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Tips to optimize digital education in ophthalmology: results from ESASO survey

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Citation

Ferrara, M., Romano, V., Iovino, C., Kadhim, M. R., Dijk, E. H. C. van, Boon, C. J. F., ... Romano, M. R. (2022). Tips to optimize digital education in ophthalmology: results from ESASO survey. *European Journal Of Ophthalmology*, 33(2), 745-753.
doi:10.1177/11206721221093187

Version: Publisher's Version

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Downloaded from: <https://hdl.handle.net/1887/3485632>

Note: To cite this publication please use the final published version (if applicable).

Tips to optimize digital education in ophthalmology: Results from ESASO survey

European Journal of Ophthalmology
2023, Vol. 33(2) 745–753
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sagepub.com/journals-permissions
DOI: 10.1177/11206721221093187
journals.sagepub.com/home/ejo



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Abstract

Purpose: To identify audience and faculty preferences to optimize digital education sessions in ophthalmology.

Methods: We distributed an online survey to ophthalmology trainees and specialists worldwide. The survey investigated respondents' preferences on various findings of hypothetical digital educational sessions. Data were analyzed using descriptive statistics, Fisher's exact probability and ANOVA tests.

Results: The survey was completed by 655 respondents, from 53 different countries. According to most respondents, the optimal duration and timeframe for a valuable digital education session would be 30–60 min, without a break (52%), in the evening time-slot (6–8 p.m.) (45%) of a weekday (Monday–Thursday) (46%), regardless of age (p -value = 0.84, 0.39, 0.89, respectively) and job position (p -value = 0.31, 0.29, 0.08, respectively). The availability of webinars and recorded surgical videos/clinical cases, associated with live discussion, represented the most important opportunity of digital educational channels for 46% and 42% of respondents, respectively.

Conclusion: Appropriate planning of timing and structure of digital educational ophthalmology sessions may optimize their effectiveness. Using multiple e-learning formats may be helpful to ensure the continuity of learning activities, also in view of a long-term replacement of traditional in-person education.

Keywords

Digital education, learning, ophthalmology, ophthalmology training, professional education, teaching, survey

Date received: 1 April 2021; accepted 22 March 2022

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Introduction

In ophthalmology, as well as in all medical specialties, continuous learning is crucial not only during residency and fellowship training (graduate medical education), but also during specialist practice (continuing medical education, CME), in order to improve physician competence, stay up-to-date on the best clinical and surgical practices and provide high quality of care.¹ Continuing professional development has become more difficult over the last year as the entire world has been facing the COVID-19 pandemic and, consequently, significant limitations have been imposed upon traditional medical education, such as restrictions of clinical and surgical activities, cancellation of traditional face-to-face lectures, meetings and conferences, and application of social distancing measures.^{2,3} A recent survey-based study, evaluating the impact of the COVID-19 pandemic on ophthalmology training, highlighted that the prompt introduction of web-based educational tools could significantly and effectively contribute to the continuity of training in the long term.⁴ In all medical specialties, including ophthalmology, there has been a forced and dramatic switch towards the digitalization of educational activities, including didactic teaching, clinical and surgical training, professional courses, scientific meetings and conferences.^{3,5} However, the urgent nature of this switch did not allow time to plan the optimal design of digital educational sessions in advance.³ In line with this need, the European School for Advanced Studies in Ophthalmology (ESASO) has been using a digital educational platform, named “e-Learning Ocular Surgery” (e-LOS), that provides educational content in a variety of online formats.

In the light of this background, we created a survey addressed to ophthalmology trainees (residents and fellows) and specialists, with the intention to point out audience and faculty preferences to optimize digital education sessions in ophthalmology.

Materials and methods

Quantilope’s platform was used to create an anonymous web-based survey, that was distributed worldwide to ophthalmology trainees and specialists over a 3-week period, from October 24, 2020 to November 15, 2020. Five of the authors, with different academic degrees, reviewed the literature and developed the survey, which conformed to the Declaration of Helsinki. The author group reviewed the first draft to assess the clarity of the questions. After minor changes based on author group’s comments, the survey was validated by all authors. The survey was available online through a link that was distributed via email and/or professional networks by the members of author group to ophthalmology trainees and specialists.

