Impact of the On-line and In-class Activities on Class Average in Anatomy & Physiology in Nursing Students

Raj Narnaware[1] and Paul Chahal[2]

1. Department of Nursing Science, Faculty of Nursing, MacEwan University
2. Department of Allied Health and Human Performance, MacEwan University, Edmonton, Alberta, Canada T5J 4S2

Research Gaps

- Both human anatomy and physiology are cornerstones of medical, allied-health and nursing curricula (Turney, 2007) and serve as a pre-requisite for clinical practice in subsequent years of these disciplines (Estai and Bunt, 2016). However, in recent years, there has been a shift in teaching and learning strategies (Estai and Bunt, 2016). Many medical and allied-health disciplines are teaching anatomy by combining multiple pedagogical resources, and students appear to learn more effectively from multi-modal and system-based approaches (Estai ad Bunt, 2016).
- However, these pedagogical resources have been utilized mostly in teaching human anatomy and rarely in physiology. Secondly, these approaches are focused more on medical and allied-health students and have not been adapted for nursing students.

Study Objectives

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

Methods

- Anatomy sections comprising of 75-80 students each were taught in Fall 2018 and Winter 2019 using 3D virtual human cadaver, Anatomage (San Jose, California, USA).
- One section of human anatomy course was taught with on-line (Kahoot quizzes, anatomy videos, muscles assignments & practice questions) and in-class (class quizzes, group discussion, and matching questions) activities whereas, other sections were taught without these activities.
- Two cohorts of human physiology comprising 75-80 students each were taught in 2017 without on-line and in-class activities. Three cohorts comprising 37-90 students were taught by introducing in-class and on-line activities in 2018 and 2019.
- Data pooled from multiple sections of anatomy and physiology with or without on-line and in-class activities were subjected to statistical evaluation using SPSS II (IBM Corp; Armonk, NY) to determine class average and GPA. Means were compared to 2-sample 't' tests. Significant differences were considered at P<0.05.

Results

- Introduction of on-line and in-class activities in teaching of gross human anatomy resulted in a significant increase in mean class average in three mid-terms (P<0.001) and final examination (P<0.05) compared to those taught without these activities (Figure 1a).

• These activities also significantly increased (P<0.05) GPA compared to sections of anatomy without these teaching approaches. (Figure 1b).

Results continue...

Figure 1a

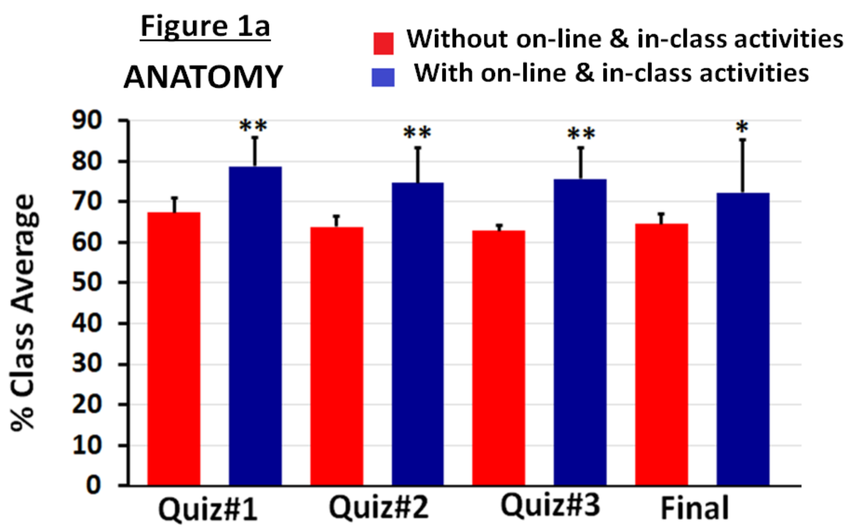


Figure 1b

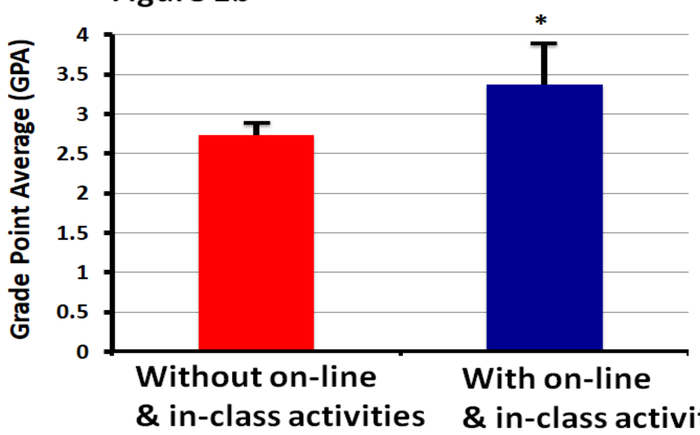


Figure 1: The impact of the on-line and in-class activities on class average (Fig. 1a) and GPA (Fig. 1b) in gross anatomy. Results are expressed as mean ± SD and converted into a percent class average and GPA. * P<0.05, **P<0.001 compared to without on-line and in-class activities.

