Impact of Lack of Online and In-Class Activities by COVID-19 on Anatomy & Physiology Class Average in Nursing Students

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Research Gaps

· Both human anatomy and physiology serve as pre-requisite courses for admission to the Bachelor of Nursing (BScN) and Bachelor of Psychiatric Nursing (BPN) programs at MacEwan University.

· The teaching and learning of these subjects are influenced by several factors, including the COVID-19 pandemic (Narnaware and Neumeier, 2020; Syed et al., 2021). In early March of 2020, this pandemic caused the emergency pedagogical transformation of nursing curricula, forcing many educational institutions worldwide to switch from face-to-face classroom teaching to an online, virtual platform. As a result, many active learning modalities such as the use of technology, labs, cadaver and prosection dissections, in-class exams, and in-person contacts with students were moved to an online, virtual learning (Syed et al., 2021). This has forced students to adopt self-directed learning approaches.

· The impact of the shift from active learning strategies to self-directed learning strategies on academic performance in nursing students taking anatomy and physiology during post-COVID-19 period has not yet been investigated.

Study Objectives

· In this study, we seek to determine the impact of the lack of various in-class activities on class average & grade point average (GPA) in anatomy & physiology courses for nursing students.

Methods

· Two sections of gross human anatomy comprising of 65-80 students were taught by didactic, passive teaching style in Fall 2019 (pre COVID-19) by using 3D virtual human cadaver, Anatomage (San Jose, California, USA) with online (Kahoot quizzes, anatomy videos, muscles assignments & practice questions) and in-class (class quizzes, mid-terms, final exam, group discussion, and matching question) activities.

· One section of human physiology comprising 83 students was taught using online Kahoot quizzes, physiology videos & practice questions) and in class (class quizzes, mid-terms, final exam, group discussion, and matching questions) activities in Fall 2019.

· Three anatomy and physiology cohorts comprising 70-80 students each were taught synchronously online but without in-class activities and Anatomage (Anatomy) in Winter 2020, Fall 2020, and Winter 2021 (post COVID-19).

· Data pooled from multiple sections of anatomy and physiology with or without in class activities were subjected to statistical evaluation using SPSS II (IBM Corp; Armonk, NY) to determine class average and GPA. Means were compared with 2 sample 't' tests. Significant differences were considered at $P<0.05$.

Results

· The teaching of gross human anatomy with online without Anatomage, in-class activities, and moving exams online resulted in a significant increase in mean class average in mid term#1 ($P<0.05$), mid term#2, Mid-term#3, and final examination ($P<0.01$) compared to those taught with these activities (Figure 1a).

· Elimination of in-class activities and non-use of the Anatomage due to COVID-19 also significantly increased ($P<0.05$) GPA compared to sections of anatomy with these teaching approaches (Figure 2).

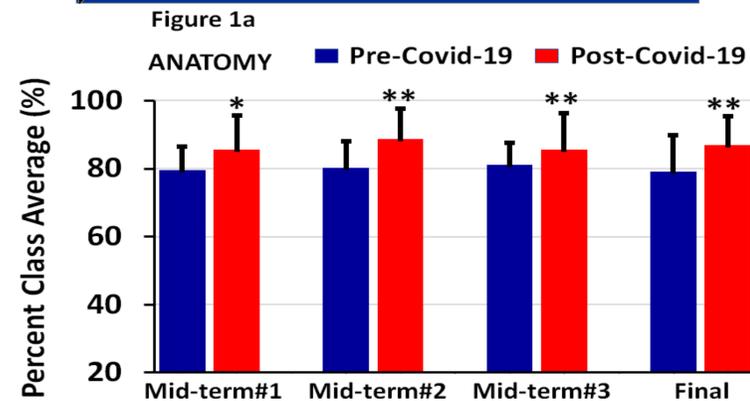## Results continue…

Figure 1a

Figure 1a: The impact of the lack of in-class activities & Anatomage on mean class average in gross anatomy. The results are expressed as mean ± SD and converted into a percent class average. *$P<0.05$, **$P<0.01$ compared to on-line and in-class activities.

