



Optometry in India: Vision of Professor Jay M Enoch and its present status

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Dedicated to Prof Jay M Enoch

Prior to Prof Jay Enoch's involvement in Indian optometry, the practice was largely confined to clinical refraction and dispensing optics. His contribution, through the Elite School of Optometry, was a game-changer for Indian optometry in many ways. The training program was upgraded to a four-year undergraduate bachelor's degree. The curriculum, then modelled after the optometry program at the University of California Berkeley, incorporated rigorous training in comprehensive eye examination techniques, ocular and systemic diseases, ophthalmic instrumentation, specialty areas of optometry, vision science research and entrepreneurship. Today, 35 years since the threshold moment, Indian optometry has produced excellent quality clinicians, academicians, researchers, and entrepreneurs globally. Optometry training has spawned manifold, with the curriculum established at the Elite School forming the basis for many of these programs. The profession has also been significantly regulated with a standardized definition, scope of practice and curriculum through the 'National Commission on Allied and Healthcare Professions (NCAHP) Act' in 2021, all in alignment with Prof Enoch's vision. While the base is now strong, the future of Indian optometry needs to be bolstered on several professional and academic fronts for continuous growth and staying relevant with the evolving eye care needs of India. This will be a true tribute to Prof Enoch's vision for a thriving optometry profession in India. © Anita Publications. All rights reserved.

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1 Introduction

The profession and practice of optometry in India is nearly a century old. This commentary aims to tersely capture the evolution of optometry in India, highlighting the contributions of Professor Jay M Enoch, an eminent academician from the University of California Berkeley School of Optometry (UCBSO), to elevate the standards of the profession in this country. Prof Enoch's contribution will be described in four sections: 1) optometry prior to Prof Enoch's entry in India, 2) modernization of Indian optometry under

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Prof Enoch's guidance, 3) development of the Elite School of Optometry (ESO) as a prototypical program of modern Indian optometry and 4) the present status and future of Indian optometry. Prof Enoch's vision for Indian optometry is taken from his lectures delivered during the inauguration of ESO in 1985, on the occasion of the 20th anniversary of the school in 2005 and during the Palkhivala oration lecture at Chennai in 2008 on the status of optometric education, research, and eye care services in India. The commentary fully recognizes the contribution of several other stalwarts in the development of optometry in India. However, in the interest of brevity and focus, this commentary will fall shy of paying a complete tribute to these contributions. Also, as a general disclaimer, some of the points raised here reflect the personal opinion of the authors that many others in the profession may disagree with. These viewpoints are largely derived from the numerous observations made by the authors through their presence in Indian optometry for well-over three decades as clinicians, academicians, and scientists in various institutes in southern India.

2 Optometry prior to Prof Enoch's entry in India

The origin of Indian optometry may be traced back to the mid 1920's when one Mr K D Dutta, a British trained optologist, returned to India to start the Indian College of Optics in Calcutta (now, Kolkata) in Bengal, Eastern India. The college was a private enterprise, not affiliated to any University but duly registered with the Govt of Bengal. This college offered a 10-month long training program in refraction and dispensing optics and had the most updated curriculum for those times (Fig 1). This was closely followed by a 2-year diploma program in optometry initiated in Calcutta under the leadership of Mr A K Banerjee in the early 1930's. The next wave of training for the profession happened nearly a decade after independence, with the establishment of 2-year diploma programs in optometry through the Regional Institutes of Ophthalmology in Aligarh, Uttar Pradesh, Chennai, Tamil Nadu, Hyderabad, erstwhile Andhra Pradesh, etc. All these programs too focused on training students in the art and science of refraction and dispensing optics, much like its predecessors. During this time, early attempts were also made to regularize the profession of optometry through the Govt. of India, the details of which are not clearly available to these authors. A significant push towards expanding the profession of optometry happened in 1976, with the All India Institute of Medical Sciences establishing a 3.5 year B Sc (Hons) degree in Ophthalmic Techniques. In addition to refraction and dispensing skills, the curriculum of this program included training in basic ocular diseases and in specialty areas of optometry like contact lenses, orthoptics and low vision. During these times, the clinical practice of optometrists in India was largely confined to performing eye refraction techniques and assisting ophthalmologists in select ophthalmic diagnostics or management procedures (e.g., pterygium extraction).