The survey was divided into 4 sections. The initial questions investigated the demographic and professional

findings of the respondents, including country of training/practice. The following 2 sections consisted of closed-ended questions aimed to investigate the attitudes of the participants towards digital educational sessions/platforms and their preferences regarding the ideal characteristics of a hypothetical digital educational session. Finally, the survey included 2 open-ended questions about the main strengths and the main weaknesses of digital events previously attended. All the participants consented to the use of the anonymized data collected in the survey for scientific and/or statistical purposes.

Statistical analysis

Statistical analysis was carried out by IBM SPSS Statistics, version 24.0 (IBM Corp., Armonk, NY, United States). We used descriptive statistics to describe the results summarizing categorical variables by percentages. Moreover, associations between non-continuous variables were analyzed through univariate analysis using Fisher’s exact probability and ANOVA. P value < 0.05 was considered statistically significant.

Results

The survey was received by 988 ophthalmology trainees or specialists and completed by a total of 655 respondents, from 53 different countries (response rate: 66.3%) (Figure 1). The baseline findings of the respondents are summarized in Table 1.

Responses to the questions investigating the attitude of respondents towards digital educational tools are shown in Table 2. Although before the first lockdown, digital education reportedly accounted for a minor proportion (up to 25%) of professional education (72%), the survey confirmed a substantial change as the vast majority of respondents declared that digital educational sessions have effectively replaced face-to-face teaching for more than 50% (72%), regardless of age and job position (p value of 0.72 and 0.80, respectively). However, the majority of respondents declared that, in case of hybrid events, they would prefer to attend in-person (48%). In this regard, informal networking was considered important for professional education, mainly as opportunity to meet experts (45%) and to share personal experience (45%).

Table 3 summarizes the responses investigating the preferences for specific findings of a hypothetical valuable digital educational session. Most respondents identified the evening time slot (6-8 p.m.) of a weekday (Monday to Thursday) as the best timeframe for a digital educational session (45% and 46%, respectively), regardless of age (p value = 0.39 and 0.89, respectively) and job position (p value = 0.29 and 0.08, respectively) of the respondents. Moreover, a time span of 30 to 60 min resulted to be the most commonly preferred option with regard to the

