The Ecology of Care: A Review of the Literature in Clinical Learning Environments

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Categories: Educational Theory, Teaching and Learning, Postgraduate (including Speciality Training), Research in Health Professions Education

Received: 27/06/2019
Published: 16/07/2019

Abstract

Several challenges have emerged in clinical education over the past two decades. Health professional programs have increased in both number and size resulting in an upsurge of trainees. The unprecedented growth has increased the workload of clinicians and their office staff as they correspond with university administrators to coordinate learners’ placements. Further complicating the matter are the varying teaching remuneration models. Surrounding the system is the interplay among government, post-secondary, and professional bodies and their social contracts, values, and mandates that inform and bind the profession's development.

Globally, the ecology of family medicine is evolving and experiencing new challenges. Concerns have been raised about the shifting dynamics and erosion of relationships between healthcare professionals and patients. Compounding matters are patients’ lack of health coverage; system pressures to find healthcare savings and efficiencies; demands for sub-specialization; and changes in the family structure and population demographics. This altered landscape and increasing divide stress the educational paradigms responsible for training learners.

The purpose of this literature review is to better understand the context, challenges, and facilitators of clinical practice education as well as how we, as institutions, can improve the experience for learners, educators, and patients.

Keywords: Family Medicine; Postgraduate; Clinical Education; Clinical Placement Model

Introduction

Several challenges have emerged in clinical education over the past two decades. Health professional programs have increased in both number and size resulting in an upsurge of trainees entering these fields (British Columbia Medical Association, 2017; U.S. Department of Health and Human Services, 2018). This rapid expansion has strained...
clinical educators as they accommodate the increase in program capacity and demands of teaching while simultaneously managing their patient care workflow (Fairbrother et al., 2016; Ryan et al., 2018; Sevenhuyzen and Haines, 2011). This unprecedented growth has also increased the workload of clinicians’ office staff and university administrators as they work together to coordinate learner placements. Further complicating the matter, are the varying teaching remuneration models, if any, between programs and their preceptors (Blouin and Van Melle, 2006). Surrounding the system is the interplay among government, post-secondary, and professional bodies and their social contracts, values, and mandates (Ash et al., 2012; Cantatore, Crane and Wilmoth, 2016; Miles, Elliott and Caballero, 2015).

Globally, the ecology of medicine has also changed. There are increasing concerns about the erosion of relationships between patients and their doctors, doctors and other doctors, and doctors and other health professional providers; as well as patients’ lack of health insurance coverage, external pressures for healthcare to be cost effective, pressures for healthcare workers to specialize, and changes in the family structure and population demographics (Gutierrez and Scheid, 2002; Murray et al., 2000). This altered landscape and divide impart their stresses on the educational paradigms and people training students in healthcare. The burst of scientific advancements, learning theories, digital technologies, coupled with a desire to take a more patient-centred approach to address these concerns add to this complexity (Miles, Elliott and Caballero, 2015) with much of the responsibility of this falling upon the community preceptor to navigate and instruct with minimum, if any, institutional support.

Interestingly, these issues are international and experienced in many of the post-secondary faculties of medicine, nursing, and health science (Rodger et al., 2008). Surprisingly however, there is a dearth of research evaluating the evolution of clinical education from hospital-based to community-based teaching and the challenges, opportunities, and outcomes posed by this transition. The purpose of this literature review is to scan the empirical research pertaining to the context, delivery, and support of clinical practice education. Sections in our review include theoretical and conceptual frameworks; methodologies evaluating the clinical experience; design and implementation of the clinical placement model; and research gaps for further inquiry.

Defining Clinical Education

To better understand our current position and potential path in this landscape of clinical education, we need to understand our roots and how we arrived to this point in our journey. In general, clinical education is the culminating experience designed to facilitate learners’ integration of their knowledge and skills. Historically, clinical education was delivered via hospital-based bedside teaching and described as the experiential capstone to one’s theoretical knowledge and research (Flexner, 1910; Rolleston, 1939). Often orchestrated by the preceptor, this apprenticeship model employed a passive, practical approach responsible for exposing learners to the “real-life” of the profession (Collier, 2017).

