Two years on- what has COVID-19 taught us about online (telerehabilitation) visual impairment teaching clinics?

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Introduction

The COVID-19 pandemic has had a major impact on the optometry educational landscape worldwide[1,2] including education and training at the Department of Optometry and Vision Sciences at City, University of London. The forced move to synchronous (learning in real time with students and the teacher based in different remote locations) and asynchronous (learning materials can be accessed at any time according to the student's convenience e.g. a recorded lecture) teaching has given many optometry academics at City the opportunity to experience online teaching and reflect on what aspects might work well and what might not. Although online teaching has been part of City's postgraduate educational provision for some time now it had not gained widespread adoption on the undergraduate optometry provision. This changed almost overnight as a result of the pandemic and there was rapid adoption of both synchronous and asynchronous online teaching, and a much slower than anticipated return to traditional on-campus face to face teaching even when COVID-19 restrictions were eased. Perhaps this is unsurprising given the unpredictable nature of the pandemic and is likely to represent a more general shift away from traditional teaching methods.

One phrase that is becoming popular is the term '*hybrid*'. Synchronous hybrid learning refers to learning where at least some individuals are based remotely (online) and others on campus.[3] This can take several forms including the '*remote classroom'* where the teacher and some students are present on one campus, with additional students at a second campus attending remotely. Raes et al also describe the *'hybrid virtual classroom'* where some students are on campus with the teacher and others log in remotely. Previous researchers have highlighted the benefits and pitfalls of synchronous hybrid learning (for a comprehensive review refer to Raes et al, 2020).[3] Organisational benefits include increased student numbers, prevention of duplication of teaching where multiple campuses exist and increased flexibility which takes into account student needs at different life stages. Pedagogical benefits include students being able to interact with peers and teachers from across the globe. This creates a richer learning experience and breaks down at least some inclusion barriers for underrepresented groups and can also improve retention. Synchronous hybrid teaching allows students to have better control over their learning as they can choose where to learn from. Despite the advantages there are challenges. From the teacher's point of view, this type of learning may necessitate radical changes to teaching to

accommodate the use of technology alongside ensuring that educational standards are met. It requires proficiency with, and the availability of adequate technology. More time and effort may be needed to run a session, which increases workload, and it may not always be possible for the teacher to run a session alone. From a student's point of view, engaging whilst online can be difficult and students may feel that on campus students are given preferential treatment. Students may also have poor access to technology and face technology disruptions which could hamper their learning experience. Despite these challenges, academics, students and organisations are likely to have experienced and appreciated some of the benefits of online learning as a result of COVID-19 and may want to continue with at least some form of online learning, especially hybrid learning, in the post-pandemic educational landscape.

Synchronous hybrid models have the potential to be adopted across a variety of different teaching formats including lectures, tutorials and clinical teaching. This type of instruction could benefit students as it would give them increased flexibility in their learning, taking into account self-isolation, family and other commitments. There may be particular benefits to utilising synchronous hybrid models in clinical optometry teaching particularly with an increase in popularity of online/ remote (teleoptometry and teleophthalmology) clinics, necessitating students to receive experience in all types of clinics, both in person and online. Kilduff et al, 2020 found that running accident and emergency ophthalmology consultations at Moorfields Eye Hospital (MEH) remotely was both ‘*’cost-effective and time-efficient for both patients and doctors''.* [4] As a result, MEH is considering increasing the number of remote clinics. There is little evidence addressing the effectiveness of online/remote teaching clinics although several researchers have investigated other forms of online teaching such as tutorials (Raes et al, 2020).[3]

Novel methods

As a result of the COVID-19 pandemic some clinical teaching on the undergraduate optometry programme at City, University of London was moved to a synchronous (online/remote) format. The undergraduate optometry programme at City is currently a three-year programme. Although students learn practical clinical skills across all three years, all clinical placements take place in the final year. Students are exposed to a variety of clinics including primary care, binocular vision, paediatric and visual impairment clinics. Synchronous (online/remote) clinics were predominantly run for visual impairment via Zoom with the students, clinician and patient all in different

locations. [5] For ease of understanding these clinics are referred to as '*traditional synchronous clinics.'* At the time the decision to run traditional synchronous clinics was made there was limited evidence [6] in the literature about the effectiveness of these clinics although the evidence continues to grow with several studies finding that remote/online clinics are acceptable for initial low vision consultation [7] and training individuals with visual impairment to us a variety of different low vision aids such as hand and stand magnifiers [9] and head mounted devices [10].

