

Competency is Where it is Found: Minimum Essentials for Establishing a
Contextualised Distributed Medical Education Programme

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Declaration page

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A handwritten signature in black ink that reads "Edward L. Dick". The signature is written in a cursive style with a large, prominent "E" and "D".

Edward Dick MD

March 20, 2016

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Dissertation Advisor: Professor Janet Grant

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List of Abbreviations

AACN	American Association of Colleges of Nursing
AAMC	Association of American Medical Colleges
ABMS	American Board of Medical Specialties
AOA	American Osteopathic Association
CanMEDS	Canadian Medical Education Directions
CBL	Computer-based Learning
CBME	Competency Based Medical Education
CEME	Community Engaged Medical Education

COME	Community Oriented Medical Education
DL	Distance Learning
DO	Doctor of Osteopathy
EBSCO	Elton B. Stevens Company
ECHO	Extension for Community Health Outcomes
EPA	Entrustable Professional Activity
EVAER	Excellent Video and Audio Recorder
GCSA	Global Consensus for Social Accountability
GDME	Geographically Distributed Medical Education
GME	Graduate Medical Education
IOM	Institutes of Medicine
LCME	Liaison Committee on Medical Education
MCAT	Medical College Admissions Test
MD	Medicīnae Doctor (Doctor of Medicine)
MSLES	Medical School Learning Environment Survey
NAP	National Academy Press
NIH	National Institutes of Health

NOSM	Northern Ontario School of Medicine
OBME	Outcomes Based Medical Education
OSCE	Objective Structured Clinical Exam
OT	Occupational Therapist
PBL	Problem Base Learning
RCPSC	Royal College of Physician and Surgeons of Canada
SDH	Social Determinants of Health
THECB	Texas Higher Education Coordinating Board
UK	United Kingdom
UME	Undergraduate Medical Education
URMM	Underrepresented Minorities in Medicine
WHO	World Health Organization

Abstract

Medical education continues to evolve to address increased pressure for social accountability including deficiencies in inclusion of underrepresented minorities and lack of physicians and medical services in underserved communities. Distance learning has been one methodology put forth to help alleviate these social deficiencies. Many models of distributing medical education to distant sites have been employed but it is not known what are the essential elements to making them successful. Using a peer-literature based questionnaire, experts in medical education are queried about their views on the challenges and potential of distance learning in contextualised community medical education. The respondents concluded that distance and community-based learning are both desirable and workable, however their constraints are shared with other forms of medical education, namely the need for appropriate curriculum, assessment, faculty support, and other educational resources.

1. LITERATURE REVIEW

1.1 Introduction to the Problem

The scope and accountability demands of medical education systems are increasingly expanding and intertwined with domains of public health, social equity, policy, and technological advances. In response to a common felt need to meet these demands, 130 organisations in medical education met to craft the Global Consensus for Social Accountability (GCSA), a joint statement on the priority of including social accountability as a cornerstone in health professions education. The GCSA reports that “a century after Flexner’s report on medical education in North America, the main challenge for the education of health professions in the 21st century resides in the responsibility of educational institutions for a greater contribution to the improvement of both health systems performance and people’s health status” (GCSA, 2011). This challenge for health professions schools has “...resulted in the paradigm shift to competency-based education in modern health professional training” which includes multiple competencies in knowledge, skills, and attitudes including attention to diverse and sometimes underrepresented groups (Eckstrand et al., 2016, p.1).

The task remains large as the United States continues to fall behind other industrialised countries on the majority of health indicators, further emphasising the importance of addressing the social determinants of health (DeVoe et al. 2016). These health disparities are felt even more deeply in the US as some social groupings and geographically isolated areas bear disproportionate negative impacts in their health

outcomes. An analysis of US counties demonstrated “generally poorer” outcomes in rural versus non rural counties in terms of mortality, clinical care, and other socio-economic indicators (Anderson et al. 2015) In a recent consensus report, experts convened and published a report by the National Academies Press (NAP) to discuss a “framework for educating health professionals to address the social determinants of health” (Committee on Educating Health Professionals to Address the Social Determinants of Health et. al, 2016). In their report, the committee experts stressed that “partnerships with communities” was essential to educating health professionals to address the social determinants of health (SDH). However, they stressed that increasing the number of health professionals with the ability to address SDH also required increasing the number of students and faculty from the underrepresented communities. “Increasing the representation of indigenous and minority populations in health professional education is critical to addressing the social determinants of health that led to health inequities” (Committee on Educating Health Professionals to Address the Social Determinants of Health et. al, 2016, p.69) The committee noted that people tend to stay within their social networks, so if that network already has low representation in occupations, it persists due in part to lack of role models. Correcting the low representation from these underrepresented groups means not only recruiting more students from these groups but also increasing the number of faculty role models from the same underrepresented groups. While health professional schools are offering coursework on achieving cultural competencies to all students, a “potentially more direct intervention is to recruit and retain faculty and health workers who reflect the cultural

diversity of the community served” (Committee on Educating Health Professionals to Address the Social Determinants of Health et. al, 2016, p.69)

Medical schools still have difficulty diversifying their student and faculty positions due, perhaps, to a lack of role models, out-dated prerequisite screening for entry, financial hurdles for participation, and shortage of mentoring efforts to sustain underrepresented minority students once enrolled. Even with considerable efforts to increase the diversity of US medical schools, according to the Association of American Medical Colleges (AAMC), the number of black male applicants to US medical schools has actually declined, going from 1,410 black male students in 1978 down to 1,337 black male applicants in 2014 (AAMC, 2015). In their publication “Altering the Course, Black Males in Medicine,” the AAMC reports that in 2014 while 24,055 white students and 9,028 Asian students applied to US medical schools, there were only 2,911 Hispanic and only 117 American Indian or Alaskan Native applicants (AAMC, 2015). In the US, the number of medical school faculty representing “underrepresented minorities in medicine” (URMM) remains low, with the “proportion of black, Latino, and Native American faculty in U.S. academic medical centres has remained almost unchanged over the last 20 years” (Rodríguez et al. 2015. p.1). One reason may be that “few academic institutions invest in the infrastructure that can enable faculty members to work in and with communities” (Committee on Educating Health Professionals to Address the Social Determinants of Health et. al, 2016, p.72)

Current payment models may further impede medical education in community settings as the community faculty lose revenue in a fee-for-service environment that does not support a “volunteer” faculty role. Community preceptors may further lack support to

improve their own practice of medicine and their skills as teachers of medicine and health. In one survey on community-based clinical teaching preceptors, the authors concluded that clinical teaching was an “unfunded mandate” and that more resources and faculty development was needed to “support and sustain” the rewards of teaching in the longitudinal integrated clerkship in which they participated (Teherani et al. 2009)

Although clinical and community-based teaching may sometimes be “unfunded,” the prospect of creating a new but otherwise conventional school to address geographic disparities such as rural areas or underrepresented minorities may be an expensive task. In the US, the complexity of medical education systems results in considerable expense to train each student. It takes 11 years minimum for high school graduates to progress through medical school to completion of a primary care residency programme, and even longer for other sub-specialties. In the US State of Texas, the Texas Higher Education Coordinating Board (THECB) used 2008 accreditation requirements and estimated that starting an allopathic medical school (M.D.) requires a minimum of 92 US million dollars for a class of 60 students (THECB, 2008). The THECB estimates “when fully operational, annual general revenue obligations for a medical school would be at least \$168 million” (THECB, 2008, p.2) The THECB notes other options for medical school expansion but based their estimate on the decision to address health disparities in Texas by creating a freestanding new medical school rather the expanding existing programmes. The costs of establishing new schools in other US states would likely be the same or more since they would share the same national accreditation standards regardless of state, and because the original estimates were based on 2008 costs.