The expansion of clinical education has resulted in diversifying these programs’ context and curriculum (Ash et al., 2012; Doubt, Paterson and O’Roiordan, 2004; Ellaway, Bates and Teunissen, 2017). Thus, administrators have had to re-examine clinical education branching from the confines of the hospital into the surrounding ecology. There were several reasons for this contextual shift. Alguire et al. (2008) highlight that "decreasing numbers of inpatients with shorter lengths of stay and higher illness intensity and the growing mismatch between the educational content and clinical practice of medicine have resulted on greater emphasis on ambulatory training” (p. 2). Furthermore, the distribution of clinical education to the community was also driven by the need to address universities’ social accountability mandate. Universities distributed their programs due to the urban overcrowding of learners in addition to the growing evidence that physicians tend to practice where they train. Hence, academia turned to its community-based clinicians to teach within in their clinical setting.
Post-secondary expectations of its trainees adjusted to reflect its new learning environment. For the purposes of this paper, community-based medical education is defined as the delivery of medical education which situates the learner's clinical training in a community setting and "exposes students to patients who are managing their illnesses within their own family, social, and community contexts" (Kelly et al., 2014). Community-based learning is often set within a business model designed to generate revenue; therefore, it requires a level of productivity to sustain itself and expects medical residents to quickly adapt and develop the skills necessary to function independently.

As clinical education evolved, so did its definition, and the intention of the space and curriculum transitioned to providing a more immersive experience designed to build on the learner's practical knowledge, skills, confidence, and independence. "Clinical education provides medical students with the opportunity to develop a wide range of skills through experience with patients and their problems. Its strengths are that it is highly relevant to future professional practice, integrates students into health care teams and provides role modelling by clinical teachers" (Conn et al., 2012). This model has since emerged as one of the primary vehicles for educating students and residents. However, since this transition, academia's reliance on community-based preceptors to support the persistence, retention, and graduation of its students has increased (Christner et al., 2016).

### Theoretical & Conceptual Frameworks

The models of clinical education are predicated on theoretical and conceptual frameworks that inform how the educational experience is conceived, designed, structured, and delivered (David, 2007; Kamel-El Sayed, 2018). These frameworks include general and ecological systems theories that describe the relationship between organizations and then focus more intimately on the experiential and active learning theories.

John Dewey (1938) established the concept of experiential learning and suggested that the learner's integration and application of knowledge is often best acquired through a setting that aligns and supports the desired activity. In addition, the quality of the experience is key as mis-educative experiences, those experiences that are disconnected or distract from the learner's intentions, can be detrimental in student progress. Kolb's (1984, 1999) experiential learning theory reinforced Dewey's foundation that learning through experience is as essential as cognitive-based approaches. Experiential learning theory is defined as "the process whereby knowledge is created through the transformation of experience" (p. 41). Lave and Wenger's (1990) situated learning theory builds on Kolb's research stating "that learning is unintentional and situated within authentic activity, context, and culture." Situated learning theory suggests that new learners arrive to a community of practice as peripheral members however they begin to experience greater engagement as they situate themselves towards the community's core.