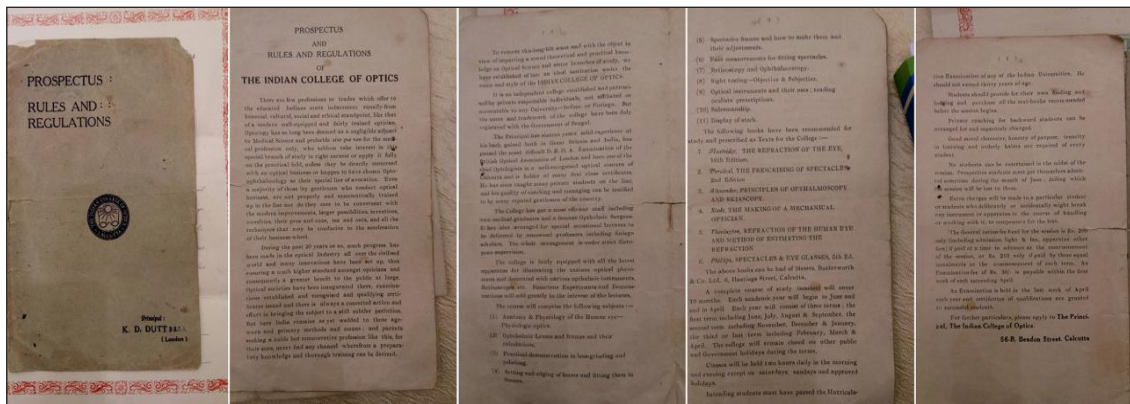


Fig 1. Photographs illustrating the details of the 10-month long training program in refraction and dispensing optics offered at the Indian College of Optics in the late 1920's under the leadership of Mr K D Dutta.

3 Modernization of Indian optometry under Prof Enoch's guidance

The foundation of 'modern optometry' in India was made possible when Dr S S Badrinath, the then Chairman of the Medical Research Foundation, Sankara Nethralaya, Chennai, met Prof Enoch to start a school of Optometry at the former's institute (Fig 2). Prof Enoch, the then Dean of the UCBSO, was in India in the fall/winter of 1984 on behalf of the University to facilitate the Berkeley-India program headquartered in New Delhi. While there, he made a side trip to Chennai to visit Dr Badrinath at Sankara Nethralaya. This visit was facilitated through Prof Vasudevan (Vengu) Lakshminarayanan, a well-wisher of the institute and then a student of Prof Enoch at the UCBSO. Dr Badrinath recognized the contribution of the optometry profession to tackle the unmet eye care needs of then 750 million-strong population of the country. The limited role played by the Indian optometrist towards this end was evident and the goal was to "modernize" the profession by producing optometry graduates who have the knowledge and skill to offer comprehensive eye examination to the patient. Dr Badrinath envisioned optometrists to become an integral part of the eye care service delivery in India and work symbiotically with ophthalmologists and other cadres of eye care personnel (e.g., ophthalmic technicians, nursing assistants, biomedical engineers/technicians, public eye health specialists, etc). Optometrists will offer primary eye care to patients in need and refer those needing pharmaceutical and surgical interventions to their ophthalmology colleagues.



Fig 2. Profile pictures of Prof Jay M Enoch (left), (Late) Prof S R Govindarajan (middle) and Dr S S Badrinath (right).