Ideally, the learning experience is guided by a blueprint that encompasses the knowledge, skills, and attitudes that a culturally capable and competent graduate should possess. Where gaps in local opportunities and teaching competencies may exist, varying learning tools may be employed to fill in the gaps and complete the learning experience. These tools may include online courses, blended courses, or other self-study assignments. They may be supplemented by telepresence-enabled teaching, clinical consultations, or simulations designed to develop competencies where local opportunities may not permit. Although these tools currently have a “high tech” sensibility, they are inherently rooted in the nature of medical education. Grant suggests that “medical education is, in practice, a distributed system. Clinical practice is central to training and so students and trainees learn wherever there are patients. And the patients are distributed across the community and within hospitals” (Grant, 2008, p.2)

One example of a distributed medical school is the Northern Ontario School of Medicine (NOSM). It prides itself on an explicit “social accountability” that uses distributed learning not only to bridge geographic gaps but also to inculcate an inherent attention to achieving social equity in its programming and its graduates and staff. NOSM operates its “community-engaged medical education programs distributed in 70 communities across Northern Ontario, made possible by partnerships with universities, advisory groups, community organizations, hospitals and clinics” (Lanphear & Strasser 2008)

Distributed medical education is a response to resource challenges in needy areas. The success of geographically distributed medical education (GDME) suggests that it is possible to delineate and deliver the core competencies needed by a successful medical graduate. Once defined, these competencies can be developed and assessed

in many settings, not just the geographically dispersed or low resourced communities that inspired the earliest experiments with distributed medical education.

Evaluations of NOSM and other similar programmes are being done prospectively, but lessons learned may help distil the essential qualities for selection, premedical preparation, and competency formation for a general medical graduate. With such a distillation, it may be possible to develop a tool that would guide formation of new distributed medical schools in others area of need that are adapted to their local culture and resources. Defining the essential elements of a distributed school would also help determine the lowest budgetary needs required for starting a school, and finally it is hoped that documenting the essential elements would permit creation of a depository that would allow others to duplicate and adapt successful efforts without the time and expense of starting these efforts from scratch. The result would be a “medical school in a box” that can be deployed where needed using shared resources and tools, with built-in tools for continuous quality improvement.

1.2 Keywords/Search Terms Used

Distributed medical education, open medical education, online medical education, eLearning, community-based medical education, competency-based medical education, new medical school accreditation, Northern Ontario School of Medicine, modular medical education, essential elements medical education, outcomes based medical education. Using these initial keywords, an EBSCO search suggested “similar” articles using keywords tagged in the index article.

1.3 Information Sources Used

Search engines included Medline (EBSCOhost database), Google Scholar, Google web, and Mendeley. Iterative searches were done when similar articles were suggested or references in the initial documents suggested a more primary reference to be consulted.

Primary sources were the peer-reviewed journal articles found in Medline. Most articles were research reports but some provided historical accounts or expert or evidence-based opinions. Secondary sources included books by subject experts or expert panels. These represented seminal works or summaries of key forces in medical education reform, particularly pertaining to competency-based medical education (CBME) and geographically distributed medical education (GDME).

1.4 Criteria for Inclusion/Exclusion of Literature

The literature search was limited to English language publications. The EBSCOhost date range was 1978-2015, although if a relevant article in that range referenced a key primary source prior to that date, it was included. EBSCOhost includes a “Smart Text” feature that permits searching for journals similar to those found in the initial search. Reform in medical education has been documented back to Abraham Flexner in 1910. The more contemporary focus is not to deny the roots of reform, its related issues, or contributions of progenitors. The main focus of the literature review was to provide guidance on future research questions that could be addressed in more detailed qualitative interviews with subject experts. Peer-reviewed journals included in Medline were the primary source of journal literature. Expert reports (consensus statements, regulatory, or quasi-governmental, or professional societies) were included to the extent

that they provided original findings or consensus syntheses of the literature. Documents suggested by subject experts were also included if they were not already found in the journal or Google Scholar search. “Duplicative” articles such as historical recounting of the founding of a particular school or review articles citing primary literature included in the review were excluded unless the review represented a structured compendium or analysis. It is understood that reforms in medical education span decades, but the literature was limited to 1978 to date to reflect the current status of regulatory, scientific, political, and population needs and attitudes. The goal of the project is to develop a template for establishing a geographically distributed medical school, therefore current forces and resources are paramount in making this template actionable and evidence based.

1.5 Literature Findings

1.5.1 Need for New Models

Medical education has a long history of ferment and flux while trying to attain excellence and the essentials for producing excellent physicians. Unfortunately, the “search for excellence” cannot be done with a singular goal of only producing a “great diagnostician.” Medical education systems must make certain that their production meets the needs of the greater society and does so with the highest value optimising cost and time to graduating a competent general physician. As Bailey et al (2015) suggest, seven million health professionals are needed worldwide to meet “critical” health needs but only one million practitioners are produced each year globally. Numerous obstacles exist to filling this gap including maldistribution of graduates,

inattention to social equity including workforce diversity, high costs, questionable effectiveness and adaptability to workforce needs.

Recent published estimates suggest that there will be a shortage of over 38,000 primary care doctors in the US by 2035 if efforts are not made to recruit more family physicians into the profession and expand the number of available training slots (Pettersen and Liaw, 2015). Graduation of some underrepresented minorities lags despite the considerable efforts made to increase their ranks. As noted previously, the number of black male applicants to medical school has actually declined from 1978 to 2014 (Nivet, 2015).

Using a new methodology to rank US medical schools in terms of accomplishing a social mission, researchers found that there was an inverse relationship with National Institutes of Health (NIH) research funding and being highly ranked as achieving the desired social mission (Mullan et al, 2010). They further found that medical schools in the US Northeast and urban areas had the lowest graduation of physicians who practise in underserved areas.

Increasing the number of healthcare providers is further challenged by a growing shortage of clinical sites and increased pressure to pay community preceptors for participation. According to a joint report of a multi-disciplinary survey, “80 percent of the respondents ...felt concern regarding the adequacy of the number of clinical training sites.” (AACN et al, 2015 p. 2)

While numerous policy options have been used to recruit and retain physicians to rural areas, the most consistently effective ways to provide doctors for underserved areas is

to recruit persons from similar areas, training them in those areas, and supporting their practice in those areas.

In one study, it was determined that over half of family physicians practise within 100 miles of their family medicine residency programme (Fagan et al. 2015). The result is that if the residency programmes operate in large urban centres, their influence may extend only to the immediate suburbs. Data from two family medicine residency programmes created to fill the needs of underserved areas of northern Ontario, Canada, indicate that the majority of their graduates also stay near to where they trained (Henig et al 2007). Experience in a rural family medicine programme in Spokane, Washington confirms that those who train in a rural environment have a strong record of staying in rural areas (Topps and Strasser 2010; Maudlin et al, 2010). Even in rural regions of Canada that did not have a medical school, research indicates that doing a rotation in that rural area increases the likelihood that doctors could be recruited and retained there (Landry et al, 2011). In the study by Landry et al (2011), the likelihood of recruitment and retention was positively linked to the length of stay in the rural rotation. The finding that the longer a student spent on the rural site, the more likely they were to stay in a rural area was also confirmed in studies of Australian students in a rural clinical track (Eley et al, 2009; Mudarikwa et al, 2010; Eley et al, 2012; Gupta et al, 2014).