· In the physiology course, elimination of in-class activities and moving mid-terms and final exam online due to COVID-19 significantly increased mean class average in mid-term#1 and mid-term#2 ($P<0.05$), and final exam ($P<0.01$) compared to those taught with these activities (Figure 1b).
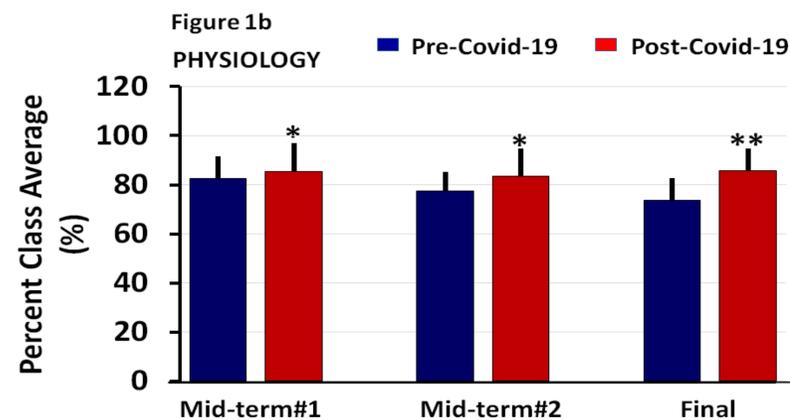
Figure 1b

Figure 1b: The impact of the lack of in-class activities on mean class average in physiology. The results are expressed as mean ± SD and converted into a percent class average. *$P<0.05$, **$P<0.01$ compared to on-line and in-class activities.

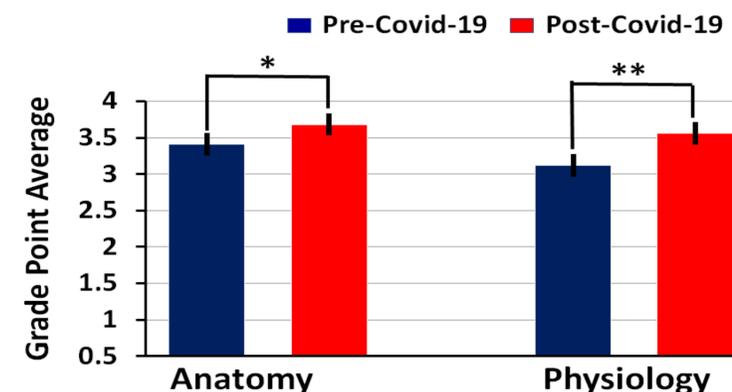· Lack of these pedagogical approaches significantly ($P<0.001$) increased GPA in physiology (Figure 2).

Figure 2: The impact of the lack of in-class activities on GPA in anatomy and physiology. The results are expressed as mean ± SD and converted into GPA. *$P<0.05$, **$P<0.01$ compared to on-line and in-class activities.

Discussion & Conclusion

▪ The present study's findings demonstrate that synchronized virtual learning during a post-COVID-19 period was equally effective to nursing students as active learning in classroom settings in the pre-COVID-19 period. This agrees with findings of Wall et al. (2021) in medical students but is in contrast to our findings that active learning approaches improved the academic performance in the same cohorts (Narnaware and Neumeier, 2019).

▪ Improved academic performance may be due to students spending more time studying these subjects or to adopting self-directed online learning (Syed et al., 2021) due to a strict lockdown, self-isolation, and lack of social interactions. Students may likely benefited from synchronized classes, help, and guidance from instructor during virtual office hours over the post-COVID-19 period.

▪ Students may have taken advantage of unsupervised online proctoring during the exams, including access to course material during the exams, although this needs to be examined further.

▪ Findings suggest that nursing students may have counterbalanced the missing active learning strategies of face-to-face learning and adopted self-directed learning during the post-COVID-19 period through synchronized learning (Ramnanan et al., 2021).

Acknowledgment

References

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