Prof Enoch readily agreed to this proposal and worked on an implementation plan with Prof S R Govindarajan, an eminent Indian physicist and academician, deputed for this task by Dr Badrinath (Fig 2). Thus, was born the blue-print for the Elite School of Optometry (ESO), which became a reality at the Medical Research Foundation, Sankara Nethralaya, in 1985 (see next section on more details about ESO). Prof. Enoch and Dr Lakshminarayanan facilitated Prof. Govindarajan's visit to several optometry schools in the USA in the summer of 1987 to understand their curriculum, course structure and clinical practice pattern. They also enabled Prof Govindarajan attend the annual Association of Schools and Colleges of Optometry (ASCO) meeting in San Diego that year, which eventually led to ESO becoming part of ASCO, albeit for only one year. It was during this time, at a meeting at the faculty club to which a number of local optometrists, faculty had been invited, an India-Berkeley optometric friendship association was formed and it organized people like Drs Michel Harris, Rolf Nygaard and Barbara Tochiura to visit ESO. Both Enoch and Govindarajan recognized the fact that the UC Berkeley optometry curriculum needed to be customized to cater to the then needs of the Indian eye care ecosystem. In his inaugural and subsequent lectures at ESO, Prof Enoch spoke about his vision for optometry in India. Figure 3 captures some excerpts of a particular lecture entitled "The need for Recognition, Regularization and Regulation of eye and Vision Care Practices in India", where he clearly outlines the burden of eye care in India, the need for optometry and ophthalmology

to shoulder this burden together and how the training program at ESO will facilitate optometrists to meet this goal. Prof Enoch urged optometrists to be a part of the primary eye care community that screens for ocular conditions and provides early detection and management all geared to reduce the needless burden of blindness. He imagined optometrists as a vital resource for certain aspects of general health screening in the community by getting trained in emergency procedures like first aid and cardiopulmonary resuscitation. Prof Enoch wanted optometrists to see their practice as not mere sales of spectacles and other ocular devices by offering free eye examinations. In fact, he considered free eye examinations demeaning to the profession and to the professional engaged in this act. However, he recognized the need for subsidizing eye care for community service and offer free eye camps especially for the deserving poor and under-privileged. He believed that optometry would have many specialty areas of practice including paediatric contact lenses, binocular vision, low vision, etc. Currently in eye institutions affiliating the authors of this commentary, optometrists have almost fifteen different specialty areas of practice. This trend is, however, not universal and continues to be in state of evolution in India [1].

Two additional facets of his vision are also very interesting to note. First, he was clear that the optometry profession in India should not be considered as ‘para-medics’, as this term simply meant ‘related to medicine in a secondary or supplementary capacity’ and does not consider the skill level or the complementary role of an optometrist. He envisioned optometry to evolve alongside ophthalmology and not in conflict with ophthalmology. Such a strife between the two valuable professions is only counterproductive to meet the eyecare needs of a country. Second, he envisioned the practice of evidence-based optometry by the practitioners becoming active consumers and generators of scientific knowledge. Such a practice was envisioned even before the concept of evidence-based practice became the cornerstone of medical practice globally [2,3]. He imagined sowing the seeds of such a practice by introducing a research project within the undergraduate optometry training program curriculum. He urged young graduating optometrists to travel anywhere in the world to advance their knowledge but go back to their native lands where their services are indispensable [4]. Both these dimensions truly reflect Enoch’s visionary nature for the profession, for, till date, optometry in India co-exists harmoniously with ophthalmology to offer the best quality of eye care to the society. The research project introduced at the undergraduate level inspired several students to pursue their higher education in optometry and vision science and become eminent scientists and academics world over [4]. Incidentally, all authors, except VL, have obtained an undergraduate degree in optometry from ESO and a PhD degree in vision science from many prestigious universities in India and abroad, including the UCBSO (co-author SRB).

