

## Innovative Use of a Panoramic Lens in Clinical Practice and Tele-Education: Our Experience

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### Abstract

For many years, telemedicine has been utilized to give treatment, education, and training, particularly to healthcare workers in remote places and nations with low resources. However, during the SARS COVID-19 pandemic, when the lockdown necessitated the use of technology more than ever, telemedicine came to popularity. Tele-education is a subset of Telemedicine that has aided millions in continuing their education over the previous two years. Photographs, audio, video, or a combination of these are the most common telemedicine formats, and they can be captured with portable cameras, mobile phones, or computers. Tele-education offers tools and approaches for improving teaching. Frequent updates and introduction of newer technologies are required to make Tele-education better, more cost effective, and user friendly, especially now that we anticipate future Pandemic wave surges. In this study, we share our experience of using Panoramic view, which can take wide angle images, in our daily clinical practice (ward, OPD, dressing room, operation theatre) and in Tele-Education. The study is unique in that there is relatively little information on the use of wide-angle lenses in clinical practise and Tele education.

**Keywords:** Panoramic view; Telemedicine; Tele education; Plastic Surgery, COVID-19, Omicron.

### Introduction

Panoramic lenses achieve extremely wide angles of view. Panoramic photography is a technique of photography, using specialized equipment or software, that captures images with horizontally elongated fields of view. It is sometimes known as wide format photography. Tele education, defined as the application of information and communication technologies (ICTs) in the delivery

of distance learning, has been used for many years to deliver continuing education programs to rural healthcare professionals.<sup>9</sup> Tele education offers a means of providing better utilization of time and availability of the few professionals who are willing to train. It is commonly acknowledged that information and communication technology (ICT) not only contributes to advancements, but also gives tools and ways for improved training. Because mistakes made by individuals with less experience or who have yet to be qualified are virtual, the risk of injury from those with less experience or who have yet to be qualified is minimized.<sup>10</sup>

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### Materials and Methods

This study was conducted in the Department of Plastic surgery in a Tertiary care center in south India. Departmental ethical clearance and consent from the subjects were obtained. In this study, we have used a panoramic capture mode from the camera of the mobile phone (Fig. 1). This was

then used to capture images for clinical practice in ward, operation theatre, out-patient department, dressing rooms, and in Tele-education to evaluate the merits and demerits (Fig. 2,3 & 4). This study was conducted for a period of 30 days and feedback proforma was taken to from 10 residents after the end of the period.

**Results**

The advantages of panoramic view mode was easy to use, convenient to use, covers a wide field of view thereby eliminating the need for taking multiple photos to cover the field of interest, ability to zoom-in and zoom-out of field of interest with image clarity. The disadvantages mentioned were image quality varied with camera specifications and software/hardware of the phones (Table 1)



Fig. 1: Phone, Clip-on with The Panoramic Lens.

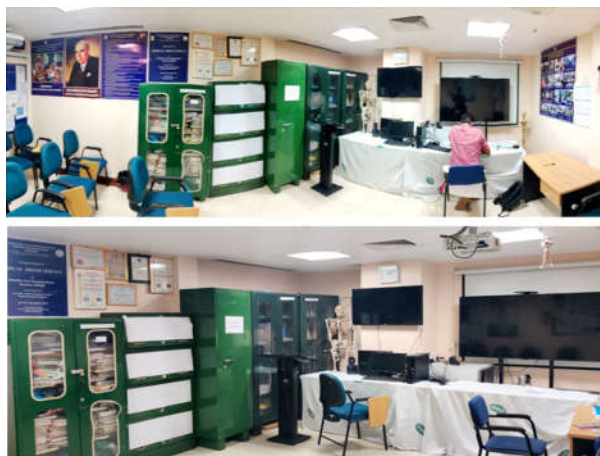


Fig. 2: Wide-Angle View vs Normal view of a Seminar Room.



Fig. 3: Wide Angle View vs Normal view of the Minor Operating Room.



Fig. 4: Wide-Angle View of Burns patient vs Normal view.

Table 1: Feedback form

Questionnaire	Rating 1 to 5 (1 being worst, 5 being best)
How easily were u able to use the clip-on	
How much was the reliability of the device compared to regular webcam	
How affordable was the clip-op leans	
Would you like to recommend other for usage of this device	Yes/No
Suggestions	

**Table 2:** Physician and their experience on scale of 1 to 5 rating, the higher the score the more was the satisfaction level.

