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## Flipped classroom curriculum for dermatologic surgery during COVID-19: A prospective cohort study



*To the Editor:* COVID-19 placed substantial constraints on resident surgical education. We recalled a prospective, multi-institution study conducted by Liu et al<sup>1</sup> demonstrating that flipped classroom (FC) surgical training of dermatology residents was efficacious in improving surgical skills. The FC model is characterized by at-home study of foundational content with in-classroom review and discussion, allowing learners to maximize their time under supervision. Although compelling, there was no control group to compare the efficacy in this study, and it was unclear if the improvement was due to the module or due to concurrent residency training. To continue our surgical training during the pandemic, we adapted this model in the form of a yearlong, 12-module curriculum with readings, videos, and simulations. To assess its efficacy, we conducted a prospective cohort study to assess whether our new FC model was superior to no intervention in improving surgical skills.

A 1-month module on basic suturing techniques was evaluated for this study, including tops, deeps, running superficial, and step off correction. We employed a pre-post study design to assess the improvement in skill and confidence. As this curriculum was mandatory for our first and second year residents, all 17 residents completed the module.

Residents were evenly split between the FC intervention and the non-flipped classroom (NFC) control groups. After the initial evaluation, the FC group was assigned the module and given simulation kits to practice at home. The NFC group was only asked to attend both the evaluations. Residents also completed surveys evaluating their confidence using a 5-point Likert scale.

Authors (RT, PH) were blinded to the cohort assignments and assessed proficiency using the Objective Structured Assessment of Technical Skills, adapted from Liu et al.<sup>1</sup> First used in dermatology by Alam et al,<sup>2</sup> this tool consists of a Global Rating Scale serving as a subjective metric totaling 40 points and a skill-specific checklist serving as an objective metric totaling 33 points. Score improvement was analyzed using a paired Student *t* test, as were the changes in confidence scores. The difference in improvement between the groups was analyzed using an unpaired Student *t* test. Interobserver variability was not studied.

In the FC group, mean confidence score among residents increased from 2.14 to 4.0 out of a total of 5 ( $P = .003$ ). The NFC group's confidence in suturing remained unchanged, with the mean confidence score increasing from 2.29 to 2.57 ( $P = .643$ ).

Total Objective Structured Assessment of Technical Skills improved by a statistically insignificant total of 2% in the NFC control group, whereas it improved by a statistically significant total of 13% in the FC experimental group. The difference in improvement between FC and NFC was statistically significant (11%,  $P = .0287$ ) (Table I).

This study demonstrated the superiority of the FC curriculum in surgical education in comparison to no additional training. This study was novel in that it included a control group to account for inherent improvement from concurrent residency training. Like Liu et al,<sup>1</sup> we support the integration of the FC method into dermatology graduate medical education.

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**Table I.** Premodule versus postmodule scores in the flipped and non-flipped classroom groups

Cohort	Before	After	95% CI	P value
Flipped classroom	Mean	Mean		
GRS	24.6	28.6	(0.36-8.78)	.0356
Skill-specific checklist	25.43	30	(1.7-7.44)	.008
OSATS total	50	58.57	(2.98-15.31)	.011
Non-flipped classroom				
GRS	27.25	27.38	(-2.95 to 3.2)	.9262
Skill-specific checklist	27	28.38	(-0.72 to 3.47)	.1643
OSATS Total	54.25	55.75	(-2.99 to 5.99)	.63

GRS, Global Rating Scale; OSATS, Objective Structured Assessment of Technical Skills.

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**Conflicts of interest**

None disclosed.

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