Not all students who do rural electives or train in rural areas will stay in or return to a rural assignment, but some pre-selection characteristics may further increase that likelihood. In one 12-year study of a US medical school, being a member of an underrepresented minority, rural background, and age more than 25 at entering medical school were significant predictors of practice in an underserved community (Wayne et

al, 2010). The importance of rural background influencing a desire to practise in rural communities was also supported in research done in Canada (Woloschuk and Tarrant, 2002).

Although factors such as rural exposure, background, and training sites increase the likelihood of practice in medically underserved areas, not all such persons stay in or return to such areas. Other factors such as poor financial remuneration, lack of support for sub-specialty care, and opportunities for spouse and family educational attainment militate against rural and underserved retention despite favourable background and training environments (Pong et al, 2007; Cameron et al, 2012). The “single best predictor of career choice at graduation was the student’s stated preference at the time he or she entered medical school (Owen et al, 2002). Results of an international study of medical schools from five different countries confirmed that prioritisation of selecting students from underrepresented backgrounds and rural locations can increase workforce participation of underrepresented groups and fill gaps in needed services. While movement toward training in and with persons from medically underserved areas may increase placement of doctors in those areas, educational policies alone cannot resolve all of the factors that discourage service in those areas.

1.5.2 Competency Assurance

Medical education will have to progressively evolve to meet the demands of technologically dynamic and fast-paced society. A recent report from the Global Forum on Innovation in Health Professional Education suggested that the graduates of health professional schools are not prepared for the realities of today’s practice world (Cuff, 2015). In this report of a meeting hosted by the US Institute of Medicine (IOM),

participants revisited the recommendations of the Lancet Commission Report (Frenk et al, 2010). In the Lancet report, their commission envisaged a world where information technologies would transform health professional education. One of their key recommendations was moving toward competency-based medical education (Frenk et al, 2010).

While steps towards achieving some of the 2010 recommendations have been made, progress has been slow due to a confluence of political factors and the dominance of some interest groups who do not want to cede any control. For example, although “learning is no longer associated with a physical facility, universities continue to request funds to build newer and larger facilities” (Cuff, 2015 pp. 1-4). While competency-based medical education is not entirely new, it has enjoyed a resurgence as it became increasingly believed that medical education needs to shift away from just counting “seat time” spent in learning activities and towards assisting learners in demonstrating their competency in “all essential domains” (Frank et al, 2010 p.640).

Use of the term competence-based medical education (CBME) can be confusing because it may also be referred to as outcomes-based medical education (OBME). In the realm of graduate medical education in the US, the Accreditation Council for Graduate Medical Education (ACGME) and the American Board of Medical Specialties (ABMS) collaborated to create the Outcomes Project (Holmboe and Batalden, 2015). These outcomes have now evolved into a defined assessment framework called Entrustable Professional Activities (EPA) (Teherani and Chen, 2014). EPAs attempt to describe the complex domains of competency that include proficiency in knowledge,

skills, attitudes, communication and other domains thought necessary to practise medicine independently.

While medical schools have long used “blueprints” to guide curriculum and assessment, the OBME movement aims to assess the successful performance of the blueprint knowledge, in terms of technical, scientific and socially constructive outcomes. “For accreditation purposes, the Milestones are competency-based developmental outcomes (e.g., knowledge, skills, attitudes, and performance) that can be demonstrated progressively by residents and fellows from the beginning of their education through graduation to the unsupervised practice of their specialties.” (ACGME, 2016)

The ACGME is not alone in attempting to define and assess essential competencies in postgraduate medical education. The Royal College of Physicians and Surgeons of Canada (RCPSC) also adopted an “outcomes-based framework of physician competencies”, initially in 1996, and later revised in 2005 (Frank and Danoff, 2007). Frank and Danoff assert that “The CanMEDS competencies have successfully become part of the fabric of Canadian medical education at all levels.” (Frank and Danoff, 2007 p. 646)

In 2009, the General Medical Council (GMC) of the United Kingdom (UK) defined the general competencies for graduate physicians. This document, originally called “Tomorrow’s Doctors,” has been updated to *Promoting Excellence: Standards for Medical Education and Training* to reflect the GMC’s desire to provide “greater coherence” for their standards across all stages of medical education, including undergraduate education (General Medical Council, 2015).

In addition to ACGME and CanMEDS, other outcome frameworks such as the Scottish Doctor Project and the Framework for Undergraduate Medical Education have been proposed (Englander et al, 2013). Englander and colleagues synthesised the disparate competency guides to create a common taxonomy of “competency domains” that will be used to create their “Reference List of General Physician Competencies (Englander et al, 2013 p. 1088). The resulting list will be used by the Association of American Medical Colleges (AAMC) to classify their learning curriculum resources.

Although the AAMC is trying to recognise the reality and importance of graduate competency domains, “there has not been similar implementation of a standard competency framework in the United States for medical student performance expectations” (Chen et al, 2015 p.434). The Liaison Committee on Medical Education (LCME) has added an education standard requiring that the objectives of medical education must be stated in “outcomes-based” terms (Carraccio and Englander, 2013). The LCME has also approved a statement on accreditation related to distance learning (LCME, 2015). In this document, the LCME links the agreed “core principles” to existing LCME standards such as administration, defined competencies, and time to prepare for class duties. There does not appear to be any absolute prohibition against distance learning methodologies but the descriptions suggest more incremental and supplemental rather than disruptive or predominant use of distance methodologies.

For the moment, the focus appears to be on defining and assessing the competencies with less focus on the means of delivery. Chen et al (2015) suggest that existing EPAs could be integrated into undergraduate medical education (UME) by achieving each EPA at a level appropriate for the student learner and their institutional environment. In

other words, a student might not expect to perform a particular surgery, but they could be involved in the history gathering or other elements related to the performance of the surgery. Coordinating the UME and GME environments makes logical sense much in the same way that quality must start in the early creation stage and not be relegated to correction or revision later in the process.

There are experiments under way to move undergraduate medical education in the US away from time-based, place-bound learning to competency-based learning with some programmes using “adaptive” learning which creates the possibility that some students could finish their medical education (or residency) earlier or later than others in the same cohort, depending on how quickly they prove “competency” in the designated core domains.

The American Medical Association (2015) is sponsoring a movement to “accelerate change” in UME with a rationale that acknowledges the broader context for social responsibility in medicine and the need for innovation to meet those responsibilities. Cited innovations include competency-based education, asynchronous learning, and other efforts to move beyond “time based” traditional education programmes. The American Medical Association (AMA) has established a unique entity called “Change MEDED” that has sponsored conferences, and grants to medical schools to pursue improvements toward socially accountable, competency-based undergraduate medical education.

While there are some early experiments with competency-based UME in the US, the University of New South Wales in Australia designed an “outcomes-based

approach...where the staged achievement of eight primary capabilities served as the blueprint for subsequent programme design.” (McNeil et al, 2006)

Competency-based medical education has influenced other continents as well with at least two medical schools in Sub-Saharan Africa adopting a CBME approach (Kiguli-Malwadde et al, 2014).

While CBME is gradually filtering into undergraduate medical education, as noted earlier, successfully meeting societal needs for equity and representation in underserved communities requires attention to the process of preparing, recruiting, and selecting entrants into undergraduate medical education. The subjects of premedical entry requirements and selection and their relationship to performance in medical school and the medical profession are beyond the scope of this literature review. However, to the extent that the focus of UME and GME are changing, it is logical that the initial entry criteria to UME might also have to change if CBME and its related components aim to address the social competencies desired. Barr (2010) provides a comprehensive critique of the failings of traditional premedical requirements to promote equality and diversity in medical education. “From a series of research reports, it became apparent that clinical skills reflect a different set of attributes than scientific knowledge and that a different set of factors predict those skills” (Barr, 2010 p. 106). Undergraduate grade performance may predict medical school performance with some statistical power, although Patterson et al conclude from their review of the published literature that there is “...a lack of long-term follow-up data to provide evidence that medical school applicants with higher grades go on to become better physicians” (Patterson et al, 2015 p.41).