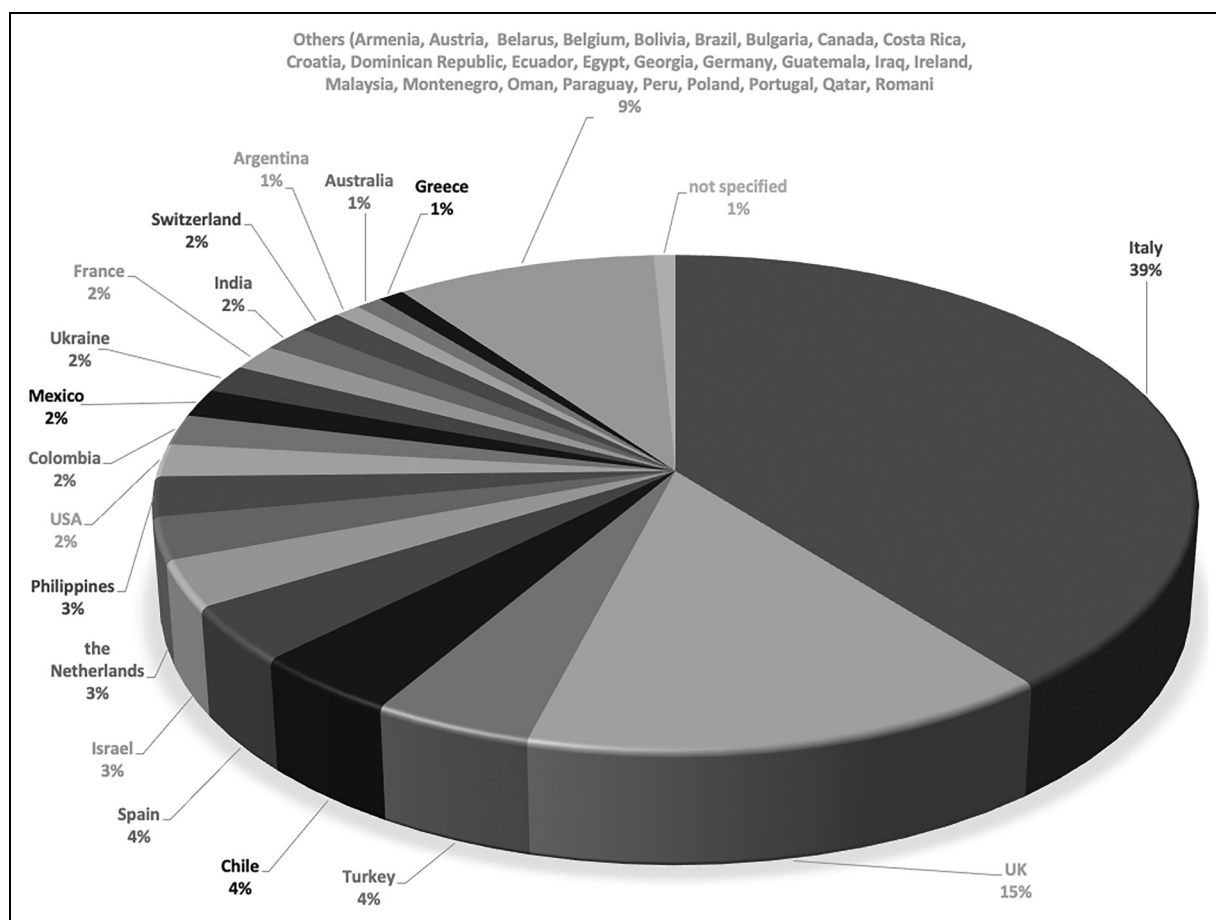


Figure 1. Countries of practice of the respondents.

Table 1. Baseline characteristics of respondents.

Age, n (%)	
- < 30 years	111 (17)
- 30-40 years	300 (46)
- 40-50 years	137 (21)
- > 50 years	107 (16)
Gender, n (%)	
- Male	378 (58)
- Female	273 (42)
Job position, n (%)	
- Resident	209 (32)
- Fellow	79 (12)
- Consultant	183 (28)
- Professor	66 (10)
- Private practice only	78 (12)
- Other	40 (6)

*Percentages rounded.

duration of a session without break (52%), with no difference based on age range or job position (p value = 0.84 and 0.31, respectively) of the respondents.

The factors chosen as the most important to provide a valuable digital educational session were the quality of

speakers (55%) and the clarity of presentations (39%) as audience member, and the innovative scientific content (48%) and the possibility to attend sessions of a specific subspecialty (45%) as faculty member, regardless of age and job position (p value > 0.05 for all) of the respondents. Overall, free registration, technical ease to join, original content and interaction were considered the most important items to improve audience participation (65%, 55%, 54% and 52%, respectively). In this regard, some differences were found depending on job position, such as the preference for content in mother tongue amongst private practitioners (36%, p value = 0.048), possibility to collect CME points for consultants (39%, p value = 0.016) and the involvement of key opinion leaders for professors (18%, p value = 0.001). Regardless of age and job position (p value > 0.05) of the respondents, webinars with experts and the sharing of recorded surgical videos or clinical cases, both associated with live discussion, were chosen as the most important opportunity offered by the digital educational channels (46% and 42%, respectively).

Finally, a total of 411 answers to the open-ended questions were collected. Quality/clarity of speakers/presentations (21%) and interesting/innovative topics (17%) were

Table 2. Use of digital education: responses to different questions.