As visual impairment clinics at City are run using volunteer patients this made it easier to move to a synchronous (online/remote) format as the clinic lead was familiar with the patients and was able to contact a majority to arrange for them to attend remotely. Prior to the synchronous session patients were offered a trial run so that the clinic lead could explain the format of the clinic. Similarly, students received a tutorial about the format of the clinic and expectations during the clinic. Students attended in small groups of up to four students and took turns at doing history and symptoms. Habitual distance visual acuity was measured using the Home Acuity Test [11] and Near Visual Acuity was measured using the Optima near vision chart. Both were posted in advance to the patient with a 1.5m long string to be used with the Home Acuity Test [12]. The charts were also used to measure acuity with the patient's existing low vision aids and helped in determining magnification requirements. Following acuity measurements, advice was given to the patients including discussing management options such as referral for a face to face appointment if a refraction was deemed appropriate. Students were provided with feedback following the session and were also required to fill out an online form reflecting on the session including indicating strengths and weaknesses. In total 221 student reflections were received. Overall students reflected positively about the sessions which provided them with a good learning opportunity although certain procedures, such as refracting the patients, were not possible. No negative reflections relating to the clinic were received.

Comments included:

''As a first patient I was able to gain a lot of knowledge on how you would take history and symptoms just general tests you can do over Zoom overall was an amazing first experience.''

''I've learnt how to successfully measure the VAs of the patient (distance and near) virtually and what it means clinically''

''I think for my first low vision clinic it went smoother than expected. Considering it's the first time I have ever done a virtual clinic I was able to communicate quite confidently with the px. It wasn't as awkward as I thought it would be''

Patient feedback was also sought. This was also positive and comments included:

'' P*articipating in the student clinics via Zoom is for me, incredibly convenient and I am able to raise issues just as easily as if I was physically present"*

"*I find the sight tests and reading more realistic in my home setting than the contrived environment of the clinics*"

As the COVID-19 situation improved patients were given the choice to attend remotely with the students on campus in the clinic or in person. A majority (9 out of 10) preferred to return to the clinics with approximately 10% (n=1) wanting to attend remotely. Having the students and clinician in the clinic with the patient remotely (referred to as '*traditional hybrid synchronous'*) worked well, although there were some challenges. For example, due to the students wearing masks the patients could not always hear if the students sat too far away from the computer. However, when the students moved closer the patient was only able to view one student at a time. These types of technological problems due to camera positioning, and the need for students to talk into a microphone have been highlighted as potential barriers to the synchronous learning experience.[13] Despite these barriers, student reflection revealed that the experience was positive. 37 traditional hybrid synchronous student reflections were recorded. No negative comments were received. Comments included:

''First virtual clinic- was very good experience''

''Good to learn how to do VA over video -useful''

Although there was no difference between the tests carried out in both synchronous formats because students were physically present (traditional hybrid synchronous) it was easy to provide hands-on experience with low vision aids. This was not possible when everyone was present remotely (traditional synchronous). Two sessions were also run where one student and the patient were remote and a small group of students were in the clinic (referred to as '*hybrid synchronous'*). This type of hybrid teaching was more challenging to run than the traditional hybrid synchronous sessions although again the tests carried out were the same. As well as the problems reported for traditional hybrid synchronous teaching, other problems were encountered, for

example, when all the students were present in the room together it was easier for them to work as a team. When there was a combination of remote and in-clinic students, teamwork became more challenging and the remote student was sometimes forgotten. Similarly, the clinician running the session found it difficult involving the remote student in the discussions as they were not physically present in the room. Huang et al (2017) highlighted that remote students can find it difficult to ask questions and can feel excluded because they are physically separated from the session. [14] None of these barriers were highlighted in student reflections (n=8) and all students including the remote students (n=2) provided positive comments including:

''Much smoother history and symptoms and engagement with the patient, despite it being a virtual appointment. Was able to use the home acuity test and be more flexible in terms of testing''

With hindsight and awareness of these challenges it is likely that they will be less of an issue in the future.

Discussion

Having experienced visual impairment teaching clinics on campus and in different synchronous online (telerehabilitation) formats (*traditional, traditional hybrid and hybrid*) it is clear that each method has something to offer. For any type of synchronous clinic to run well, everyone should be familiar with the technology being used, and organisations should provide adequate support and training.[15] There should be recognition that synchronous teaching comes with an increased workload. [15] For example, when clinics are run entirely on campus, it is possible to supervise two sets of students simultaneously. With synchronous clinics it is generally only possible to supervise one set of students, effectively doubling teaching commitment. Ideally when running hybrid sessions, a remote facilitator should be available who can facilitate the learning of remote students. This could to a large extent mitigate remote students feeling less engaged and would also benefit the supervisor in the clinic. Expectations about the session should be communicated through a briefing session prior to the clinic. Remote students should understand what to do when technology goes wrong. Teachers should provide alternative learning resources where practical hands-on experience is unavailable to the remote students but is available to in-clinic students. For example, when synchronous clinics ran at City students had access to a low vision aids box and carried out a reflective exercise to complement the clinic.