It seems to follow from all this that the prerequisites and entry exams for medical school must evolve to better select the students most likely to become the new ideal for physicians in the 21st Century. In a review of the new Medical College Admission Test (MCAT), it is noted that the new MCAT was designed to measure desirable social knowledge and skills in order to better select culturally competent applicants who can contribute to the social mission of medical schools and their communities (Sorrel, 2015).

1.5.3 The Great Uncoupling

Achieving social equity requires increased participation of underrepresented groups with mechanisms to provide effective health services in needy places. Research has shown that doing medical education in needy places increases the likelihood that health personnel stay in those places. The traditional, research intensive, medical school necessitates large, expensive physical plant, tertiary hospitals, and other capital services that obviate location in all but the largest urban centres. However, a competency-based curriculum might liberate medical education from the absolutes of traditional lecture hall time-and-place-based education. If the competency can be defined, assessed, and its essential resources identified, then it can be delivered in any place where those requisites are met. This uncoupling of traditional places, teachers and students from an exclusively physically collocated facility has been represented by various names such as distance or open learning. It allows a well-designed and implemented curriculum to be shared and scaled up globally, making excellence more accessible and at lower cost per unit developed and delivered. Delivering a medical school lecture can be done by any qualified person on any continent and delivered to

any person on any continent through available electronic means (van der Vleuten and Driessen, 2014).

Distance and open learning encompass various media and technologies. In addition to specially prepared print materials, the variety of eLearning methodologies and the varying methods of deploying them have in turn created terminologies of “blended, hybrid, or flipped learning.” It is possible for a student to undertake completely independent self-study with traditional paper tools or to have a classroom that unites learners linked via technology synchronously or asynchronously on various continents. This blending of modalities and methods has removed the bright line between traditional on-campus learning and distance learning (Grant, 2015).

1.5.4 ELearning: Tools to Connect

Although knowledge and best evidence-based practice change regularly in medicine, it is stable enough that it can be encapsulated in electronic media for use in delivery, assessment and other cognitive measurements.

The World Health Organisation (WHO) published a comprehensive and systematic review of the status and promise of ELearning in undergraduate education. Their experts concluded that compared to traditional learning, in the majority of studies, computer-based learning (CBL) produced higher increases in skills (Al-Shorbaji, 2015). CBL has the added benefits of lower cost and convenience.

One example of the convergence of distance learning and a commitment to social accountability is the Northern Ontario School of Medicine (NOSM). NOSM was created to address social inequalities starting at the pipeline for premedical students from rural

areas continuing through UME, GME, and continuing education (Strasser et al, 2009). Subsequent evaluations of NOSM have demonstrated favourable outcomes in terms of producing graduates who are from underrepresented communities, practising in rural areas, and practising primary care (Strasser et al, 2013). The economic contribution of NOSM has been estimated as 67 million dollars to Northern Ontario (Hogenbirk et al, 2015).

While NOSM provides wholesale distributed education, other Canadian schools have chosen to use distance learning to support portions of their undergraduate and graduate training programmes. The University of Calgary has determined that “community distributed education in pre-clerkship may offer academically equivalent training to traditional medical school curricula while also providing learners with positive rural social learning environments” (Myhre et al, 2014 p.1). McMaster University developed a distributed “modular” education programme for Southern Ontario. Performance on assessments such as post-clerkship assessments was equal to or better than those who did not do the rural clerkships. Myhre et al concluded that their study “...adds underserved, small urban communities in Canada to the previous list of Australian and US rural sites offering high-quality clinical training, comparable or superior to the tertiary centre experience of most medical students” (Myhre et al, 2014 p. 70).

1.5.5 Challenges

While the medical education literature appears to support the movement towards CBME, challenges and concerns remain. Challenges to CanMEDS, for example, include instructors lacking basic knowledge of the framework and concerns that shortened time to independent practice could unleash unqualified medical professionals

on the public before they are ready (Whitehead and Kuper 2015). Some authors question if the current psychometric tools are sufficient to assess the competencies, especially in the realms of social and cultural competencies (Whitehead et al, 2015). An additional criticism of CBME frameworks is that they may lack emphasis on processes that "...facilitate skills integration, such as reflection, meta-processes, and self-regulation" (Swing, 2010 p. 667).

Like any medical education enterprise, competency-based medical education and geographically distributed medical education (GDME) need political support, sustained financing, and commitment to protect the time of the community-based teachers and teams who provide the bulk of the direct supervision and teaching. Systems have been developed to protect the time and income of community teachers through the development of an educational value unit (EVU) to quantify the contribution and needs of community teachers (Denton et al, 2015).

A final limitation to achieving the optimal levels of cost effectiveness and community-based control for CBME or GDME lies with the accreditors. The ACGME will soon become the sole accreditor of postgraduate training programmes, having been joined by the American Osteopathic Association (AOA) for joint accreditation of GME. The Liaison Committee on Medical Education (LCME) is the sole accreditor of allopathic (MD) programmes in the US. While both ACGME and LCME feature prominently in reform movements toward socially accountable medical education, their monopolistic status may impede alternative models of CBME or GDME. Christensen (2009) notes that except for the Mayo Clinic, all medical schools in the US are affiliated with a university. "If hospitals were to suddenly jump into educating physicians, in contrast, the medical

school and accrediting bodies would block them every step of the way” (Christensen, 2009 p. 361).

1.6 Conclusions

The general sweep of the medical education literature and observed professional consortiums (AAMC, ACGME, WHO etc.) suggest that medical education continues to move in the direction of competency-based medical education. The need to increase the supply and quality of health professionals remains daunting worldwide. Adoption of competency-based medical education using distance learning offers a promising means of overcoming challenges to the education, distribution, equity, and quality of future health professionals. While there has been some synthesis of the common domains of competency in medical education, further exploration is needed to help develop a common tool box for implementing GDME in a variety of settings.

The peer-reviewed literature reports the results of efforts but does not provide detailed tools for a template for creation and management of a GDME. It is hoped that the qualitative interviews of this study will provide additional insight and reproducible steps for the essential elements of socially responsive GDME.

2. METHOD

2.1 Aims of the Study

This study aims to engage experts in medical education regarding the potential and challenges for using distance learning to achieve contextualised learning in underserved communities. To better address the social determinants of health and reduce health disparities, new models of healthcare delivery are needed. Many innovations have been

reported including the introduction of competency-based education, geographically distributed medical education, community engaged medical education (CEME), changes in premedical requirements to improve diversity, and distance learning. What has not been so clear, in the midst of a variety of pilots, demonstrations and redesigns, is what elements of these innovations are essential to increasing the availability of contextually appropriate medicine in the communities of need. In other words, lots of things have been done, and results reported, but what is minimally effective, maximally effective, and rate limiting essential remains unclear. If one were to create a framework for a scalable, adaptable, cost-effective medical education programme that met the needs of local populations and improved the inclusiveness of underrepresented persons, can experts agree on what basic ingredients would be needed to achieve this framework?

Using qualitative interviews, it is possible to engage experts in medical and distance education to distil their expertise regarding what may be these essential elements. There may not be a final consensus on these elements, but the findings can guide further research into an evidence base for medical education programme design and possible experiments for testing improved, effective models for reducing disparities in health and health professional education.