Question	Respondents n (%) [*]
Before the lockdown due to COVID-19 pandemic, what was the proportion of digital sessions (e.g. webinars, podcast, online courses, etc.) compared to in-person teaching/meeting/courses in your professional education?	
- 0%	87 (13)
- 1-25	388 (59)
- 26-50%	86 (13)
- 51-75%	37 (6)
- 76-99%	36 (6)
- 100%	21 (3)
How much have digital educational sessions replaced face-to-face education in the last 6 months?	
- 0%	15 (2)
- 1-25%	64 (10)
- 26-50%	102 (16)
- 51-75%	129 (20)
- 76-99%	217 (33)
- 100%	128 (19)
Which digital media sharing network channels do you use most commonly for your professional medical education?	
- At least one from Facebook, Instagram, LinkedIn, Twitter, You Tube, Sermo, DocCheck, Coliquio, EyeTube, eLOS, Doximity, QuantiaMD, Figure1, MomMD, Student Doctors Network, WeMedUp, DailyRounds, DoctorsHangout, Among Doctors	572 (87)
- None of them	83 (13)
Do you actively contribute by sharing your own professional content on any digital media sharing network?	
- Yes	233 (36)
- No	422 (64)
Why do not you share your own professional content? (choose one or more)	
- My content is not interesting enough	97 (23)
- I do not know how to do it	37 (9)
- I am not keen on sharing my personal cases	84 (20)
- I do not have time	180 (43)
- I prefer to avoid public judgement	52 (12)
- It is not useful for a constructive discussion	24 (6)
- I do not want to say	13 (3)
- Other	60 (14)
How many digital education sessions did you attend as an audience member in the last 6 months?	
- None	20 (3)
- < 5	104 (16)
- 5-15	274 (42)
- 16-30	136 (21)
- > 30	121 (18)
How many digital education sessions did you attend as a faculty member in the last 6 months?	
- None	235 (36)
- < 5	181 (28)
- 5-15	146 (22)
- 16-30	51 (8)
- > 30	42 (6)
In case of hybrid events, that you can attend both in-person and via live streaming, which attendance modality would you prefer?	
- Always in-person	91 (14)
- Preferentially in-person	314 (48)
- I do not have a preference	103 (16)
- Preferentially via live streaming	127 (19)
- Always via live streaming	20 (3)
What do you think about the importance of the informal networking with colleagues during education meetings/congresses for your professional education (choose one or more)	
- Important for peer-to-peer discussion	209 (32)
- Important to create scientific collaborations	273 (42)

(Continued)

Table 2. (Continued)

Question	Respondents n (%) [*]
- Important to meet experts in their field	293 (45)
- Important as informal interaction is easier	20.3 (31)
- Important to share personal experience	292 (45)
- Other important reason	12 (2)
- Limited importance	12 (2)
- Pleasant, but not important for my professional education	26 (4)
-Not important at all	9 (1)

^{*}Percentages rounded.

more commonly reported as the main strength of digital educational events, whereas difficulty in interaction or limited time for discussion (23%) were more frequently mentioned as the main weaknesses, followed by excessive duration (19%) and technical issues that could occur (13%).

Discussion

E-learning is likely to represent a significant part of ophthalmology education in the future.⁵ Most of the studies aimed to assess the use of e-learning in ophthalmology were limited to modules for medical students.^{5–14} Furthermore, no previous study has focused on the optimal planning of digital educational sessions, although this is crucial to optimize audience acceptance and, potentially, teaching effectiveness. For instance, it has been emphasized that the adaptation of ophthalmology conferences to a virtual setting needs to consider some key findings, such as timing, duration, format and discussion tools.¹⁵ The need of some guidance regarding the structure of online teaching, such as the length of classes and the break between them, has also been recently claimed.¹⁶ In view of this, we conducted a survey-based study aiming to identify structural features, potentially beneficial for the planning of digital ophthalmology educational sessions, based on users' preferences.

According to the respondents, webinars and recorded surgical videos or clinical cases, both associated with live discussion, were the most effective opportunities offered by the digital educational channels for professional learning. In this regard, ophthalmology webinars have been described as a promising and effective teaching tool to improve knowledge acquisition and stimulate active participation of the learners.⁶ Indeed, unlike other online educational formats (e.g. podcasts, vodcasts, webcasts, etc.), webinars offer the significant advantages of preserving the real-time interaction learner-to-learner and learner-to-teacher and allowing the integration of techniques promoting the active participation of the learners and interaction (active learning).^{6,8,17,18} Recently, Romano et al.⁸ proposed a model of "active e-learning" consisting of an

entirely online course combining webinars with multiple techniques of active learning (such as pause procedures, case-based discussion, open discussion, commitment activities) and reported that this format preserved audience engagement, participants' satisfaction and interaction, and was perceived as effective by an audience of ophthalmology trainees and specialists.