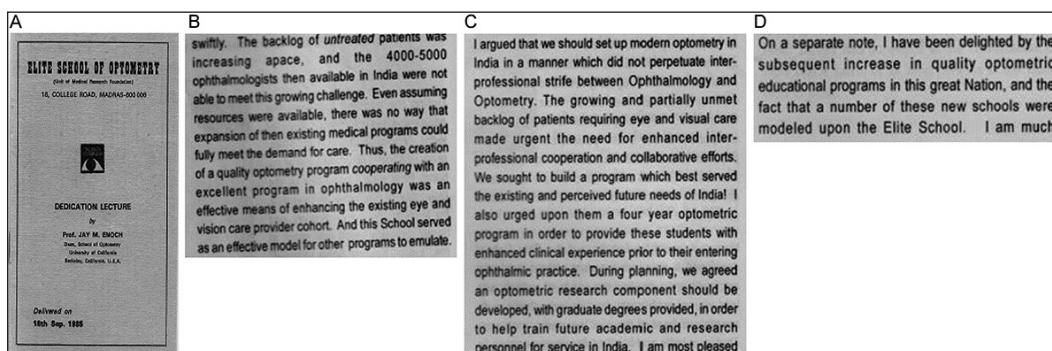


Fig 3. Panel A) Cover page of the Elite School of Optometry (ESO) dedication lecture delivered by Prof Enoch in 1985. Panels B – D) Excerpts from the article, “Some early reminiscences regarding the Elite School” written by Prof Enoch during the 20th anniversary of ESO. Panels B and C describe the need for a modernized profession of optometry in India, in light of the unmet eye needs of the Indian diaspora. Panel D describes his emotions at the establishment of ESO.

It is important to recognize that Prof Enoch was one of the earliest contributors to translational vision science in India. Around the time of establishment of ESO, Prof Enoch, at the urging of Prof Karl Kupfer, the founding director of the National Eye Institute, Bethesda, USA, also established a robust collaboration with the Aravind Eye Care System (AECS) in Madurai, India, to use psychophysical measurements of hyperacuity to study the visual potential of patients with cataract and macular degeneration. Vernier acuity judgments, a form of hyperacuity, are rather immune to image quality losses in the eye and can be used to evaluate the visual potential of the patients with these disorders [5,6]. Towards this end, Prof Enoch and author VL had developed an equipment to measure hyperacuity and transported the same to AECS in the early 1990's to conduct these studies using the latter's robust public health system. All these efforts culminated in a series of peer-reviewed papers in the journal *Optometry and Vision Science* in the late 1990's [7-10]. Dr R D Ravindran, Chairman, AECS, recalls how Prof Enoch would combine his trips to ESO in Chennai and AECS in Madurai to further two divergent, yet related areas of optometry and vision science.

4 The Elite School of Optometry as a prototypical program of modern Indian Optometry

Elite School of Optometry, the first modern school of Optometry offering a four-year Baccalaureate programme was born in 1985 at the Medical Research Foundation, Sankara Nethralaya, Chennai, India, under the visionary leadership of Dr S S Badrinath and Profs Jay Enoch and S R Govindarajan. Dr Vasanthi Badrinath solicited financial support for this initiative to Mr C K Shah of Elite Opticals, Madras, who readily supported this initiative through a generous donation, at least two-orders of magnitude greater than what was sought initially. He also supported construction of a building in its current premises, leading to the institution being named as the "Elite School of Optometry" (Fig 4). In the early years, Prof Enoch shipped ophthalmic examination equipment and books from his personal library collection to ESO, courtesy gratis shipping by the American President Lines, a company based in Oakland, California. He also arranged the visits of several optometry faculty and graduate students from UC Berkeley to teach at ESO (Drs Rolf Nygaard, Barbara Tochiura and Profs Darrell Carter, Russel De Valois, and Karen De Valois). Of these, Dr Nygaard taught visual optics and some psychophysics, Dr Tochiura taught optometric clinical procedures, while other taught areas of their specialization to the students of ESO. Of special mention is the contribution of Profs Russell and Karen De Valois, both eminent visual neurophysiologists affiliated to the UCBSO and with roots in India, who took time off their sabbatical in Kodaikanal, Tamilnadu, to come and teach at ESO.