There is no doubt that synchronous learning is likely to stay. Although conventional on campus visual impairment teaching clinics give students hands-on experience of interacting with patients and carrying out practical tests which cannot always be carried out remotely, they do not allow students to interact with patients who are unable to travel to the clinic. Online (telerehabilitation) teaching clinics can offer experiences with a wide range of patients and can give students the flexibility to attend these clinics from any location, allowing them to work around their individual circumstances.

Conclusion

To conclude, although COVID-19 has brought a great deal of hardship it has given teaching staff the opportunity to think outside the box, try teaching methods that were unlikely to have been considered previously, and take forward those which work best for students. Those involved in clinical teaching, particularly visual impairment teaching, should consider traditional and hybrid synchronous clinics alongside more traditional on campus clinics to give students a variety of different experiences whilst giving both the student and the patient increased flexibility.

References

1. Jonuscheit S, Lam AKC, Schmid KL, et al. COVID-19: ensuring safe clinical teaching at university optometry schools. Ophthalmic and Physiological Optics 2021; 41: 144–156.
2. Ramani KK, Hussaindeen JR. Optometric education in the post-COVID-19 era: A time of forced change! Indian J Ophthalmol 2021; 69: 746–750.
3. Bryson JR, Andres L. Covid-19 and rapid adoption and improvisation of online teaching: curating resources for extensive versus intensive online learning experiences. Journal of Geography in Higher Education 2020; 44: 608–623.
4. Raes A, Detienne L, Windey I, et al. A systematic literature review on synchronous hybrid learning: gaps identified. Learning Environ Res 2020; 23: 269–290.
5. Kilduff CL, Thomas AA, Dugdill J, et al. Creating the Moorfields' virtual eye casualty: video consultations to provide emergency teleophthalmology care during and beyond the COVID-19 pandemic. BMJ Health Care Inform; 27. Epub ahead of print 13 August 2020. DOI: 10.1136/bmjhci-2020-100179.
6. Subramanian A. Remote visual impairment teaching clinics during COVID-19 at a university optometry school. Ophthalmic and Physiological Optics 2021; 41: 630–631.
7. Bittner AK, Yoshinaga PD, Wykstra SL, et al. Telerehabilitation for people with low vision. Cochrane Database of Systematic Reviews. Epub ahead of print 26 February 2020. DOI: 10.1002/14651858.CD011019.pub3.
8. Ihrig C. Home Low Vision Ocular Rehabilitation Telehealth Expansion Due to COVID-19 Pandemic. Telemed J E Health 2022; 28: 873–877.
9. Bittner AK, Yoshinaga P, Bowers A, et al. Feasibility of Telerehabilitation for Low Vision: Satisfaction Ratings by Providers and Patients. Optom Vis Sci 2018; 95: 865–872.
10. Lorenzini M-C, Wittich W. Personalized Telerehabilitation for a Head-mounted Low Vision Aid: A Randomized Feasibility Study. Optom Vis Sci 2021; 98: 570–581.
11. Crossland MD, Dekker TM, Hancox J, et al. Evaluation of a Home-Printable Vision Screening Test for Telemedicine. JAMA Ophthalmol. Epub ahead of print 7 January 2021. DOI: 10.1001/jamaophthalmol.2020.5972.

12. Optima - The Low Vision Experts - Choosing LVAs - Finding the correct level of magnification, http://www.optimalowvision.co.uk/choosing.cfm?id=1572 (accessed 22 January 2021).
13. Cunningham U. Teaching the disembodied: Othering and activity systems in a blended synchronous learning situation. The International Review of Research in Open and Distributed Learning; 15. Epub ahead of print 22 October 2014. DOI: 10.19173/irrodl.v15i6.1793.
14. Huang Y, Zhao C, Shu F, et al. Investigating and Analyzing Teaching Effect of Blended Synchronous Classroom. In: 2017 International Conference of Educational Innovation through Technology (EITT). 2017, pp. 134–135.
15. Bower M, Dalgarno B, Kennedy GE, et al. Design and implementation factors in blended synchronous learning environments: Outcomes from a cross-case analysis. Computers & Education 2015; 86: 1–17.