

## **A Blended Online Curriculum in the Basic Surgery Clerkship: A Pilot Study**

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**Background:** Delivery of educational content in surgical clerkships relies on lectures to supplement students' clinical experiences, but may not be sustainable given increasing focus on faculty productivity. We hypothesize that a less faculty-intense blended online curriculum will provide similar or improved performance on knowledge assessments compared to traditional curricula.

**Methods:** Students enrolled in the basic surgery clerkship at Johns Hopkins SOM during the Spring 2013 term (N=29) comprised the control group, undergoing the traditional curriculum (20 in-person lectures). The Summer 2013 term students (N=16) comprised the intervention group, with a blended online curriculum (10 in-person lectures, 10 assigned WISE-MD online modules). Student performance and satisfaction were assessed at each term's end using subjective clinical evaluations, NBME exam scores, a student knowledge assessment based on ASE's Manual of Surgical Objectives, and clerkship evaluations. Differences between groups were calculated using the Wilcoxon rank sum test. Multivariate linear regression was performed to adjust for term, student year, race, and sex.

**Results:** Mean clinical evaluation scores were significantly higher in the intervention group compared to the control group (Spring mean = 82%, Summer mean = 86%,  $p=0.03$ ). No significant differences were observed between groups on NBME exam (Spring mean = 76%, Summer mean = 79%,  $p=0.22$ ) or student knowledge assessment scores (Spring mean = 57.4%, Summer mean = 58%,  $p=0.90$ ). After adjustment for student year, race and sex, both NBME exam scores and clinical evaluations were significantly higher in the intervention group compared to control (Table 1). Student lecture ratings were significantly higher in the intervention group (4.06/5 vs 3.45/5,  $p=0.05$ ).

**Conclusions:** Blended online curriculum incorporation in the basic surgery clerkship resulted not only in non-inferior outcomes, but significantly improved student satisfaction and performance in the intervention group after adjustment for student year, race, and sex. Further study is ongoing to confirm these findings.

**Table 1: Multivariate Linear Regression Analysis of NBME Exam, Student Knowledge Assessment, and Rotation Evaluation Scores**

Variable	Coefficient	95% CI	<i>p</i>
<i>NBME score</i>			
Summer term	9.25	(1.88-16.62)	<b>0.02</b>
3 <sup>rd</sup> year	8.10	(0.94-15.25)	<b>0.03</b>
Non-White race	-4.20	(-9.92-1.53)	0.15
Female	0.79	(-4.72-6.29)	0.77
<i>Student knowledge assessment</i>			
Summer term	4.03	(-5.91-13.98)	0.42
3 <sup>rd</sup> year	3.73	(-5.92-13.38)	0.44
Non-White race	-3.80	(-11.53-3.93)	0.33
Female	-4.64	(-12.06-2.79)	0.22
<i>Rotation evaluation</i>			
Summer term	4.88	(0.03-9.74)	<b>0.05</b>
3 <sup>rd</sup> year	1.05	(-3.67-5.76)	0.66
Non-White race	-1.17	(-4.94-2.60)	0.54
Female	-1.20	(-4.83-2.43)	0.51

Note: Reference group is Spring term, 2<sup>nd</sup> year, white race, and male.