Over the past decade, active learning theory has gained traction in medical education in that it describes the need for learners to take part in the learning process and participate in activities that encourage retention, reflection, and application of knowledge (O'Keefe et al., 2016). Active learning posits "that meaningful learning occurs when learners engage in appropriate cognitive processing during learning, including attending to relevant material, mentally organising it into a coherent cognitive representation, and integrating it with prior knowledge activated from long-term memory" (Mayer, 2010). Cutrer et al. (2017) coined master adaptive learning theory to described the "metacognitive, reflective, and self-regulated learning in the healthcare environment, where learners plan, learn, assess, and adjust their learning and practice based on experience." Our current healthcare setting is complex and rapidly changing. The curriculum and context requires learners to respond and adapt quickly to their environment's needs. Furthermore, medical education programs are comprised of rotation blocks that expose learners to short stints of specialties with the expectation that the learner will build on these experiences and be better equipped to later adapt to the changing nature of their workplace.
In the longitudinal integrated clerkship where a learner is placed in a setting for an extended period of time, the preceptor plays a more intimate role in the student's development as a practitioner. As Brown, Collins and Duguid (1989) describe "cognitive apprenticeship supports learning in a domain by enabling students to acquire, develop and use cognitive tools in authentic domain activity." David (2007) emphasizes that the cognitive apprenticeship theory advances learning through collaborative social interaction and the social construction of knowledge as well as provides students a role model that contributes to their professional identity, i.e., what it means to be a physician, in addition to honing the skills of the practice.

Professional identity and roles are informed by healthcare, educational, and governmental agents. General systems theory suggests that "systems cannot be reduced to a series of parts functioning in isolation, but that, in order to understand the whole, one must understand the interrelations between these parts" (Anderson, 2016). Clinical training is situated within larger spheres such as government, healthcare, and education. The culture, values, policies, and practices that emerge from these areas influence learning organizations, such as universities and colleges, and how they are resourced in their design of educational programs; in their clinical settings that facilitate curriculum delivery; and in their placement models. It is these general and ecological systems that foster stability, disruption, resilience, adaptability, and transformability within a learning organization (Ellaway et al., 2017).

The learning organization is an "ideal towards which organizations have to evolve in order to be able to respond to the various pressures [they face] (Finger and Brand 1999, p. 36). It is characterized by a recognition that individual and collective learning are key (Smith 2001, 2007). Developing a shared vision; utilizing a systems-thinking approach; the application of mental models; nurturing team learning; and guiding personal mastery are recommended traits that help sustain and progress these models (Kofman and Senge, 1993). Ellaway et al. (2017) introduced ecological theories of systems to address the contextual and temporal variability that clinical education poses to actors within the learning organization. As the authors describe, the clinical training context is "a dynamic and ever-changing system that emerges from underlying patterns of patients, locations, practice culture and health systems, medical education, and society, and from the unpredictable interactions between these patterns" (Ellaway et al., 2017). Programmatically, there is an implied expectation that this diversification in learning environments will train students to be more adaptive and responsive in a variety settings. Given this, ecological theories of systems offer further insight to the "range of concepts of how and why systems change and how and why they respond to change."

As the context of clinical education evolves, as will new theoretical frameworks about teaching and learning in an experiential, service-delivery setting. Frameworks that describe this unique learning construct will assist those responsible for curricular design. To establish a learning culture in an ecology of care, university programs are encouraged to create relationships with their community partners (Stewart and Wubbena, 2014). This assists both groups in understanding their gaps and strengths as well as nurturing the interpersonal dynamic of clinician and learner; aligning the program's curriculum objectives with the community's needs; and ultimately delivering the best patient care in our broader healthcare system (Stewart and Wubbena, 2014).

**Methodologies: Clinical Education & Practice Placement Model**

Clinical education and its placement models are designed to situate learners in both an academic and workplace setting. These complex spaces intersect a multitude of intentions, expectations, and assumptions about how people will behave and function (Gruppen et al., 2018). Questions then arise such as how do we evaluate these settings while taking into account and celebrating the inherent diversity in their personal, social, organizational, and environmental components? How do we best define success in an atmosphere layered with a multitude of agents and...
constructs that inform the learning process? Finally, how do we gather and make sense of the data in order to provide clinical learners, educators, and administrators with meaningful information that can guide their evolution?