Physician	Ease of usage	Reliability	Cost-effectiveness	Field of View	Will you recommend others this device
Physician-1	4	4	4	3	No
Physician-2	4	4	4	4	Yes
Physician-3	5	4	5	4	Yes
Physician-4	4	5	4	3	Yes
Physician-5	4	4	5	5	Yes
Physician-6	4	5	4	3	No
Physician-7	3	4	4	5	Yes
Physician-8	5	5	4	4	Yes
Physician-9	3	4	5	4	Yes
Physician-10	4	4	4	4	Yes
Average	4	4.3	4.3	4	Yes= 8/10

## Discussion

A panoramic lens is a camera component that can capture an ultra wide field of view. Long before the invention of photography, the panorama was used in painting, particularly in murals as early as 20 A.D. in those recovered at Pompeii,<sup>1,2,3</sup> as a technique of generating an immersive 'panoptic' view of a vista. It reached a zenith of development in the century preceding to the introduction of photography, and from 1787, with the work of Robert Barker,<sup>4</sup> when entire structures were created to hold 360° panoramas,<sup>5</sup> and even included lighting effects and moving parts.<sup>6</sup> Von Marten developed panoramic daguerreotypes with a unique panoramic camera he designed himself. On a single daguerreotype plate, the camera could record a wide vista. A cityscape is put out in complete and vivid detail in front of the viewer.<sup>8</sup>

For many years, tele education has been used to provide continuing education to rural healthcare practitioners. The main modes include audio, video, phones, and computers. Its benefits include lower travel expenses and hazards, a broader reach due to the democratisation of information chances, the ability to choose one's own study hours, and a greater chance of receiving on the job training without having to leave one's workplace. However, there are several drawbacks, such as the requirement for specialist staff (including additional teacher and tutor training), the availability of steady and sufficient connections, and students' digital competency (digital and information literacy). Many students struggle to adjust to online learning, either due to a proclivity for procrastination or other technical limits.<sup>10</sup>

SARS COVID-19 has caused schools all throughout the world to close. Over 1.2 billion

youngsters are out of school worldwide. As a result, education has undergone significant transformations, with the rise of e-learning, in which instruction is done remotely and via digital platforms. According to research, online learning increases information retention and takes less time, implying that the alterations created by the coronavirus are here to stay.

Tele education can help healthcare workers learn and increase capacity, both from the start and as part of continuous medical education. Distance is no longer a limiting factor when telemedicine is used, hence this can be an integral aspect of telehealth. It is suggested that any usage of information technology in day to day care include tele education and capacity building to enable employees and workers to use telemedicine to troubleshoot issues that occur frequently. A separate workforce proficient in both healthcare and Telemedicine is required in rural places, where information technology is less widely used.

Sunita Maheshwari's et al case study of e-teaching in Cardiology in India revealed the following benefits of virtual live e-teaching or tele teaching in medicine: Instructor shortages are avoided since one teacher can educate many pupils in multiple geographic places at the same time. All centres undertaking specialist training can receive the same curriculum, resulting in a national consensus on diagnostic and management approaches among all trainees. The e classes can be recorded and replayed, allowing the same group or fresh learners to view them multiple times. The question and answer sessions are fully participatory and similar to those in a traditional classroom setting.<sup>11</sup> Another study done by Nishad K, Chittoria RK, Gupta S, Reddy CL, Mohan PB, Pathan I, et al. Mobile telemedicine kiosk for tele-burn ward consultations during

COVID-19 period concluded that Telemedicine Kiosk was used for the Tele consultations like Teleward rounds, Tele ICU rounds, Tele burns ward rounds, Tele patient attendant interactions as well as Tele monitoring of patients or flaps.<sup>13</sup>

The panoramic mode of the mobile phone camera captures a ultra wide field of view eliminating the need for multiple photos and constantly moving the camera to focus on field of interest. The images captured have good image quality and also the ability to zoom-in and zoom out to a particular section. These advantages have been applied to our daily clinical practice, patient management and tele education to maximise the efficiency and efficacy.

### Conclusion

From the undergraduate level onwards, tele-education must be incorporated into educational processes. Other components of health information technology, such as how to use an electronic patient record, health information systems, decision support systems, tele health and telemedicine, video collaboration, and teamwork training, can all be taught at the same time. This will make it easier to build a convergent vision in the new and existing digital environment. Panoramic mode of capture is encouraged in primary and secondary level centres, out reach clinics, and camps where there is no funding for computers/laptops with webcams, as it is readily available (panoramic mode in mobile phone camera), cost effective, easy to carry, easy to use (even for beginners), and provides a wide-angle of view. These benefits have been used to our daily clinical practise, patient care, and tele-education in order to increase efficiency and efficacy, particularly during the present SARS COVID-19 era (and possible upcoming Omicron epidemic).

**Conflict of Interest:** Nil

**Authors Contributions:** All authors made contributions to the article

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