Prof Enoch's support for ESO continued on even as the school become self-sufficient and developed its own robust infrastructure, training structure and affiliation in 1994 from the prestigious Birla Institute of Technology, a deemed to be University in Pilani, Rajasthan. author SRB fondly recalls two incidents that reflected Prof Enoch and Berkeley's affection/support for ESO at large. First, SRB happened to be the first student from ESO to pursue graduate studies at the UCBSO, sixteen years after its inception in 1985. Prof Enoch himself has obtained an emeritus status by then and all the faculty members who had helped him teach at ESO were no longer at Berkeley. Despite this, the legacy of Enoch's contribution to Indian optometry was continuing to live through ESO and its numerous contributions. Several faculty members approached SRB to learn how this program was running in India and if they could contribute anything to its continued success, reflecting the positive momentum Prof Enoch had created at Berkeley at the time of ESO's initiation. As a special treatment to an ESO alumnus, the De Valois couple extended personal invitations to author SRB for dinner to reflect on their yester years in India. Second, SRB and a fellow master's student at that time, Ms Varuna Kumaran (also an alumna of ESO), helped Prof Enoch pack a whole library full of books from his personal collection to ESO in 2003-2004. At least forty-odd boxes were packed that evening, with difficulties encountered en-route to pack the boxes because of a malfunctioning packing tape dispenser. Prof Enoch's jocular comment on "how many Ph D's does it take to open a packing tape dispenser?" still vividly resonates in SRB's mind, two-decades since the incident. SRB is forever indebted to Prof Enoch and his contributions to the development of ESO, for none of these experiences would have

been possible had it not been for his status as an ESO alumnus. Likewise, author PNS recalls an incident with Prof Enoch when she was a graduate student at the Ohio State University (OSU) College of Optometry. Prof Enoch received the Fry Medal from the OSU in 2007 and a grand evening reception was organized by the school to celebrate this event. PNS and two fellow graduate students attended this event and introduced themselves as ESO alumni to Prof Enoch. He was very delighted and got carried away reminiscing about ESO with these students, even while the rest of the faculty were waiting to start the evening reception. Soon the students had to point out the delay to Prof Enoch and usher him to the event.

Today, after thirty-eight years of its inception, ESO and its alumni have contributed significantly to the profession of optometry in India. The school has graduated 735 students from the bachelor's programme, 131 students from the masters and 12 doctoral-level graduates in this time period. Approximately 48% of the alumni are in clinical practices of optometry either in India or abroad, 23% function as academicians in various schools and colleges of optometry in India and abroad, 26% are pursuing research in vision science and/or are leaders in their areas of research in India or abroad [11], 7% pursue a career in public eye health and 14% are in the corporate sector either as technical specialists or in their sales/management domain. A small percentage of optometrists from ESO have also become technopreneurs and developing state-of-the-art technology to bridge the unmet needs of eye care in India and other developing/under-developed nations. The customized curriculum created for ESO has now become the basic framework for many optometry schools in India. This curriculum also formed the skeletal framework for the "Common Minimum Optometry Curriculum (CMOC)" and the "India Entry Level Optometry Competency Skills (IELOCS)" that were eventually adopted by the Association of Schools and Colleges of Optometry, India and by the Ministry of Health and Family Welfare, Govt. of India. Notably, Prof Enoch presided over the first meeting of the CMOC in 2008 and provided the much-needed direction for the development of this document.