These are essential questions that medical education has, for the most part, failed to ask and investigate. Cited by Miller and Archer (2010), "Historically, assessments have been implicit, unstandardised, and based on holistic or subjective judgments (the apprenticeship model)." As many disciplines are becoming increasing aware of the influence that the learning environment imposes, clinical education (on the whole) appears to be lagging in employing validated tools that measure learners’ perceptions, behaviours, and outcomes. This is further perpetuated by the lack of workplace-based assessments on physicians’ and its impact on education and performance (Miller and Archer, 2010). The consequence of this failure is that collectively we have very little evidence that definitively points to what constitutes learning and what defines success in clinical learning environments (Gurková et al., 2017).

Validated assessment tools have been developed to evaluate the undergraduate medical, postgraduate medical, nursing, hospital and clinical learning environments. Released in 1997, Dundee Ready Education Environment Measure (DREEM) evaluates medical and health-related educational environments and measures students' perception of learning, students' perception of teachers, students' academic self-perception, students' perception of atmosphere, and students’ social self-perception. The international use of the survey has also provided medical schools and their climates to be benchmarked and compared to one another (Yusoff, 2012). Based on DREEM, the Postgraduate Hospital Educational Environment Measurement (PHEEM) questionnaire was created to specifically "assesses metrics of the level of autonomy, quality of teaching and social support during the hospital-based training period undertaken by all new physicians" (Vieira, 2008). The Clinical Learning Environment Inventory (CLEI) was designed by Chan (2001) to improve the clinical studying of nursing in hospital settings. CLEI (2001) uses the scales of individualisation; innovation; involvement; personalisation; and task orientation to measure the learner’s perceptions and experience. Similar to the CLEI, the Clinical Learning Environment and Supervision (CLES) survey developed by Suen and Chow (2001) was designed for nursing students focusing on the dynamic between the learner and their clinical educator.

Methodologies to evaluate the clinical learning environment have been predominantly quantitative in order to capture the mass volume of learners' perceptions, behaviours, and experiences. The majority of these tools have informed each other in their development and grown to reflect the changing milieu of both medicine and education. Evaluation has lagged in its transition to the community-based clinical context and there remains a paucity of literature in the area. In addition, there appears to be gaps in the assessment of the physical and virtual environment and how the design of space supports the program’s learning objectives, intentions, and outcomes (Gruppen et al., 2018). Many of these tools are focused on the experience of the learner as opposed to capturing the clinical educator’s teaching performance, experience, and perceptions. As a result, there is no clear indication as to what model or environment best supports teaching and the clinical educator’s objectives.

**Design: Clinical Education Placements**

Clinical education placements describe how the student is introduced and situated in their new learning environment. Programs design these placements to give students the time and space to practice and develop their skills in addition to learning how to work with patients and colleagues in a team-orientated environment. Sydney Australia’s Mental Health Coordinating Council (2013) identified factors that contribute to the design of clinical placements. These variables include the primary purpose of the experience; the primary activity that the learner will be engaged in; the location and length of placement; determining students’ capability, student-educator ratio, learning style, and
learning partners involved in the placement; supervision of learner and experience; and placement educator including their profession, role expectation, and support of the experience. The deconstruction of the clinical education placement model assists those in designing new models by recognizing and considering the facets involved and more importantly what areas should be modified in order to improve the experience. Identifying these variables also helps in the design and implementation of evaluation tools that assist those in assessing student and preceptor placement experience.

Models of Clinical Placement

In reviewing the literature, clinical placement models have been divided into social, content delivery, and context categories. Social describes models that are designed based on the number and arrangement of learners, clinical educators, and staff. This may include changes to the model by adding, subtracting, or modifying the role of members in the placement. Delivery describes the method of how the content is disseminated to the learner and includes face-to-face; simulation; multimedia sources; virtual, augmented, and mixed realities; and the rotation's length and design. Context pertains to the environment that the learning takes place in and includes urban, suburban, rural, and remote settings in addition to classroom; hospital; ambulatory; clinical; and wilderness environments. Social, content delivery, and contextual models are interrelated and limited by space, curricular scheduling, accreditation policies, and resources.

