Knowledge to action: Integrating evidence-based practice into online PBL cases during COVID-19

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1 | PROBLEM

Expert consensus considers that critical thinking is “…that mode of thinking—about any subject, content, or problem—in which the thinker improves the quality of his or her thinking by skillfully taking charge of the structures inherent in thinking and imposing intellectual standards upon them.”

Instructional strategies that involve working in small groups, engaging in debates, and argument mapping all serve to develop students’ critical thinking skills. The East Carolina University School of Dental Medicine uses Problem-Based Learning (PBL) approach to introduce dental students to research as the foundation for the evidence base in the dental profession. First year-dental students are introduced to the role of study design, statistical analysis, and interpretation of basic, clinical, and health services research. The course instructs students on how to efficiently access and critically analyze scientific information and place these skills in the context of evidence-based practice. The course provides a theoretical foundation to (1) identify ethical issues in research and (2) use critical thinking and scientific knowledge in decision-making processes concerning research findings and evidence.

Face-to-face interactions, discussion, and articulation of ideas with peers, who are engaged in a collaborative process of knowledge building, are essential for developing critical thinking competencies. The COVID-19 pandemic has substantially impacted dentistry, higher education, and dental education. Maintaining the unique features of active, engaging, and horizontal learning were our primary concerns as we moved to virtual instruction.

2 | SOLUTION

Facilitators and students were given a 45-min introduction to Microsoft Teams (Microsoft, CA), a business communication platform used for videoconferencing, collaborative document editing, files sharing, and instant messaging. PBL cases were open-ended problems to enhance learning skills, critical appraisal, and literature retrieval skills relevant for dental practice standards and guidelines. Facilitators were calibrated on the PBL process, specifically (1) defining problems, (2) structuring hypotheses, (3) constructing a learning objective with self-directed study, (4) independent resource collection, (5) knowledge application, (6) case presentation and assessment, and (7) self-evaluation and peer evaluation (Figure 1). Additionally, facilitators were instructed to step back and allow the students to work as a group to address the problem without influencing their process with a prescribed solution methodology. Each small group of students (n = 6) and facilitator met thrice (120 min each session, once a week) and actively engaged in evidence searching, thinking aloud, brainstorming, and group discussion. After 3 weeks, the students presented their case to the whole class and received peer students and facilitators’ comments.

3 | RESULTS

The Microsoft Teams platform was straightforward and seamlessly allowed students to share documents and work interactively as a group in real-time to analyze, gather information, and apply knowledge to the PBL cases. Student performance was assessed using rubrics and was
PBL steps are widely used in health professional education. Inner/Light purple—Steps 1–5 occur in chronological order and are repeated during the case. Steps 6 and 7 are accomplished upon the conclusion of the case. Middle/Yellow—Evidence-based practice framework: ask, acquire, appraise, apply, assess—5 A's. Outer/Purple gradient—Skills/competence/performance assessment.

Finding and evaluating scientific evidence is an essential skill for the independent decision-making process, lifelong learning, and professional autonomy.

Similar to previous face-to-face presentations. Facilitators provided very enthusiastic and positive feedback on student's performance in finding and evaluating evidence, organizing and prioritizing hypotheses, and making logical inferences during the case. Despite the limitations of virtual interactions, this report provides positive support for the use of a web-based platform like Microsoft Teams to facilitate PBL modules for critical skills development in dental students, when learning is restricted to online sessions.

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REFERENCES
1. Paul R, Elder L. The Miniature Guide to Critical Thinking Concepts and Tools. Lanham, MD: Foundation for Critical Thinking Press; 2008. https://www.criticalthinking.org/store/products/the-miniature-guide-to-critical-thinking-concepts-amp-tools/156. Accessed on February 14, 2021.
2. Commission on Dental Accreditation. Accreditation Standards for Dental Education Programs. Chicago: Commission on Dental Accreditation; 2020.
3. Wood DF. Problem based learning. BMJ. 2003;326(7384):328-330.
4. de Groot M, van der Wouden JM, van Hell EA, Nieweg MB. Evidence-based practice for individuals or groups: let's make a difference. Perspect Med Educ. 2013;2(4):216-221.
5. Miller GE. The assessment of clinical skills/competence/performance. Acad Med. 1990;65(9):S63-S67.

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