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# Perspectives on virtual ophthalmology education among Canadian medical students

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Ocular complaints are common in primary and emergency care settings, yet the quantity and quality of ophthalmology education vary significantly across Canada, and medical students report not receiving sufficient ophthalmic knowledge from their medical school curricula.<sup>1–3</sup> Time constraints, an explosion of medical knowledge in other specialties, and the coronavirus disease 2019 (COVID-19) pandemic have led to a reduction in undergraduate ophthalmology teaching.<sup>4,5</sup> Reduced in-person clinical teaching to accommodate safety protocols in the post-COVID-19 era may result in many medical trainees graduating with inadequate ophthalmic knowledge and skills.<sup>5</sup> Currently, medical education can be delivered via 4 methods: didactic lectures, synchronous (interactive) virtual learning, asynchronous (static) virtual learning, and direct patient care clinical experiences.<sup>6</sup> There is an urgent need to establish innovative strategies that can recreate clinically immersive learning environments by which proficiency in ophthalmic competency can be attained while respecting social distancing. We conducted a survey study to assess whether a virtual pedagogical approach is feasible and efficacious for teaching ophthalmology to medical students.

## Methods

A 36-item online quality improvement survey based on the relevant literature and current undergraduate ophthalmology curricula in Canada was created and pilot-tested among medical students. The objective was to assess students' perceived efficacy of a program comprising interactive webinars and online modules for learning ophthalmology. Medskl.com, a free online learning resource, conducted an ophthalmology program for medical students; the program comprised 4 synchronous webinars held weekly during May 2020 and 6 asynchronous video modules that could be completed independently. Canadian medical students who had participated in at least one webinar and/or module were invited to complete the survey. Data were categorized by demographic variables, and basic statistics, including

Spearman's correlation, were done. This project was deemed quality improvement and research ethics approval was waived.

## Results

Nineteen of the 57 (33%) Canadian medical students who participated in one or more program offerings completed the survey. Over half (58%) of respondents reported not having received or anticipate receiving sufficient exposure to ophthalmology through their medical school curriculum, and 68% of respondents believed that COVID-19 hindered their exposure to ophthalmology. Participants also reported that access to virtual ophthalmology learning increased equitability and inclusion to medical education, and those who attended more webinar sessions were less likely to feel socially isolated ( $p = 3.010e-005$ ) (Table 1).

Characteristics of an effective virtual learning environment were assessed, and 74% preferred virtual (synchronous or asynchronous) modalities over didactic in-class learning. Students found webinars to be most helpful for receiving immediate feedback from experienced clinician educators (79%) and participating anonymously in clinical cases (79%). The greatest utility of modules was scheduling flexibility (92%) and individualization to learning needs (77%) (Fig. 1).

Students who found webinars and modules to be effective for learning were more likely to agree that they helped supplement in-person clinical teaching. In addition, students found modules to be more effective than webinars for learning in a more convenient format ( $p = 0.04$ ). Unlike webinars ( $p = 0.04$ ), however, students did not believe that modules were effective in increasing their knowledge and confidence in ophthalmology (Table 1).