- In physiology course, introduction of these activities significantly increased mean class average in mid-term-I (P<0.001) and mid-term-II (P<0.05) but only increased by 3.9% in final exam compared to those taught without these activities.

Figure 2a

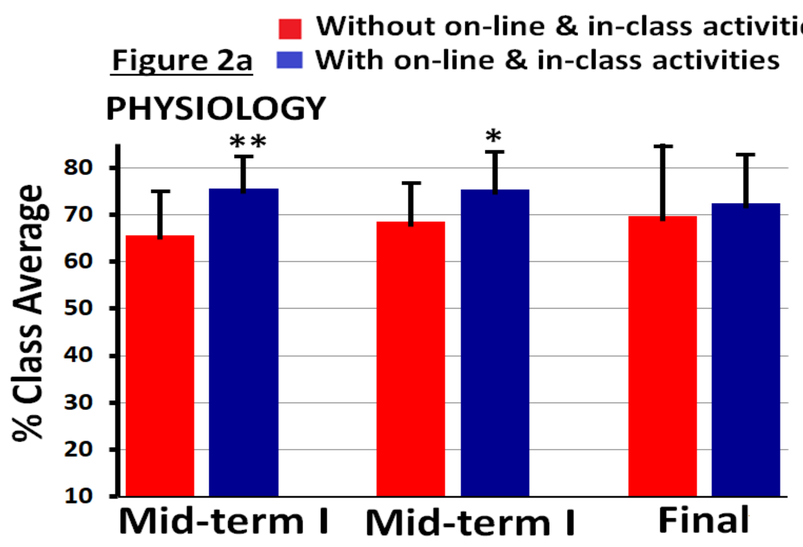
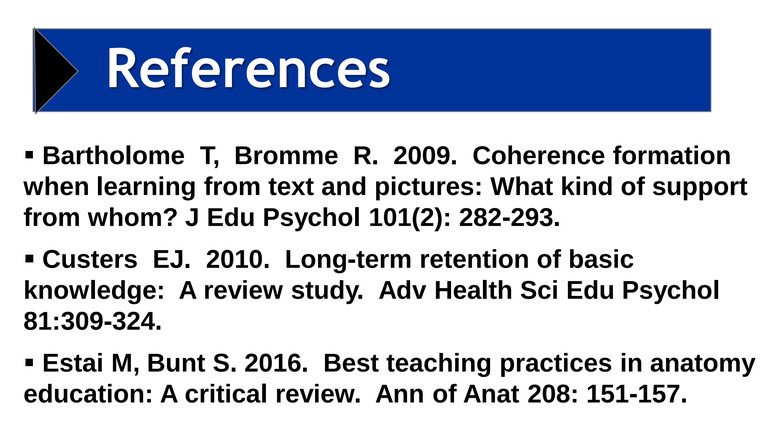


Figure 2: The impact of the on-line and in-class activities on class average (Fig. 2a) and GPA (Fig. 2b) in physiology. Results are expressed as mean ± SD and converted into a percent class average and GPA. * P<0.05, **P<0.001 compared to without on-line and in-class activities.

- These pedagogical approaches increased GPA in physiology by 11.7%.

Figure 2b



Discussion & Conclusion

• Keeping course objectives, teaching and/ or presentation style and use of modern teaching technology constant, this study demonstrates that incorporation of multi-modal and system-based pedagogical approaches can significantly improve the academic performance of nursing students.

•

• These pedagogical approaches may help nursing students to develop social, interactive and communication, critical thinking skills, promote class attendance and engagement, increase confidence in learning, reduce exam anxiety, stress, alter cognitive load and memory (Custers, 2010) , and improve their long-term knowledge retention of anatomy and physiology (Bartholome and Bromme, 2009).

Acknowledgment

- The authors acknowledge Dr. Miriam Stewart, Professor Emeritus, University of Alberta, Edmonton for a very valuable review and editing of this study.

References

- Bartholome T, Bromme R. 2009. Coherence formation when learning from text and pictures: What kind of support from whom? J Edu Psychol 101(2): 282-293.
- Custers EJ. 2010. Long-term retention of basic knowledge: A review study. Adv Health Sci Edu Psychol 81:309-324.
- Estai M, Bunt S. 2016. Best teaching practices in anatomy education: A critical review. Ann of Anat 208: 151-157.
- Turney BW. 2007. Anatomy in a modern medical curriculum. Ann R Coll Surg 79: 114-117.