The qualitative interview instrument builds on the findings of the literature review in terms of available evidence and expert opinions about the need to innovate, and open questions for further research on distance medical education. These open questions are sometimes opinion or policy-related and not the usual subject of randomised or experimental designs. Therefore, a qualitative interview provides an alternative but high

quality means to gauge and disseminate expert opinion. The purpose of the interviews was to enrich the discussion and possible design of distance medical education.

2.2 Subjects of the Study

The experts chosen for the interviews reflect a purposive sample, being a spectrum of roles and experiences in medical education but encompassing specifically the areas of competency, assessment, distance learning, undergraduate medical education, graduate medical education, telemedicine, and geographically distributed training. Faculty leaders with specific experience in founding distributed learning and socially contextualised medical education are included. The subjects come from the United Kingdom, Canada, and the United States but have extensive international experience. The interview subjects and their background are detailed in Table One.

Table One: Interview Subjects

Subject	Experience and Academic Formation
S1	Professor of neuroscience with interests and publications in basic science research and open/distance learning in science and medicine. Experience with creation and administration of medical distance learning in Asia.
S2	Surgeon and medical educator. Experience with the creation of a new medical school and distance learning program in Africa.
S3	Physician and medical educator. Interests and publications in teaching, assessment, and learning. Extensive service on commissions and panels related to primary care teaching and learning.

S4	Physician and medical educator. Experience in the establishment of graduate medical education programs in distributed, remote, or rural sites.
S5	Physician and medical educator. Experience in the establishment and leadership of undergraduate and graduate medical education programs from initiation, accreditation, and operation in distributed North American environments including contextualised first nation contexts.
S6	Social scientist and medical educator. International experience in multiple contexts including Asia, Africa, the Middle East, and Europe. Interests and publications in medical assessment, distance learning, and medical education leadership.
S7	Physician and medical educator. Experience in the establishment and administration of medical schools in distributed, (including contextualised first nation environments) in the US West and Southwest, from early conception, accreditation, and ongoing administration.
S8	Physician and medical educator. Experience in creating telemedicine training for village health workers in Afghanistan and postgraduate sub specialists working in military theatres on or near the front lines.
S9	Social scientist and medical educator. Experience with curricular integration of the social determinants of health in Near East and North American medical education environments. Ongoing leadership in consortium charged with addressing the social determinants of health in academic medical centres.

2.3 Data Collection Methods and Instruments

2.3.1 Survey Tool Background

The interview tool was developed based on the literature review and study aim of distilling essential elements for the conduct of a contextualised community based medical education programme. The interview tool consisted of 12 questions with associated prompts to stimulate reflection. It is divided into sections related to distance learning overviews, community based curricula, and a final summary reflection on distance learning in community based, socially orientated medical education. The survey was developed in conjunction with faculty advisors as part of a pre-dissertation exercise. Interviewees were reached via Skype and the interviews recorded using EVAER software.

Interviewees were reminded that they were being recorded and that the interview would last approximately 30-45 minutes, with permission given to request clarification or terminate the interview. If the interviewee felt that the question was outside their expertise or they had no comment, a reply was not required.

Table Two: Questionnaire Used

Question	Distance Learning
1.	<p>We intend to have students working in groups in various community locations [primary care and district hospitals etc.] sometime far from the central medical school. They will be supervised locally, and the central administration will keep in touch by means of the provision of distance learning courses that cover the acquisition of knowledge [anything that might have been offered in lectures]. There will be exercises for the student to submit centrally.</p> <p>What do you think of this plan? Is it feasible? Where are the challenges?</p> <p>PROMPTS: Students working in distributed groups / local supervision / distance learning (DL) courses / exercises.</p>
2.	<p>What technologies are available in your community facilities?</p>
3.	<p>There will have to be a rigorous assessment regime covering knowledge and skills: Multiple choice questions, OSCEs, clinical exams etc. What part of this could be delivered locally and what part might have to be centrally administered?</p>
4.	<p>What might make DL acceptable in medical education? PROMPTS: To students, to teachers, to the public, to the central university</p>

5.	What would be the problems with implementing DL in medical education? For students, for teachers, for the public, for the central university?
	Curriculum
6.	Do you think that learning in the community and district hospitals will change the medical school curriculum in any way? E.g. different health priorities and conditions, different ways of learning, different range of teachers.
7.	What special opportunities for learning does the community offer?
8.	How would the syllabus be decided? Who and what sources might be consulted? e.g. community health workers, epidemiology
9.	How would students in primary and secondary care in the community best learn? e.g.; practical clinical experience, getting to understand the context of health etc.
10.	Who would be the teachers and how should they be supported?
11.	What are the opportunities for research in the community? How could we build an effective research process?
12.	What other observations and advice do you have about designing and implementing a medical curriculum for distributed learning?

2.4 Data Analysis Method

Interviews were reviewed aurally by the researcher. No transcriptions were made in order to preserve meaning and inflection. The points made were summarised as 26 named codes. The codes serve as enriching data and are not research evidence so no external validation of the codes was done. Illustrative quotations were transcribed to illustrate the meaning of each code. These are presented in Table Three: Rank Order of Codes.

Each interview was reviewed and if the speaker addressed a coded item, it was marked once as having been included. Using the final tally of codes, each one was ranked from the most frequently mentioned across the interviewees to the least frequent (Table Three).

The elaborated interview codes followed the general order of the questions in the questionnaire and the corresponding themes were consolidated under the rubrics of Assessment/Evaluation, Distance Learning Issues, Faculty Issues, Technology Issues, and Community-based Research Issues. Technical limitations with the EVAER software and available internet bandwidth required a subsequent written submission of answers by Subject 6 after the initial audio portion could not be recovered. The audio portion of questions relating to the curriculum portion of the questionnaire for subject 3 could also not be recovered and so the final count does not reflect their directed input on that portion of the questions.

Table Three: Rank Order of Codes

Rank Order Most Common to Least	Number of Subjects Mentioning (subject n=9)	Code Description
1.	9	Distance learning is effective
2.	8	Distance learning is a methodology not the end
	8	Community learning has advantages
3.	6	Invest in teachers so they will invest in the school
	6	Research opportunities vary by community
4.	5	Good curriculum is essential to teaching effectiveness
5.	4	Distance learning extends healthcare to remote and needy communities
	4	No technology is perfect
6.	3	External evaluation/assessment is critical to validity
	3	Distance learning cannot replace "hands-on" skill sessions

	3	Accreditors need guidance/coaching to understand how distance learning/distributed learning meets standards
	3	Student evaluations can weed out bad or keep good faculty
7.	2	Goals drive good supervision
	2	Teaching effectiveness is independent of technology
	2	Good governance is critical to good outcomes
	2	Lack of money/resources limit any method
	2	Distance learning must meet privacy laws/rules
	2	Osteopathic (D.O.) tradition has long experience with community-based learning
	2	Distance learning demands may drive faculty away

	2	Demands of accreditors/licensure/specialty boards still drive curriculum regardless of social needs or distance learning innovations
	1	Successful use of distance learning/telemedicine needs training
	1	Innovations such as distance learning, self-study, competency-based advancement should not shield students from “real-world” practice demands
	1	Younger students are comfortable with technology
	1	Telemedicine can function as tele mentoring
	1	Distance learning and eLearning are not the same
	1	Methods and money cannot overcome poorly prepared students

To guide the discussion of results, the final codes were grouped under common thematic categories, with 4 final categories felt to encompass the themes that the respective codes held in common (the actual frequencies for each code are noted in Table Three).

2.5 Results

2.5.1 Distance Learning Issues

Distance learning works.