Non-traditional models in clinical education have emerged in response to the challenges including addressing shortages in clinical placements and clinical educators, lack of teaching compensation, and aging teaching demographics. Also, a series of initiatives have emerged to increase university-community partnerships in delivering care; to heighten students' educational experience by exposing them to vulnerable populations or rural communities; and providing environments that encourage collaboration, peer teaching, and intraprofessional learning.

Social

Traditional Model: Preceptorship
The traditional model, often referred to as "Preceptorship" of clinical education includes 1-2 preceptors shadowed in the workplace by 1-8 learners over the course of several weeks to longer durations as experienced in one to two-year integrated clerkships (Kelly, Walters and Rosenthal, 2014). The 1:1 model was designed to expose the learner to the clinician's daily routines, rituals, and practices as well as introduce them to patient cases with supervision and guidance. Although somewhat antiquated, the model continues to be used in many medical education settings and provides a semblance of standardization in the learner's experience.

Capacity Development Facilitators
Fairbrother et al. (2016) implemented the Capacity Development Facilitators model (CDF) in the hospital setting to accommodate the growth in their physiotherapy student placements and assist clinical educators with supervising these additions. CDFs are dedicated positions whose role is to "actively engage" in the clinical learning environment and support both learner and clinical educator by serving as a sounding board, facilitating and assessing the learning dynamic, and designing educational resources. Fairbrother et al. (2016) results indicate that the CDF model "increased capacity, provides robust learning experiences and is a satisfying model of delivery for student placements from the perspectives of the hospital and university staff and students" (p. 58).

Dedicated Education Units (DEU)
Dedicated Education Units are designed to address competition for nursing student placements, faculty shortages,
and provide adequate clinical education experiences (Hunt, Milani and Wilson, 2015). DEUs are highly organized learning environments situated within the hospital or clinical context. They are comprised of students, preceptors, and a clinical instructor who oversees the rotation experience. In this model, students are grouped during the clinical rotation and paired with a preceptor responsible for assisting the learner in providing patient assessment and care as well as administering medications. The preceptor and student work closely with one another and utilize the clinical instructor only when a situation is warranted. Hunt et al. (2015) reported that DEUs helped students incorporate their theoretical knowledge with clinical practice and supported greater engagement with patients. Faculty also responded stating that they had more time with students especially in providing student performance feedback. One of the key findings of this study was that students responded positively to the learning experience if they perceived the faculty was engaged in teaching.

**Collaborative Learning Units (CLU)**

CLUs were inspired by the DEU model and are self-directed clinical environments where students develop learning plans that identify their individual set rotations, their learning assignment, and the preceptor that they will work with. The student's learning plan is shared among the clinicians and therefore all on the unit are aware and involved in providing the learner with opportunities to build on their knowledge and practical experience (Callaghan et al., 2009; Phillips and Aktan, 2017). The results of the study conducted Callaghan et al. (2017) were mixed in that nursing students found advantages and disadvantages in working with the CLU and traditional 1:1 preceptorship model. The CLU model promoted team work and encouraged learning about the practice from different perspectives. It also offered a more intimate approach to the profession and allowed learners to establish a relationship with their mentor that provided a source of feedback and trust.

**Pairing Learners 2:1 Model**

Currens and Bithell (2003) explored the use of the 2:1 clinical placement model in a practice-based setting. This model places two physiotherapy students with one preceptor with the intention of encouraging peer learning and reducing the teaching demands felt by the preceptor. The results of their study indicated that learners perceived that the arrangement "enhanced the quality of the placement learning" although preceptors questioned the quality of the learning experience given that a portion of the teaching occurred between the students (Currens and Bithell, 2003).

