

Association for Surgical Education

A blended online curriculum in the basic surgery clerkship: a pilot study



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Abstract

BACKGROUND: A “lectures plus clinical experiences” curriculum for surgical clerkships has significant faculty demand. A less faculty-intense blended online curriculum (BOC) could provide similar/improved academic performance compared with traditional curricula (TCs).

METHODS: Following an initial pilot study, students in the surgery clerkship at Johns Hopkins during 2013 to 2014 experienced a BOC ($n = 129$). Students the preceding year (2012 to 2013) experienced the TC ($n = 108$). Performance and satisfaction were compared between groups using clinical evaluations, National Board of Medical Examiners examination scores, and clerkship evaluations.

RESULTS: No significant differences in academic performance between BOC and TC students were observed on National Board of Medical Examiners examination or clinical evaluation scores. After multivariable adjustment, student year was the only significant predictor of student performance. Clerkship teaching ratings were higher for BOC students than TC students (4.25/5 vs 3.98/5, $P = .03$).

CONCLUSIONS: BOC incorporation in the basic surgery clerkship resulted in noninferior academic outcomes and significantly improved student satisfaction.

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Medical education as we currently know it began to take shape in the mid-1700s and continued largely unchanged over the next 2 centuries, with didactic instruction comprising the majority of the curriculum. Over the past 20 years, however, medical school curricula worldwide have seen a shift toward an interactive format utilizing

problem-based and small group learning.¹ As medical schools move away from formal lectures in the preclinical setting, students are becoming more self-directed in their learning and develop skills for critical problem solving that will be used both in their clerkship rotations and clinical practice. However, educators continue to struggle with navigating the fine line between delivering content material while enhancing skills for problem solving.²

During the clerkship years of medical school, delivery of educational content has largely consisted of didactic lectures that supplement students’ clinical experiences. However, this is a human resource-intense activity with tenuous sustainability because of a variety of individual and system-related conflicts.³ This may be particularly challenging in surgical disciplines where there is an increasing

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focus on clinical revenue and faculty productivity in the United States. Opportunity costs for faculty participation, difficulty with scheduling, consistency of presented content, mode of delivery value, and applicability to learners all present tangible barriers to the current use of didactic lectures given by faculty members at our institution, and these challenges are likely similar to those faced elsewhere in surgery clerkship curricula.

To address the gap between educational content delivery and the availability of human resources to deliver this content, our study group was curious whether an opportunity exists to harness this generation of students' aptitude for and familiarity with technology to accomplish their learning efforts more efficiently. We aimed to understand the impact of implementing a curriculum that utilizes both didactic lectures and online learning modules (a blended online model) on student learning, along with the effect of technology as an educational adjunct during the surgical clerkship. Specifically, we hypothesized that the formal integration of online learning modules into the surgical clerkship would result in student knowledge and understanding of key surgical concepts that is as good as or better than previous cohorts, as demonstrated by end of rotation assessments.

Methods

Curricular design

Blended learning has been defined as "a formal education program in which a student learns at least in part through online delivery of content and instruction with some element of student control over time, place, path, and/or pace, and at least in part at a supervised brick-and-mortar location away from home."⁴ To ensure quality and validity of presented content as well as minimize institutional resources for creation of a blended online curriculum (BOC), we elected to utilize a nationally recognized repository of undergraduate-level surgical content, the Web Initiative for Surgical Education of Medical Doctors (WISE-MD; Med-U, New York, NY), to which an institutional subscription was provided by the School of Medicine.

The basic surgery clerkship at the Johns Hopkins University School of Medicine is an 8-week experience divided into one 4-week general surgery experience and two 2-week subspecialty experiences. The clerkship is offered during 5 discrete terms throughout the academic year, beginning in August. Students (average Medical College Admission Test score of 35.3 and average age at matriculation of 23) begin their clinical rotations during Term 5 of their second year and are permitted to complete core clerkships at any time before graduation. Historically, the clerkship's didactic curriculum, referred to as the traditional curriculum (TC), consisted of 20 in-person lectures given by School of Medicine faculty members, each over 1 hour, with core content based on the Manual of Surgical Objectives published by the Association for Surgical Education.⁵

For the BOC, we elected to have approximately half of the clerkship curriculum delivered as online modules to replace the didactic lectures. A review of all student lecture evaluations for the clerkship was performed, and the lectures that consistently received low student ratings from previous clerkships were aligned with WISE-MD modules where possible. A total of 10 modules were selected to replace 7 of the 20 core lectures and trauma-specific content, which had been previously delivered in a student laboratory session. [Appendix materials](#) outline the surgery clerkship curriculum, including integrated online modules and the lectures they replaced. Because modules were incorporated as an essential component of the curriculum rather than being used as a supplement, their completion was required and monitored as a component of the surgery clerkship professionalism assessment.

Of the 4 distinct models for blended learning curricula that have been proposed,⁴ the BOC described in this study uses a rotation model, whereby students rotate through the online and in-person curricular components on a schedule determined by the instructor. In our BOC, the time that would have been used for the 7 didactic lectures removed from the curriculum (7 hours) became protected study time during the afternoon of students' regularly scheduled didactic day which they were encouraged, although not required, to use to complete the assigned online modules (average 25 minutes in length) or engage in other self-directed learning activities.

The Institutional Review Board of the Johns Hopkins University School of Medicine exempted this study from review as research conducted in commonly accepted educational settings.

Pilot study

The pilot study was conducted from March to July 2013 to ensure feasibility and similar performance of the BOC compared with the TC. The first group (March to May 2013) comprised 29 students who were given the TC, while the second group (June to July 2013) consisted of 16 students given the BOC.

Longitudinal study

On the basis of these results, the BOC was continued into the 2013 to 2014 academic year beginning in August 2013 for further longitudinal data collection so that the performance of students from the same term (eg, Term 1 with TC vs Term 1 with BOC) could be compared, as it is well known that student performance tends to improve over the course of the academic year.⁶ It should also be noted that while baseline academic performance is often considered to coincide with the beginning of the academic year, at our institution, second-year students begin their clinical clerkships during the spring (March to May) and should thus be considered the performance baseline. Additionally, students are permitted to

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