There was universal support for the potential of distance learning in medical education with all nine subjects expressing their support.

“For me it’s an excellent idea...what’s happened increasingly as healthcare changes is that the central schools have become really specialised and what students need to see is more generalised problems.” I have also had firms where cardiologists won’t teach students how to examine chests because they say they can’t do it; they are so specialised (S3).”

“It’s a great plan and lot of folks are doing exactly that (S7).”

However, even in locations where it was not being used widely, one subject felt that distance learning could enhance the curriculum and provide structure to a challenged, low resource environment.

“From the top down, the whole thing needs to be reorganised and I think bringing in distance learning would be the ideal opportunity (S2).”

Distance learning is a methodology not the end.

While the general term “distance learning” was understood, eight subjects expressed concerns that a particular method was overshadowing the context or intent of community based education. Distance learning is a way to bring knowledge to the learner but it should not be assumed that the content creator (“centre”) was in anyway superior to the distributed sites or learners.

“I have a problem with the way the question is framed...because it continues to promote the idea that there’s something special, different, superior about the centre or the central school as compared with other sites and so that sometimes the terms that’s used, hub and spoke, mothership, satellite or something like that and I find those concepts really unhelpful...My preferred language is to talk about distributed learning, of us, it is distributed, community-engaged learning, and really to avoid language that encourages the sort of them and us and in particular that the centre is somehow , has more significance or importance compared to other sites in the network (S5).”

Distance learning and eLearning are not the same

One respondent (S6) drew a distinction between distance learning and eLearning.

“We must be careful to differentiate between distance learning and e-learning. Distance learning is often most effective when students have specially prepared print units to study with exercises and feedback. Print is a more flexible way of learning and students

often prefer that to being stuck in front of a computer where the presentation disappears when the next page is accessed...Technology is useful for illustration, virtual reality and so on. But we should not automatically think of it as the primary mode of delivery (S6).”

Distance learning extends healthcare to remote and needy communities.

In keeping with the understanding that distance learning is a tool in a broader context, it was noted by eight subjects that distance methodologies not only extend knowledge to the learner but in turn, the creation of clinical opportunities for the learner can multiply the availability of quality healthcare services in a community, both in terms of the types and amount of services available.

“Quite a nice one is the example of occupational therapy students...remote supervision is a sort of win win win ...the people in this community get access to OT services you know more quickly than just staying on a waiting list that sometimes is more than a year (S3).”

Good governance is critical to good outcomes.

Having the right curriculum and the right means to assess will only be successful if there is effective institutional governance and will to make sure that the best plans are implemented at all levels. One speaker described a successful distance learning programme conducted in a lower resource environment in Asia that had a central governance structure that “worked quite well as it was cascaded down” from senior clinicians to biomedical technicians (S1).

“There were different levels of what needed to be done was people at each of the levels needed to be quite clear of what they were doing and what the objectives were and there was a means to assess what they were doing...(S1).”

Distance learning cannot replace all hands-on activities

While there was universal agreement on the value of distance learning in medical education, there were three subjects who had caveats about its role and potential.

“I don’t believe that the entire curricula of medical school can or should be done using distance learning technologies. I think that a great part of what’s going on in the future, what we’re looking at as far as entrustable professional activities is going to be the development of professionalism which includes teamwork, interprofessional education. I think a lot of those things you really need to have a physical presence...(S4).”

Distance learning and various telemedicine or tele “presence” technologies were used interchangeably, recognising that medical education is inherently a clinical discipline involving patients, health systems, and other health providers. However, it was noted by a practitioner in the osteopathic medical tradition that no “distance learning” had yet been proven to replace the literally “hands on” teaching needed by that discipline.

“The alternative was the faculty that really needed to do hands on training in clinical skills and for us in osteopathic principles and practice because they literally had to travel hours ...to get to the branch campus (S4).”

Lack of money and resources limits any method or effort.

While there was unanimous agreement about the potential of distance learning, it was also felt strongly by one subject that distance learning alone cannot overcome fundamental lack of support or resources.

“I don’t think there would be any problems about quality or acceptability. The main thing would be the costs.” “Whatever you do here, you have to have the money to support it (S2).”

Good curriculum is essential to teaching effectiveness.

Continuing the idea that distance learning is a method not an end, the importance of curriculum as a guiding principle was stressed by five subjects as central to providing a uniform experience that covers the essential components identified as a best practice or blueprint. This need for curricular adherence is not unique to distance learning but its role in keeping disparate sites tied to minimum essentials was stressed.

“You have to have a curriculum with a syllabus so at least they know what they’ve got to learn, what they’ve got to do (S2).”

“Make sure that you train the people out in the district hospital and the community what you want them to learn and how. Otherwise they can be taught different things in different ways. But I think you can get that in a tertiary hospital anywhere... (S3).”

Methods and money cannot overcome poorly prepared students.

One subject (S2) noted that distance learning may be valuable but it alone cannot redeem poorly prepared students. Distance learning and technology cannot overcome students who lack adequate preparation.

“You’ve got to have good students (S2).”

Community learning has advantages.

Eight subjects felt that training in the community gave students an accurate reflection of common pathology and the natural history of the general population, much more so than tertiary care centres that may tend to see only the most difficult or unusual cases. One respondent (S4) described the experience of a medical school colleague who was training in a prestigious multi-specialty clinic. His colleague had dealt with various rare and difficult cases but had not seen many common pneumonias and heart attacks because they presented first to other hospitals, not his.

(quoting his sub- specialised colleague) “I’d be scared to death if I had to go into the community (S4).”

Innovations such as distance learning, self-study, and competency based advancements should not shield students from “real world” practice demands.

Distance learning was seen by one subject as part of competency-based, self-directed learning methodology. In this context, the ability to progress at one’s own pace was thought to be potentially negative if the required competency did not include the ability to perform the desired knowledge, skills, and attitudes in the sometimes time pressured, production focused environment of modern medicine.

“...part of the concern with getting through medical school is the amount of load...the academic load that the learner has to go through because in some ways it approximates

the load, the difficulty, the stress, that will go some ways in patient care once you get to the point where you are the one taking care of patients...(S4).”

Osteopathic tradition has long experience with community-based learning.

For physicians trained in the US Osteopathic medical tradition, community learning is not new and has long been a part of their history.

“For 100 years we have been training in community based hospitals, in community based clinics, in rural settings, because we believe that the best training you get is to train people in the communities that they are going to serve (S4).”

2.5.2 Faculty Issues

Goals drive good supervision.

Two subjects stressed that the key to success in medical education was having the right curriculum and the right training and supervision to make sure that it was used appropriately.

“I do think you need to train the people out there with what you are trying to achieve with your curriculum. And they need to understand the curriculum and what you are trying to do (S2).”

Teaching effectiveness is independent of technology.

Like the need for good students, technology, and good curriculum cannot overcome fundamentally unsound faculty. Two subjects felt that the lack of local teaching faculty

with the commensurate and desired clinical skills, attitudes, and teaching acumen will be the limiting step in conduct of a successful community based education programme.

“You have to have half-decent supervisors, and they’re few and far in between (S2).”

Invest in teachers so they will invest in their school.

Six subjects reported that successful medication education required deep faculty support. Consistent with the varied international contexts represented by the respondents, there were varying opinions about what was needed to support local faculty. One subject stated that in a developing country context, non-remunerative benefits of teaching (faculty appointment, recognition) cannot offset the loss of clinical fees for the voluntary community teachers, one subject stated that making it hard to recruit even otherwise basically qualified clinical faculty (S2).

“One of the major problems here is the poverty in that most doctors are heavily involved in private practice and they don’t want to teach (S2).”

