (Physiology), Ocular Anatomy (OA), and Geometric and Theoretical Optics II (Optics). After the last traditional lecture year in 2019-20, each course adopted distance learning modalities with the emergence of COVID-19 in 2020-21 and continued in a new normal, flexible DL course formats in 2021-22.

Total Science (TS) OAT scores upon entering optometry school were used to organize students by presumed academic preparedness, comparing students with TS OAT  $\leq 300$  and TS OAT  $\geq 340$ . Using identical exam items in each didactic course, culled exams were created to calculate student performance in each course each academic year. Performance of the students organized by TS OAT score, in each course across the three years, was compared. Data were analyzed with Microsoft Excel and GraphPad Prism v9.4.1. This study was approved by the Illinois College of Optometry IRB.

## Academic performance is noninferior in purposefully-designed distance learning courses compared to traditional lecture



## RESULTS

For all 3 courses, students with TS OAT  $\leq 300$  achieved noninferior academic success in the new DL format of 2021-22 compared to traditional lecture format of 2019-20. Students with TS OAT  $\leq 300$  showed a significant increase in performance in OA and Physiology during fully online learning in 2020-21 compared to traditional 2019-20 and new DL 2021-22 course modalities. These students showed a significant decrease in performance in Optics in the flexible DL format of 2021-22 compared to the online learning format of 2020-21.

Students with TS OAT  $\geq 340$  showed no change in performance in OA or Physiology across the 3 years of variable course formats. In the flexible DL format of 2021-22, this group had significantly lower performance in Optics compared to the online learning format of 2020-21, and nearly significant lower performance ( $p=0.087$ ) compared to the traditional lecture format of 2019-20. The data suggest the DL format for this course may require additional student accountability strategies to maintain equivalence with the traditional lecture environment.

## DISCUSSION

The data support that flexible DL course formats of 2021-22 are noninferior to traditional course formats for all students. For courses which require knowledge integration and applied problem solving, such as Optics, we caution educators that a DL format may require purposeful supplemental activities for increased student engagement, accountability, and success.

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### Supp. Material