## Discussion

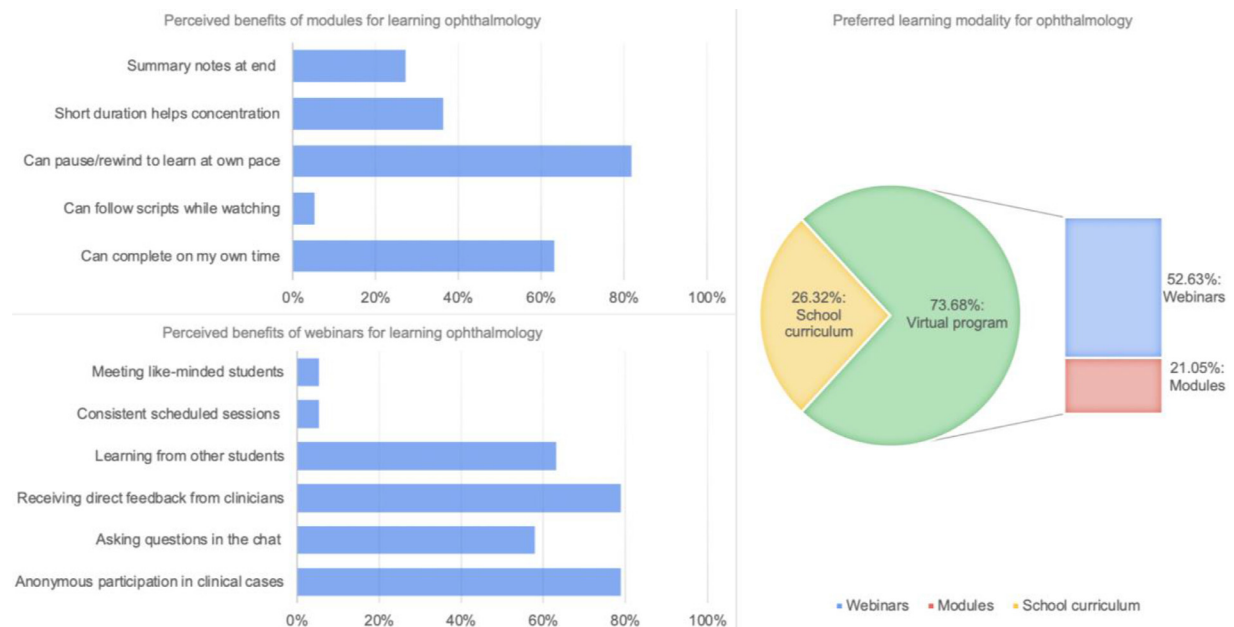
To our knowledge, this is the first study to have found that inequities in accessing high-quality ophthalmology education can be mitigated with virtual learning. Similarly

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**Table 1—Correlations between perceived efficacy of webinars (n = 19) and modules (n = 11) with various elements of student learning**

Various Elements of Student Learning	Correlation $\rho$	95% Confidence interval	$p$
Webinar: Increased my knowledge and confidence in clinical ophthalmology	0.514	0.028–0.803	<b>0.040</b>
Webinar: Supplemented in-person clinical teaching for ophthalmology	0.699	0.296–0.891	<b>0.004</b>
Webinar: Replaced in-person clinical teaching for ophthalmology	0.202	–0.341 to 0.644	0.455
Webinar: Allowed for learning in a more convenient format compared with in-person teaching	0.090	–0.438 to 0.572	0.811
Number of webinars attended and mitigating feelings of social isolation and/or inequities to learning ophthalmology	0.821	0.5635–0.9329	<b>3.010e-005</b>
Module: Increased my knowledge and confidence in clinical ophthalmology	0.422	–0.257 to 0.822	0.219
Module: Supplemented in-person clinical teaching for ophthalmology	0.943	0.782–0.986	<b>0.001</b>
Module: Replaced in-person clinical teaching for ophthalmology	–0.239	n/a	0.548
Module: Allowed for learning in a more convenient format compared with in-person teaching	0.794	n/a	<b>0.040</b>
Number of modules completed and mitigating feelings of social isolation and/or inequities to learning ophthalmology	0.023	–0.572 to 0.602	0.956

Boldfaced values indicate significance at 0.05 level.



**Fig. 1—Characteristics of an effective virtual learning environment.**

structured virtual learning programs may be used to deliver high-quality clinical learning to enhance students’ ophthalmic knowledge, skills, and confidence. Limitations of our study include the relatively small sample size and the self-reported nature of the survey in which participants may be subject to recall and reporting bias. However, response rates between 20% and 40% have previously been deemed adequate for surveys of moderate-high importance.<sup>7</sup> Future directions include exploring how to optimize online learning resources and teaching tools for undergraduate medical education in ophthalmology.

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**Footnotes and Disclosure**

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Dr. Sanjay Sharma is the editor-in-chief and founder of Medskl.com.

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