“The country is so poor if you’ve got children, and you want them to go to university they have to go to a private school, if you want to go to a private school, you have to do a private practice (S2).”

In the North American or European contexts of the other five subjects, volunteer faculty were available and willing but still needed for directed and ongoing faculty development.

“we saw the need for intensive faculty development for all kinds (S5).”

Distance learning demands may drive faculty away.

Two subjects expressed concerns that the introduction of distance learning to support distributed sites can drive some established faculty away. The use of technology or other innovations may be rejected by existing faculty because it is contrary to their own “sage on the stage” tradition of live in person lectures and strictly face to face didactics (S4).

“Another barrier is that faculty think how they were trained and think that is the best way to be trained. They sort of have made their training legendary in their own minds as far as being the best way to be trained and that may not necessarily be so. In that case a friend of mine says change comes one funeral at a time (S7).”

Telemedicine can function as tele mentoring of faculty.

Distance learning and telemedicine allow sharing and extension of knowledge over great distances. As noted as a community advantage, distributed learning can bring needed health and medical services to shortage communities. In interacting with the sub specialist at a distance, the local health provider gains confidence in managing common problems as they deal with them repeatedly under the tutelage of the distant expert. One example offered by (S8) was the use of “tele dermatology” which not only provided a service to the patient, but had the indirect effect of increasing the confidence of the local practitioner who no longer felt the need to consult the sub specialist after managing several patients with the same condition. In speaking of the incidental effect of tele mentoring of telemedicine, one subject noted that after time:

“...referrals drop off (S8).”

2.5.3. Assessment and Evaluation

External evaluation and assessment are critical to distance learning validity.

Three subjects stated that to succeed, medical education needs to be guided by a solid curriculum, taught by capable faculty, and measured by meaningful assessments.

Distance learning programmes will need to be evaluated by external auditors to make sure that they are achieving their milestones. They stated that external oversight needed to be done in any medical education programme, but distributed sites may make it more difficult to achieve the level of supervision needed. They stated that to be credible, distance based, community based programmes must exert added diligence in internal and external supervision.

“It is very hard to standardise assessments when they are spread out (S7).”

Accreditors need guidance and coaching to understand how distance learning and distributed learning meet standards.

Accreditors may be accustomed to looking for certain resources, capital assets, and other markers of robustness that may not be readily apparent in distributed or community settings. The founders of distributed undergraduate and graduate educational programmes had to spend considerable amounts of time with repeat site visits from their respective accreditors to help the site visitors understand how the intent of the accreditation standards were being met.

“We had to...interpret their standards in a way, that so sometimes what we do doesn't fit with the exact letter of what's on paper, but what we did was work to demonstrate that we were fulfilling the intent of the standard (S5).”

“...we had our first major external review for our residency programs and in all cases we’ve insisted that the teams visit communities, the smaller communities...so they can see and experience for themselves the perspective of our programmes and involvement of communities and faculty members in those communities as well as our students and residents (S5).”

Demands of accreditors and licensure boards still drive curriculum regardless of social needs or distance learning innovations.

Community programmes take pride in including many local constituencies in the planning and conduct of their training but where mentioned by two subjects.

“...the tail that wags the dog is the board exams...these are kind of handed to us. You will teach these and they will have the following kinds of competencies so far as knowledge...(S4).”

Student evaluations can weed out or keep good faculty

Many tools are available to evaluate clinical teaching but student evaluations were thought by three subjects to be an integral part of gauging the conduct of clinical teachers, especially when done in conjunction with other measures of student performance such as exam scores, board scores, and other evaluations by other faculty.

“I think that it has been borne out over the years that while student evaluations of their trainers are far from perfect they can allow you to parse out the good ones from the bad ones (S4).”

2.5.4 Technology Issues

Distance learning technology must meet privacy laws and rules.

Four subjects noted that distance learning technology was imperfect. Two subjects felt that while the technology existed in some usable form, the issue was making sure that it complied with privacy laws and regulations.

“For the most part the video technology is already there, it’s just a matter of making sure that its HIPAA compliant (S8).”

Successful use of distance learning and telemedicine requires training.

Although millennial learners may be comfortable with “always on” internet tools such as smart phones, there is still a need for training them and their faculty in their proper use in medical care. Subject four specifically mentioned that medical training should include structured training in the conduct of telemedicine consultations.

“We need to train students for the future of medicine rather than the past of medicine...We have had some discussions with our Dean that we are going to be incorporating some aspects of telemedicine into our simulation lab (S4).”

There is no perfect technology.

Four subjects stressed that no technology was perfect and it requires varying levels of information technology support and even patience.

“Although vendors try to make you believe that their product is perfect, I have not run into any perfect product. You’re still looking at a 2 dimensional screen that works most of the time but not always (S7).”

2.5.5 Community- based Research

Research options vary by communities.

Six subjects specifically recognised potential opportunities for community based research.

“You could develop a PBRN (Practice Based Research Network) which could mean clinical trials, it could mean evaluating socio-economic determinants of health, you could do public health research, it just depends on what the needs of the community are (S7).”

“There is no reason why there should not be research in the community managed by a central research office, as in any other medical school. That research could possibly cover any topic in science and clinical medicine as well as topics associated with management and with social and societal issues, as well as public health in general. Establishing a research office should be a primary task of the distributed medical school (S6).”

3.0 Discussion

Although the focus of this study has been contextualised distance learning in the community, the opinion of the respondents and the published literature suggest that the “essential elements” to success are less dependent on distances and technology and

more focused on governance (evaluation/assessment), curricular design, choosing personnel (students and faculty), and supporting them with adequate resources (including supported time, IT, and teaching/clinical infrastructure). Distance learning in the community has some added burdens in terms of training participants in its use and technical support and costs, but these are minor compared to the other “essential elements.” The subjects were unanimous that distance learning in medical education is desirable and successful, but also eight out of nine were just as specific to clarify that it is a method, not an end in itself.

While large research based academic medical centres are not disappearing, there is a convergence of shared issues and solutions between the tertiary care centres and community based programmes. As McGaghie (2015) notes: “There is a growing consensus that traditional approaches to clinical medical education are becoming obsolete. Traditional clinical medical education embodied in clerkships, residency rotations, and fellowship experiences is not an effective approach to help medical learners achieve key competencies” (McGaghie, 2015, p. 1438). McGaghie suggests adoption of “mastery learning” which can be done in any environment, at the tertiary medical centres or distant sites. He describes a shift in paradigm away from time spent in clinical exposures to a “competency-based model involving mastery learning where education outcomes are uniform and learning time varies.” (McGaghie, 2015, p. 1440) There continues to be a need to shift away from traditional teaching with books and lectures to more effective and efficient means of medical education. As Berman et al (2016) note: “Medical knowledge is expanding rapidly, which demands not only more

efficient teaching methods but also the teaching of knowledge management...” (Berman et al, 2016, p. 1)

Distance learning and telepresence advantages and disadvantages are also intermingled, as they are clinical knowledge delivery systems directed to learners from students to graduate professionals in their care of community patients. In the example of the occupational therapy (OT) students, the distance modality permitted students to train in OT in their community while delivering needed services to isolated community members who might have to wait up to a year to see an OT in the distant city medical centre. Sandberg et al (2016) describe the multi-site, multi-specialty success of Project ECHO at the University of New Mexico Health Science Centre. In the teleECHO clinic model, sub specialists are connected with remote clinicians in “isolated, poor, and minority communities. A large proportion of consultations serve patients from ethnic and racial minority groups.” (Sandberg et al 2016, p. 33) The tele-mentoring power of the distance relationship demonstrated that “community-based primary care clinicians participating in Project ECHO report improving their knowledge, clinical expertise, and connection with peers through participating in the program” (Sandberg et al 2016, p.35). Sandberg et al report that the outcomes of community physicians were statistically equivalent to university physicians in the outcomes of patients treated for hepatitis C, for example.