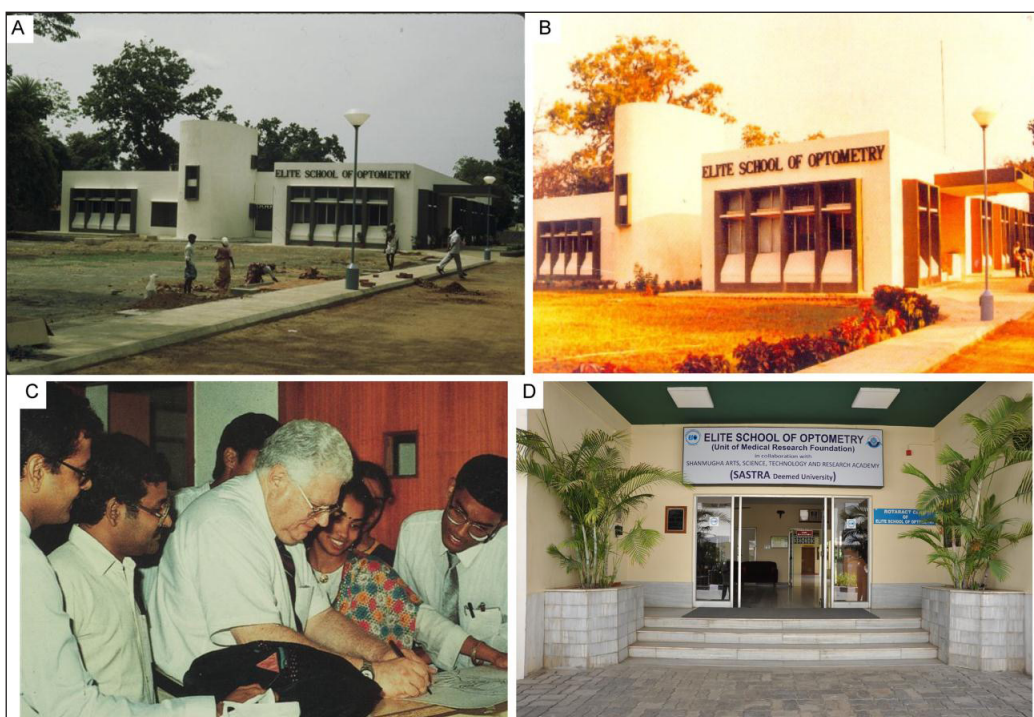


Fig 4. Panels A and B) The Elite School of Optometry (ESO), Sankara Nethralaya, Chennai during construction and soon after construction. Panel C) Prof. Enoch interacting with some of the early cohort of students at ESO. Panel D) ESO in its present state.

5 The present status and future of Indian optometry

Prof Enoch and stalwarts of their time sowed the seeds for a strong profession of Optometry in India with their visionary ideas. Today, the optometry profession is reaping the benefits of their efforts in multitude of ways. Two to three decades ago, the profession of optometry was rather unknown in India – the profession used to be confused with opticianry and its graduates were considered as assistants for ophthalmology, much against the vision of Prof Enoch. Between 1985, when ESO was established and 2001, there were only four schools/colleges that offered four-year baccalaureate training in optometry, each with no more than 30 students in a class. The graduates primarily worked for eye hospitals or optical chains, with a handful of them turning to private practice in optometry. Opportunities for post-graduate education in optometry were limited, with a few hospitals offering fellowship programs for enhancing the clinical acumen of the graduates. Several of its graduates looked abroad for higher education and research, contributing to the brain-drain of some of the best optometry graduates from the country. Professional regulation of optometry was far from sight, leading to several fly-by-night operators running questionable short-term courses in the name of optometry. Even while this slow-growing trajectory of modern optometry was certainly at odds with what Prof Enoch had imagined, the quality of the graduates was top-notch and their contribution in whatever small way was certainly perceptible. Graduates from these four institutions were lauded for their knowledge of optics, ophthalmic disease, and specialty areas of optometry and for their superior skills in performing a comprehensive eye examination. Their ability to interpret research findings in light of the present practice standards was also superior to the “old-school” optometrist.

The scene has changed between the early 2000’s and the present-day. Today, the profession of optometry and their role in eye care is more recognized amongst the general public, health care personnel and the government [12]. There are now over 200 schools/colleges of optometry, run by various universities and eye hospitals and the total number of optometry graduates has increased by over a log unit since the 1980’s. Today’s optometry graduate has a plethora of career paths to choose from, unlike the scenario in the 1980’s. Optometry graduates interested in a clinical career can be recruited by eye hospitals/institutes, smaller private practices in ophthalmology/optometry and in retail optical chains. The entrepreneurial graduate may also consider establishing a solitary or co-managed private practice, with appropriate support from several financial institutions. Optometry graduates with a flair in community eye care may consider joining the government, non-governmental organizations or private institutions that focus on service delivery and research in public eye health. Optometrists interested in a teaching career find employment opportunities in the several colleges/schools of optometry that have mushroomed throughout the country. Those interested in the business side of eye care are routinely hired by corporate organizations focused on eye wear, contact lenses and ophthalmic equipment. Laboratories led by optometrists that focus on cutting-edge basic and translational vision science research are now available in India. High quality national meetings on optometry and vision science have also become available in India for dissemination of new knowledge. This research ecosystem has also enabled the establishment of a new cadre of research optometrists who form the primary workforce for these laboratories. All these career options are appropriately supported through higher education opportunities like clinical fellowships and master’s degree in optometry or public health or business administration.