Similarly, in 2014, the University California San Francisco School of Medicine began pairing second year nurse practitioner students with second year medical residents. The purpose of this model was to encourage peer learning as well as prepare health professionals to work in integrated teams within a community-based setting (Schwartz, 2014). The results of their study were positive in that learners acquired different perspectives paired with different professions. However, Sevenhuysen et al. (2014) found that clinicians and their physiotherapy students preferred the traditional clinical education model 1:1 as opposed to being paired with other learners even though the 2:1 model provided students with additional feedback and provided clinical educators with additional time to address unrelated student activities.

**Parallel Consulting**

Confronted with the challenge of placing learners in community, primary, and ambulatory settings, Flinders University opted to create rural clinical schools that facilitated the placement of their General Practice students while also exposing them to greater volumes of experiential learning (Ash et al., 2012). Given the limited number of rural clinical educators, there were concerns about how many patients they would be able to attend to while attached to a learner. Therefore, in their rural and regional student placements, the parallel consulting model was implemented (Ash et al., 2012). In this model, the patient is visited separately by the preceptor and student. Following their individual meeting, the preceptor, student, and patient then convene for a joint consultation before moving on to the next patient. The model has allowed the preceptor to continue to see the same volume of patients.
Interestingly, analysis on this model "indicates that the nature of the consultation changes, with a greater emphasis on history-taking in shared consultations, compared with the GP's usual management of patient consultations" (p. 2).

**Delivery**

*Avatar/Patient Program for Learning Enhancement*

Nursing has been plagued with many of the same struggles as other disciplines in their delivery of clinical education. Niederhauser *et al.* (2012) launched a Nursing Education Redesign Summit that invited nurses, nurse leaders, and faculty members to examine how the changes in their profession were impacting the landscape of their clinical education program. The summit inspired a series of clinical education projects that were later tested to determine their efficacy in managing faculty workloads, costs, and engagement.

The APPLE project (Avatar/Patient Program for Learning Enhancement) proposed experimenting with the use of preprogrammed avatars (PPA) and avatars in multi-user virtual environments (MUVE). PPA and MUVE learning experiences were facilitated by three clinical educators and provided to 100 students during 4 nursing courses over two semesters. Student orientation to the program ranged from 0-2 hours. Student experiences were assessed via qualitative and quantitative evaluation instruments. Following the virtual delivery, students explained that the learning activities, team work, practice of multidisciplinary skills, and immediate performance feedback assisted them in incorporating course content in clinical settings. More importantly, students described their learning experience as both "fun and energizing."

*Rotation 2-4 Week Block*

In Gilmour *et al.* (2013) the authors explored medical students learning experiences based on the 2-4 week block placement model and two continuous days per week model. The results of their study found that the learners perceive the different clinical placement models as offering both advantages and disadvantages; however, it was the learner’s facilitator that made the greatest impression on their experience. Salminen, Ohman and Stenfors-Hayes (2016) research on the clinical environment indicated that the supervisor, as opposed to the design of the rotation, played the central and key role in a student’s learning experience.

*Patient Partner Program: P3 Model*

Barr, Ogden and Rooney (2014) describe the P3 model as patient-centred medical education that builds on a student’s consulting and management skills through regular contact with an assigned community-based patient suffering from a chronic illness. Through this placement, medical students are encouraged to holistically address the patient while simultaneously addressing their chronic illness. Clinical educators serve as tutors to help provide feedback and assessment of the dynamic between patient and student. This placement occurs in the students’ senior clinical year and is facilitated by the partnership of the university and community-based clinics. Program coordinators are instrumental in this matchmaking process and assist in screening patients to determine their appropriateness with the program and to address any issues that may emerge from the partnership.