Faculty issues did vary between sites, with some resource limited sites lacking enough skilled or willing community faculty to conduct a community based programme, even if distance learning was available. In Brazil, for example, even though there is an open university that can provide some professional consultations at a distance, it alone

cannot overcome the reality that most medical students in Brazil come from Brazil's "social elite" who are not attracted to Brazil's poor urban and rural areas (de Campos, 2013). Our expert panel had long-term and broad international experiences with a variety of educational and health systems represented. There was consensus that distance learning can assist improvements in a number of environments, but attention to local structural constraints are necessary to harness its potential.

In contrast, in the more resourced environments, rural physicians generally favoured participation in community-based education. In a study reported by Hudson et al (2012) of Australian rural placement supervisors, about 66 percent reported neutral or positive financial impact while 19 percent reported income losses (the remainder were "unconcerned" about the finances). Hudson et al (2011) had reported in a previous study high supervisor motivation with the relationship offering positive "reciprocal benefits." In the wealthier clinical environments, clinical faculty had enough margin to permit their altruistic participation in clinical teaching. Farmer et al (2015) reviewed the literature on the power of rural training to increase numbers of rural providers and concluded that even with some reservations about the quality of the research, medical education in rural areas does seem to increase "the number of medical graduates that will work in a rural area" (Farmer 2015, p1). Farmer et al concluded that "technology should make education of all types more readily available in future, regardless of location, but there will always be a strong element of medication education that involves hands-on work with patients and learning from skilled role models" (Farmer et al p.13).

The attitude and outlook of the community faculty is conditioned in part by their contentment with the local community and their health system. Ellaway et al (2015)

conducted a systematic review of the relationships between “medical education programmes and communities.” Their review of the literature was not limited to distance learning or rural communities but was addressed to community based medical education (CBME), community orientated medical education (COME), and community engaged medical education (CEME). They concluded that “even though the relationships between communities and medical education are central to the educational and social missions of many medical schools, they can also be complex and troubling...” (Ellaway et al., 2015, p.1). In their review, Ellaway et al expressed concerns about the quality of the available studies and the lack of clarity about what “community” constituted, but were able to distil a number of insights including a general sense that “community teachers came to appreciate that a student presence did not detract from their interactions with patients but could improve them by requiring them to be more specific and deliberate in the care they provided” (Ellaway et al, 2015, p. 11). Their review found a reciprocal appreciation of the community for the medical school, “in terms of an enhanced sense of community authority and self-worth, which in turn increased their commitment to investing in the relationship...” (Ellaway et al, 2015, p. 11).

4.0 Conclusions and Future Work

Although a large body of literature and expert opinion supports the positive potential of distance learning in extending workable medical education and services into rural and underserved communities, there are a number of issues needing further clarification. As noted by Ellaway et al (2015), the heterogeneity of “community” medical education innovations make comparability difficult to assess. Furthermore, a number of variables

need to be controlled across studies such as demographics, attitudes, and motivations of the students for entering into the community rotations. For example, Kusurkar et al (2011) demonstrated in their critical review of the literature that “motivation is an independent variable in medical education influencing important outcomes and is also a dependent variable influenced by autonomy, competence, and relatedness” (Kusurkar, 2011, p. 242). Even though “motivation” is a variable in student performance, there remains a real but less defined variable or variables related to the learning environment. Skochelak et al (2016) report on a 28 medical school survey looking at the relationship between the “Medical School Learning Environment Survey (MSLES) scores and student characteristics.” The MSLES surveys were started as part of compliance with a new accreditation standard for US and Canadian allopathic (MD) medical schools. The standard was added because the research on “learning environment in the context of curriculum reform is scarce but leaders in medical education are promulgating the necessity of collaborative learning environments that expose the ‘hidden’ curriculum” (Skochelak, 2016, p. 1). Some demographics were included such as if a parent was a physician or if the student came from a rural, suburban, or urban environment but the schools were not characterised by their location (rural, suburban, urban) or other distinctive (primary care versus tertiary care focus, competency based curriculum, public vs private etc.) There were no correlations with other entry characteristics such as admission scores, grade point average, but four “attribute tools” were correlated with the MSLES (“Ways of Coping Questionnaire, Tolerance of Ambiguity Scale, Jefferson Scale of Empathy and Patient Practitioner Orientation Scale” Skochelak, 2016, p. 2). In their results, Skochelak et al (2016) found that the “student’s school or campus location,

with its inherent local institutional culture, explains almost 90% of the measured variance in student perception of the learning environment...student demographics, and personal attribute measures...only explained about 2% of the variance” (Skochelak et al, 2016, p.6). The importance of this MSLES study is that “there is evidence suggesting that the learning environment is a critical element in the establishment of professional identity, which in turn fosters ‘competency’ in many areas” (Skochelak 2016, p. 1). Future studies of the impact of distance learning on medical education in community-based settings will need to define clearly the meaning of community in their studies and find a means to control for the somewhat vague and ill-defined “learning environment” that the MSLES study has begun to document as functioning as independent of other psychological and personality attributes of students.

De Jong et al (2013) looked at the role of patient mix and learners in “work-based clinical settings.” In their review of the literature, “the indications of positive relationships were stronger regarding the quality of learning experience (learning benefit, instructional quality or effectiveness of a rotation). Supervision quality seems to be a mediating factor to improve patient or education-related outcome” (De Jong 2013, p. e1191). In another systematic literature review, Thistlewaite et al (2013) concluded from the literature that “placements are less likely to work if academic and administrative staff are ill-prepared or ill-supported, if students feel disadvantaged in terms of resources and specialty experiences, and/or if students are unable to take responsibility for their own learning” (Thistlewaite et al, 2013, p. e1353). Future evaluations and assessments of learning in distance learning in medical education will share the challenges of all medical education

research in controlling for multiple factors that include the learner, the learning environment, and the community and health system in which they are conducted.

Finally, there remain long-term questions about the impact of innovations in distributed learning in contextualised community environments. The literature reviews and articles cited include a number of studies looking at short-term outcomes such as subjective satisfaction and assessments of learning. Norman et al (2008) reported a study looking at the relationship between the problem-based learning (PBL) innovation. In their study, they found that in looking at graduate doctors in practice who were investigated for medical malpractice and underwent peer review actions, there was no statistical difference in those physicians who had trained in a PBL environment versus those who were graduates of a traditional curriculum programme (Normal et al, 2008). On the one hand, it was reassuring that the innovation appeared to be no worse than the conventional training but the study authors emphasised “the difficulty of linking curriculum to performance outcomes in practice. Much more detailed examination of the causal pathway from learning to outcome is required” (Norman et al, 2008, p. 795). Further research into the global benefits, costs, and the actual variables leading to positive and negative outcomes will need long-term and deep, multivariate analysis to fully evaluate the impact of distance learning, community-directed medical education.

5.0 Reflective Summary

Investigation into distance learning and community-directed medical education illustrates the challenges in medical education in general, namely the need to control for multiple variables that have an impact on the learner, faculty, and community in their

subjective and sometimes, objective experiences. While technology continues to mature and sometimes frustrate, it would seem that increasingly the barriers will be less technological and continue to be pedagogical, administrative, and interpersonal. In that sense, an inquiry into distance learning has shown that what may be a “new” way to do medical education is in fact “old” in the elements that contribute to success or failure.

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