Prof Enoch’s vision for standardizing the definition, scope of practice and education of optometry in India also recently saw light when the ‘National Commission on Allied and Healthcare Professions (NCAHP) Act’ was passed by the Ministry of Health and Family Welfare, Govt. of India in 2021 (<https://egazette.nic.in/WriteReadData/2021/226213.pdf>). This blanket act covers fifty-six professional profiles organised under ten professional councils. These councils, operating through the Allied and Health Care councils of the respective states of India, would ensure best practice and education standards in their respective professions. Under the ophthalmic sciences council, optometry is recognized under the category of ‘Health Professionals’. Only

those with a four-year long bachelor's degree in optometry (Boptom) will be considered "optometrists" while those with a two-year diploma training are identified as "ophthalmic assistants" or "vision technicians" and are listed under the category of 'Allied health professionals'. Given this clarification, one can now identify three distinct cadres of individuals – the ophthalmologist, the optometrist and the ophthalmic assistant/vision technician – who can work symbiotically with distinctive roles to provide the best possible eye care for the India diaspora.

Even while the backbone of optometry is now strong, few challenges need to be addressed for Indian optometry to flourish in the future. A detailed treatment of these challenges is beyond the scope of this commentary – only a terse description will therefore follow. The expansion of the training program to 200-plus schools of optometry in merely two decades has resulted in a certain quantity to quality trade-off. Today's students find it challenging to cope up with the expanded scope of the profession and often fall short of expectations in the clinic. This deficiency perhaps stems from the lack of good quality faculty, infrastructure, and an outdated curriculum in most optometry schools across India. For today's 200+ optometry schools, one requires a pool of at least 1000 well-qualified optometry trainers to impart quality education to the student. The profession lags behind significantly in having this pool of quality trainers. Many of today's optometry schools also have limited clinical teaching infrastructure or patient base, resulting in less-than-optimal quality of clinical skills training and patient exposure. The curriculum established at ESO in the 1980's has also fundamentally remained the same even while the professional needs have changed dramatically in the due course of time. As a result of all this, today's optometry graduates may have a rather outdated and superficial knowledge/skills of their profession which effectively could reduce their employability in the eye care market and limits their scope of practice [1]. Another worrisome challenge is the lack of a larger vision for Indian optometry amongst the policy makers. This might make optometry a rudderless profession that is unable to coherently work with the Government to frame policies and/or work with the schools of optometry to implement these policies. The present leadership of Indian optometry is urged to recognize these cracks, offer a direction to the profession and work cohesively to implement this direction, all to bolster the profession for the future generation of optometrists. Only these will fulfil the dreams for Indian optometry, as set out by visionaries like Prof Enoch.

6 Conclusions

In conclusion, Prof Enoch's name is etched forever in the legacy of Indian optometry. Even while some of his ideas may have been too futuristic for their times, Indian optometry has steadily worked towards making them a reality. Institutes of eminence like the Elite School of Optometry have taught us that these visionary ideas can become a reality and they can also be effectively replicated in other parts of the country. Today, Indian optometry is reaping the benefits of the foresightful ideas of Prof Enoch and the profession is far more recognized and stronger than ever before. The cracks apparent in today's optometry need to be fixed urgently for the profession to thrive and stay meaningful in the Indian eye care ecosystem. This will be the only fitting tribute to the strong foundations laid by stalwarts like Prof Enoch for the profession of optometry in India.

Acknowledgments

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