**Context**

*Continuity Clinics & Continuity Community Clinics*

Continuity clinics are designed to provide residents the exposure to delivering longitudinal care within a community. During this 2 to 3-year program, residents are scheduled to regularly work in the community clinic in addition to a series block rotations. To execute this model, the University of Chicago Internal Medicine Residency Program partnered with their local free clinic to create a community-based continuity clinic that offers residents greater exposure to underserved demographics over a period of three years (Pincavage *et al.*, 2013). Results indicated that
residents who worked in the continuity community health clinic had greater satisfaction related to caring for the underserved as opposed to a non-community health continuity clinic. Residents in continuity clinics also reported greater autonomy in handling patients’ complaints; were fulfilled and motivated to go to work; and felt that they contributed to improving patients’ overall wellbeing and care (Pincavage et al., 2013).

**Multiple Mentoring Clinical Placement Model**

Multiple mentoring clinical placement models provide multiple learners access to multiple clinical educators in a clinical setting. The University of Queensland has offered this model of educational placement for their occupational therapy students as it affords them the opportunity to learn from each other as well as other clinicians about different approaches to their practice and profession. Sites employing this model are frequently able to take multiple placements and offset the workload amongst other clinical educators (Copley, 2007; Nolinske, 1995).

**Research Gaps & Areas for Further Inquiry**

Community-based teaching and the multitude of clinical placement models implemented have expanded the diversity of learning environments and those teaching in them. For post-secondary institutions who are obligated to deliver specific curriculum objectives, this variability in both the learning setting and patient census can inspire new opportunities as well as challenge the learner to satisfy their program objectives. Exploring different clinical placement models has been essential to address some of these challenges and non-traditional models are probing the system to determine if certain matrix structures accommodate the increase in needed placements while negotiating workforce constraints and promoting learning.

In general, the empirical research on the clinical education environment is limited. Nursing is the most prolific in examining the topic and Australia offers great innovation in experimenting with new models. There are several approaches to aligning clinical education models with service delivery; however, the literature indicates that the dynamic between these variables is sensitive to the culture, affordances, and resources of their surrounding ecology (Esteghamati et al., 2016). Therefore, it may be advantageous to approach the topic with methods, as opposed to solutions, that solicit those embedded in the context to share their experience, insights, and ideas about how to best address their dilemmas (Lekkas et al., 2007).

Methods that establish communication channels and facilitate a continual discourse on clinical education allows members to share their current challenges and offers administrators the opportunity to proactively address their concerns as they are raised (Kosunen, 2008). Applying an interdisciplinary lens may also provide clinical educators additional theories and paradigms that help deconstruct their situations to better understand how to frame and address the underlying cause (Schwartz, 2014). Through intraprofessional communication, collaboration, and team building we can better position medical education and our learners for the future of healthcare.

**Take Home Messages**

- The literature review highlights four key areas including.
- Institutions are exploring a variety of community-based clinical placement models in addressing the challenges posed by an increase in trainees.
- Australia and Nursing are leading in the design and evaluation of new clinical placement models.
- The evaluation data is inconclusive as to determining what constitutes a successful clinical placement model.
- Post-graduate and medical education are promoting an interdisciplinary approach.
Notes On Contributors

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Acknowledgements

None.

Bibliography/References

Anderson, B. (2016) 'Improving healthcare by embracing systems theory', Journal of Thoracic and Cardiovascular Surgery, 152(2), pp. 593-594. https://doi.org/10.1016/j.jtcvs.2016.03.029

Ash, J., Walters, L., Prideaux, D. and Wilson, I. (2012) 'The context of clinical teaching and learning in Australia: Towards a reconstruction of the relationship between medical school and health services', The Medical Journal of Australia, 196(7), pp. 475. https://doi.org/10.5694/mja10.11488

Australia’s Mental Health Coordinating Council. (2013) '2013-2014 Annual Report. NSW Ministry of Health', Available at https://www.mhcc.org.au/wp-content/uploads/2018/05/annual_report_2013-14-web.pdf(Accessed: 12 Dec 2018).

