Blended Learning for Larynx & Pharynx Anatomy

Teresa Pattucci PhD\textsuperscript{1}, Johnny Neist MLIS\textsuperscript{1}, Amy Easton Bengenheimer MLIS\textsuperscript{2}, Jeffery Fritz PhD\textsuperscript{2}
\textsuperscript{1}Medical College of Wisconsin – Milwaukee Campus, \textsuperscript{2}Medical College of Wisconsin – Central Wisconsin Campus
**Email tpattucci@mcw.edu with any questions related to this poster**

**SUMMARY**

Larynx & Pharynx is an anatomically complex region of the body and important for medical students to grasp. A challenge for multi-site institutions is maintaining consistency among locations while offering personalized learning experiences for all students. Blended learning can help address these both challenges. Here we describe a blended learning session on the topic of pharynx and larynx run at a multi-site medical school where all students viewed a custom pre-work video, then attended an in-class session with a local facilitator. This study evaluated student comprehension and satisfaction between campuses and high levels of learner satisfaction with the session.

**PURPOSE**

Larynx and pharynx is a complex area of the body anatomically, making it difficult to grasp in a single learning session. However, it is crucial for clinicians to understand the relationship between the pharynx, larynx, and digestive tract for procedures like intubation or endoscopy. Learning is enhanced when students are actively engaged with the material. One approach to active learning is a blended learning paradigm, which requires learners to complete online pre-work followed by in-person sessions with an instructor in which the students actively solve problems. Blended learning has been shown to help reduce achievement gaps, improve exam performance\textsuperscript{1}, increase student satisfaction and engagement\textsuperscript{1}, and help students take more difficult problems involving analysis and evaluation\textsuperscript{1}. Our institution, the Medical College of Wisconsin (MCW), has three sites: a main 4-year campus in Milwaukee and two 3-year regional campuses. A current challenge is balancing quality student interaction with consistency across sites. Our goal is to introduce innovative, active learning methods in which students engage with local faculty during “lecture time.” This study evaluated student comprehension and satisfaction following a blended learning module on the topic of Larynx and Pharynx with a custom pre-work video followed by a local in-class problem set.

**METHODS**

The Medical College of Wisconsin (MCW) is a multi-site institution with three sites: a main 4-year campus in Milwaukee (MCW-MKE, n = 208 students) and two 3-year regional campuses (MCW-Green Bay (GB), n = 25, Central Wisconsin (CW), n = 21). Our Clinical Human Anatomy course is taught by an anatomical region. Learning sessions are primarily didactic and livestreamed from the main campus to the regional campuses in addition to being recorded for later viewing. By contrast, in the 2019-2020 academic year, we utilized a blended learning paradigm for the topic of larynx and pharynx during the Head and Neck unit of the course. In both cases, learners completed didactic lectures with local instructors following “lecture time.”

**PRE-WORK:**

- **Required:** Custom made video accessed through Learning Management System, Brightspace (Fig. 1A). Video illustrated and narrated by the TNP, available on YouTube https://www.youtube.com/watch?v=zytXay5C3p4&t=12s
- **Optional:** “Check your understanding” activities consisting of labeling worksheets and practice application questions (Fig. 1B)

**IN-CLASS PROBLEM SET (90 minutes):**

- **Facilitator:** TNP facilitated sessions with MCW-MKE (in the room) and MCW-GB (remote). While TNP facilitated sessions with MCW-CW (in the room).
- **Format:** Some questions required students to respond via the Audience Response System, TopHat, while discussion questions were answered verbally using the think-pair-share format.
- **Problem set:** Questions increased in difficulty as the session progressed, eventually having students solve complex clinical problems (Fig. 2A-B).

**ASSESSMENT:**

- **Exams:** Questions for this topic were set at varying Bloom’s taxonomy levels. Low (level 1) and high (level 3-4, i.e. learning outcome 6).
- **Aggregate data of performance on the whole exam and larynx & pharynx-specific questions was compared between campuses (Fig. 3A). There was no significant difference in Head and Neck exam performance between campuses (Fig. 3A). Additionally, there was no significant difference in performance between campuses for low (Fig. 3B) or high (Fig. 3C) Bloom’s taxonomy level questions. Together these data show equivalent comprehension among students on the topic of Larynx and Pharynx regardless of facilitator or site. Additionally, student performance on larynx and pharynx-specific questions was equivalent overall exam performance showing the module effectively met set session objectives.

**RESULTS**

Aggregative response on Head and Neck questions overall and larynx and pharynx specific questions was compared between campuses (Fig. 3A). There was no significant difference in Head and Neck exam performance between campuses (Fig. 3A). Likewise, there was no significant difference in performance between campuses for low (Fig. 3B) or high (Fig. 3C) Bloom’s taxonomy level questions. Overall, 63/78 respondents (81%) were very satisfied or satisfied with the blended learning session, 14/78 (18%) were neutral, 1/78 (1%) was dissatisfied or very dissatisfied (Fig. 4E). Representative comments from student survey:

- “I feel that I do better when I have access to the material before lectures (especially videos), because when I hear it for the second time I am already thinking about what I saw the first time. I don’t find it confusing to figure out what the words mean, and can start getting a handle on the concept itself.”
- “I like both blended learning and didactic. I think blended learning is a good way to switch things up and can add more to our ‘to-do’ lists on top of regular studying.”
- “Hard to change from all in-person to blended learning without being used to it. Struggled with it but I can see the appeal to it if you get additional exposure to the material and the ability to apply the material to situations. Separates the ‘showing through material’ and ‘using the material’.
- “I think that because this particular area of the body was so difficult for me it made coming to the in-class course less stressful. However, I don’t want the majority of lecture to be presented in a blended model because it can add more to our ‘to-do’ lists on top of regular studying.”

**CONCLUSIONS & RECOMMENDATIONS**

This study shows that this blended learning module on larynx and pharynx gross anatomy resulted in high levels of learner comprehension and satisfaction. Additionally, it demonstrates a viable blended learning approach for instruction across multi-site institutions by having all students complete engaging pre-work before participating in a problem set with a on-site instructors.

**Author Recommendations for Successful Blended Learning Session:**

- Interactive pre-work (active & engaging)
- Pre-work required to attend session
- Trust with in-class facilitator and classmates
- In-class material worth attending class (targeted and clinically relevant)

**REFERENCES**

4. Intracranial anatomy lessons, Medical Education 46, 802 (2012)
6. Medical College of Wisconsin – Central Wisconsin Campus

**Figure 1A:** Example of Pre-Work Video (Still from Video) 3 Subdivisions of Pharynx

**Figure 1B:** Example of Optional Pre-Work Activity (Labeling Worksheet)

**Figure 2A:** In-Class Problem Set: Early questions

**Figure 2B:** In-Class Problem Set: Late questions

**Figure 3A:** Exam Performance

**Figure 3B:** Low Level Blooms Taxonomy

**Figure 3C:** High Level Blooms Taxonomy

**Figure 4A:** Survey Results – Student Perception

**Figure 4B:** Example of Optional Pre-Work Activity (Labeling Worksheet)

**Figure 4C:** Example of Optional Pre-Work Activity (Labeling Worksheet)