In the current survey, the interaction resulted to be one of the most important item to improve audience participation in digital educational sessions and, in agreement with this, the inadequacy of interaction and limited time for discussion were considered the main weaknesses of digital events previously attended. Moreover, it is known that inadequate interaction can reduce the acceptance of e-learning methods.¹⁶ In this survey, the evening slot (from 6 to 8 p.m.) of a weekday (Monday-Thursday) was chosen as the best timeframe for digital education session. This is of interest, as identifying the best timeframe for the live broadcast, can enhance live attendance and, consequently, the possibility of live interaction.

Another critical aspect to optimize the effectiveness of any e-learning module/course/event is the duration of each session without breaks. Indeed, the excessive length of a lecture can compromise the efficient assimilation of new information and thus compromise the learning process.¹⁹ It has been suggested that the optimal duration of a lecture might be about 30 min as students level of attention during lectures usually reaches a peak after the first 15 min and then progressively decreases.²⁰ Moreover, a recent survey-based study, addressed to medical and nursing students, showed that digital classes of more than 40 min were significantly associated with the onset of loss of concentration, eye strain, neck and back pain.¹⁶ In this regard, 15–30 min and 30–60 min were the options more frequently preferred in our survey as optimal duration of a digital educational session without a break. Moreover, the incorporation of active learning tools every 10–15 min may improve the retention of knowledge and maintain high levels of attention.¹⁷

As audience members, quality of speakers and the clarity of presentations were chosen as being of greatest

Table 3. Respondents' preferences regarding digital educational sessions' findings.

Question	Respondents n (%) [*]
Which is the optimal duration of a digital educational session without a break?	
- < 15 min	37 (6)
- 15-30 min	192 (29)
- 30-60 min	339 (52)
- 60-90 min	86 (13)
- > 90 min	1 (<1)
Which day of the week would you prefer to attend a digital professional educational session?	
- Monday-Thursday	303 (46)
- Friday	138 (21)
- Saturday	163 (25)
- Sunday	51 (8)
What is the best timing of a live digital educational event with regards fitting into your normal schedule?	
- Before 9 a.m.	45 (7)
- 9 a.m. – 12 p.m.	74 (11)
- 12 p.m. – 2 p.m.	33 (5)
- 2 p.m. – 6 p.m.	76 (12)
- 6 p.m. – 8 p.m.	296 (45)
- After 8 p.m.	131 (20)
As an audience member, which of the following are most relevant to provide a valuable/useful digital educational session? (choose one or more, up to three)	
- Innovative scientific content	199 (30)
- Choice of sub-specialty topic	158 (24)
- Choice of topics of common usefulness in daily practice	187 (28)
- Duration	95 (14)
- Strict respect of the timetable	40 (6)
- Adequate time for live discussion	83 (13)
- Availability of instant messaging during the live session	67 (10)
- Quality of speakers	362 (55)
- Clarity of presentations	259 (39)
- Lectures given by international experts	137 (21)
- Availability of recorded sessions on the digital platform	215 (33)
- Other	8 (1)
As a faculty member, which of the following are most relevant to provide a valuable/useful digital educational session? (choose one or more, up to three) [†]	
- Innovative scientific content	201 (48)
- Attending session of my subspecialty	189 (45)
- Duration	85 (20)
- Strict respect of the timetable	67 (16)
- Adequate time for live discussion	141 (34)
- Availability of instant messaging during the live session	79 (19)
- The other faculty members	60 (14)
- Possibility to pre-record the presentation	121 (29)
- Possibility to give the lectures live	90 (21)
- Other	9 (1)
Please, select the most important items for audience participation (choose one or more, up to three)	
- Technically easy to join	358 (55)
- Aligned with an independent educational institution	106 (16)
- Transparent sponsorship	103 (16)
- Peer-to-peer discussion	255 (39)
- Content in mother tongue	153 (23)
- Unbiased content	175 (27)
- Original content	355 (54)
- Interactive events	341 (52)
- Respected key opinion leader involvement	39 (6)

