Our multiyear analysis of LMS data from three different physiology courses found:

#1 Easily obtained LMS data about student engagement and time investment correlates with performance in undergraduate physiology courses.

By comparing 2020 and 2021:

Overall consistency between “online” and in-person data suggests that students were similarly engaged through LMS in both learning modalities. If the 2020 AY was “abnormal”, then we still have not returned to normal.

#2

**STUDY RATIONALE AND OVERVIEW:**

The COVID-19 pandemic continues to alter the landscape of higher education. In Fall 2020, the University of Connecticut operated remotely with most courses offered in a distance learning format. In Fall 2021, students returned to campus for in-person classes. Although there has been a great deal of speculation by students and faculty alike, the impact of these abrupt transitions on students is still unknown. Here we explore student engagement, investment, and performance in three undergraduate physiology courses by comparing course LMS data from the Fall 2020 and 2021. We analyzed the time students invested in LMS based instruction, the frequency of engagement with the course LMS, and correlated these metrics with overall student performance. We demonstrate that easily obtained LMS data offers useful, quantifiable insights to inform teaching practice, course evaluation, and student support measures. Our work contradicts a popular narrative that students were not adequately engaged by “online” learning during the 2020-2021 academic year, since our students engaged similarly (or better). As pressure mounts to undo student support measures put in place during the pandemic, our data may serve as a warning to departments, graduate programs, and other stakeholders that the effects of the pandemic on students are ongoing despite strong institutional desires for normalcy.

**QUESTION 1: DID ENGAGEMENT CORRELATE WITH PERFORMANCE IN 2020 vs. 2021?**

Yes, for most students!

Grades and year were validated as predictive parameters in GLMs of student LMS logs using Poisson distributions. Correlates are strongest in courses with high enrollments and heavy use of LMS based instruction/assessment. Z values are reported from individual parameters within each course model. Significance reported as P<.001 **, P<.01 *.

**QUESTION 2: DID TIME INVESTED IN LMS CORRELATE WITH PERFORMANCE IN 2020 vs. 2021?**

Yes, for courses that relied on LMS based instruction and assessment!

Letter grades and year were used as predictive parameters in GLMs of student time spent in LMS using normal distribution. Z values are reported from individual parameters within each course model. Correlates are strongest in Human Anatomy and Physiology and Animal Physiology. Significance reported as P<.001 **, P<.01 *.

**CONCLUSIONS:**

Physiology courses may benefit from increased access to LMS data that is recorded as students interact with course materials. Our findings suggest that LMS data can provide useful insights to inform teaching practice, course evaluation, and student support measures. We encourage institutions to continue documenting student engagement and performance data to inform evidence-based decisions in the ongoing evolution of teaching practices.

Nicole Krauss PhD, Jeffrey Divino PhD, Joseph Crivello PhD, John Redden PhD

The authors would like to thank Hengameh Vosough for assistance collecting and interpreting LMS data.