(Continued)

Table 3. (Continued)

Question	Respondents n (%) [*]
- Free registration	423 (65)
- Peer-to-peer invitation/recommendation	137 (21)
- CME points	196 (30)
- Other	10 (2)
Please select the most useful/effective opportunity offered by digital educational platform for your professional education (<i>choose one or more up to three</i>)	
- Live surgery sessions by experts with live discussion	244 (37)
- Webinars with experts and live discussion	299 (46)
- Online training courses with live interaction providing CME credits	181 (28)
- Sharing of recorded surgical videos or clinical cases and associated community discussion	275 (42)
- Library of recorded training courses providing CME credits	187 (28)
- Surveys on hot topics in ophthalmology and associated community discussion	135 (21)
- Sharing of scientific publications and associated community discussion	138 (21)
- Possibility to privately connect with peers and/or expert colleagues through the chat function	95 (14)
- Other	9 (1)

^{*}Percentages rounded.

[†]the percentages are referred to the 420 respondents who had experience as faculty members in digital educational sessions in the 6 months before the distribution of the survey.

importance for a valuable digital educational session. It is known that the appropriate design of teaching materials may impact both transfer of knowledge and learner engagement positively.¹⁸ For instance, the incorporation of verbal and pictorial elements in teaching material results in increased transfer and retention of knowledge. However, the content presented in visual and verbal information needs to not exceed learners' cognitive processing limits, potentially leading to a cognitive overload.^{18,21,22} Various strategies can avoid cognitive overload, such as planning a small interval between different segments of the presentation or signaling the most important information on a slide.²⁰

Recently, Chatziralli et al.⁵ highlighted that professional networking is unavoidably restricted by the current online adaptation of educational activities. In line with previous findings, our survey showed that in-person informal networking is considered a useful professional opportunity to meet experts and to share personal experience. In this regard, it may be argued that different to a single e-learning module/event, a digital educational platform, characterized by a community made up by members of different professional grades and experiences, may allow the creation of a wide network, beyond the temporal and spatial limits of any specific face-to-face event.

In conclusion, in response to the emergence and spread of the COVID-19 pandemic, the prompt adaption of traditional teaching to e-learning methods ensured the continuity of professional education in ophthalmology and in the other medical specialties. In the view of a necessary long-term use of e-learning tools, the improvement of timing and design of digital educational sessions may result in the optimization of their acceptance and effectiveness.

Moreover, digital educational platforms, may be useful tools to ensure effective teaching activities and to enable professional network building.

Acknowledgements

Researchers participating in the e-LOS Study Group: Aniruddha Agarwal (Post Graduate Institute of Medical Education and Research (PGIMER), Chandigarh, India)

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Dinah Zur (Ophthalmology Division, Tel Aviv Medical Center, affiliated to Sackler Faculty of Medicine, Tel Aviv University, Tel Aviv, Israel)

Supported by HOYA Surgical Optics GmbH that contributed to the creation of the survey.

Declaration of Conflicting Interests

The author(s) declared the following potential conflicts of interest with respect to the research, authorship, and/or publication of this article: XXXXXXX. Mario R Romano is the scientific director of e-LOS. The following Authors are members of ESASO faculty: Martina Angi, Ernesto Bali, Aman Chandra, Sibel Demirel, Nataliia Malachkova, Rodolfo Mastropasqua, Gerard McGowan, Michele Reibaldi, Robert Rejdak, Mario R Romano, Tommaso Rossi, David Steel, Mario Toro, Xavier Valldeperas, Jose L Vallejo-Garcia.

Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

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References

1. Whitehurst KE, Carraway M, Riddick A, et al. Making the learning continuum a reality: the critical role of a graduate medical education-continuing medical education partnership. *J Contin Educ Health Prof* 2019; 39: 279–284.
2. Romano MR, Montericchio A, Montalbano C, et al. Facing COVID-19 in ophthalmology department. *Curr Eye Res* 2020; 45: 653–658.
3. Wong TY and Bandello F. Academic ophthalmology during and after the COVID-19 pandemic. *Ophthalmology* 2020; 127: e51–e52.
4. Ferrara M, Romano V, Steel DH, et al. Reshaping ophthalmology training after COVID-19 pandemic. *Eye (Lond)* 2020; 34: 2089–2097.
5. Chatziralli I, Ventura CV, Touhami S, et al. Transforming ophthalmic education into virtual learning during COVID-19 pandemic: a global perspective. *Eye (Lond)* 2021; 35: 1459–1466.
6. Mayorga EP, Bekerman JG and Palis AG. Webinar software: a tool for developing more effective lectures (online or in-person). *Middle East Afr J Ophthalmol* 2014; 21: 123–127.
7. Petrarca CA, Warner J, Simpson A, et al. Evaluation of eLearning for the teaching of undergraduate ophthalmology

- at medical school: a randomised controlled crossover study. *Eye (Lond)* 2018; 32: 1498–1503.
8. Romano MR, Ferrara M, Rocha-de-Lossada C, et al. Active e-learning in ophthalmology through live webinars: back to the theatre. *Eye (Lond)* 2021; 35: 3159–3160.
 9. Al-Azzam N, Elsalem L and Gombedza F. A cross-sectional study to determine factors affecting dental and medical students' preference for virtual learning during the COVID-19 outbreak. *Heliyon* 2020; 6: e05704.
 10. Wendt S, Abdullah Z, Barrett S, et al. A virtual COVID-19 ophthalmology rotation. *Surv Ophthalmol* 2021; 66: 354–361.
 11. He B, Tanya SM and Sharma S. Overcoming barriers in access to ophthalmic education with virtual learning. *Eye (Lond)* 2022; 36: 237–238.
 12. Hsiao YT, Liu HY and Hsiao CC. Development of a novel interactive multimedia E-learning model to enhance clinical competency training and quality of care among medical students. *Healthcare (Basel)* 2020; 8: 500.
 13. Sud R, Sharma P, Budhwar V, et al. Undergraduate ophthalmology teaching in COVID-19 times: students' perspective and feedback. *Indian J Ophthalmol* 2020; 68: 1490–1491.
 14. Dasgupta S, Shakeel T, Gupta P, et al. Impact of ophthalmic webinars on the resident's Learning experience during COVID-19 pandemic: an insight into its present and future prospects. *Indian J Ophthalmol* 2021; 69: 145–150.
 15. Gupta MP, Sridhar J, Wykoff CC, et al. Ophthalmology conferences in the coronavirus disease 2019 era. *Curr Opin Ophthalmol* 2020; 31: 396–402.
 16. Singh HK, Joshi A, Malepati RN, et al. A survey of E-learning methods in nursing and medical education during COVID-19 pandemic in India. *Nurse Educ Today* 2021; 99: 104796.
 17. Knipfer C, Wagner F, Knipfer K, et al. Learners' acceptance of a webinar for continuing medical education. *Int J Oral Maxillofac Surg* 2019; 48: 841–846.
 18. Cloonan M and Fingeret AL. Developing teaching materials for learners in surgery. *Surgery* 2020; 167: 689–692.
 19. Schweppe J and Rummer R. Attention, working memory, and long-term memory in multimedia learning: an integrated perspective based on process models of working memory. *Educ Psychol Rev* 2014; 26: 285–306.
 20. Stuart J and Rutherford RJ. Medical student concentration during lectures. *Lancet* 1978; 2: 514–516.
 21. Sorden S. The cognitive theory of multimedia learning. In: Irby B, Brown G, Lara-Alecio R and Jackson S (eds) *The handbook of educational theories*. Charlotte: Information Age Publishing, 2013, pp.155e169.
 22. Mayer RE and Moreno R. Nine ways to reduce cognitive load in multimedia learning. *Educ Psychol* 2003; 38: 43e52.