Barr, J., Ogden, K. and Rooney, K. (2014) 'Committing to patient-centred medical education', Clinical Teaching, 11(7), pp. 503-506. https://doi.org/10.1111/tct.12196

Bailey, J. (2008) 'First steps in qualitative data analysis: transcribing', Family Practice, 25(2), pp. 127–131. https://doi.org/10.1093/fampra/cmn003

Blouin, D. and Van Melle, E. (2006) 'Faculty development needs of Ontario rural physician preceptors', Queen’s University. Available at https://meds.queensu.ca/sites/default/files/inline-files/Ontario Community Preceptors Faculty Development Needs Assessment.pdf(Accessed: 12 Dec 2018).

British Columbia Medical Association. (2012) 'Charting the course: Designing British Columbia’s health care system for the next 25 years'. Available at https://www.doctorsofbc.ca/sites/default/files/charting_the_course_final.pdf(Accessed: 12 Dec 2018).

Brown, J., Collins, A. and Duguid, S. (1989) 'Situated cognition and the culture of learning', Educational Researcher, 18(1), pp. 32-42. Available at http://www.johnseelybrown.com/Situated Cognition and the culture of learning.pdf(Accessed: 12 Dec 2018).

Callaghan, D., Watts, W., McCullough, D., Moreau, J., et al. (2009) 'The experience of two practice education models: collaborative learning unit and preceptorship', Nurse Education in Practice, 9(4), pp. 244-252. https://doi.org/10.1016/j.nepr.2008.08.010
Christner, J., Dallaghan, G., Briscoe, G., Casey, P., et al. (2016) 'The community preceptor crisis: Recruiting and retaining community-based faculty to teach medical students - A shared perspective from the alliance for clinical education', Teaching and Learning in Medicine, 28(3), pp. 1-8. https://doi.org/10.1080/10401334.2016.1152899

Clinical Education Australia. 'Enabling Clinical Education Skills. (ND) Placement models and approaches to supervision'. Available at http://www.clinedaus.org.au/topics-category/placement-models-and-approaches-to-supervision-88(Accessed: 12 Dec 2018).

Collier, A. (2017) 'Characteristics of an effective nursing clinical instructor: The state of the science', Journal of Clinical Nursing, 27(2), pp. 363-374. https://doi.org/10.1111/jocn.13931

Conn, J., Lake, F., McColl, G., Bilszta, J., et al. (2012) 'Clinical teaching and learning: From theory and research to application', The Medical Journal of Australia, 196(8), pp. 527. https://doi.org/10.5694/mja10.11473

Copley, J. (2007) 'Occupational therapy clinical educator, multiple-mentoring placement model', ClinEdAus. Available at https://otpecq.group.uq.edu.au/education-placements/placement-options-and-models/multiple-mentoring-placements/tips-increasing-efficiency-using-multiple-mentoring-clinical-placement-model(Accessed: 12 Dec 2018).

Creswell, J. (2003) Research design: Qualitative, quantitative, and mixed methods approaches. 2nd Ed. Thousand Oaks (CA): Sage Publications, Inc.

Currens, J. and Bithell, C. (2003) 'The 2:1 clinical placement model: Perceptions of clinical educators and students,' Physiotherapy, 89(4), pp. 204-218. https://doi.org/10.1016/S0031-9406(05)60152-6

Cutrer, W., Miller, B., Pusic, M., Mejicano, G., et al. (2017) 'Fostering the development of master adaptive learners: A conceptual model to guide skill acquisition in medical education', Academic Medicine, 92(1), pp. 70-75. https://doi.org/10.1097/ACM.0000000000001323

David, L. (2007) Situated learning theory (Lave) in learning theories, Learning Theories. Available at https://www.learning-theories.com/situated-learning-theory-lave.html (Accessed: 12 Dec 2018).

Dewey, J. (1938) Experience and education. New York: Collier Books.

Doubt, L., Paterson, M. and O'Riordan, A. (2004) 'Clinical education in private practice: an interdisciplinary project', Journal of Allied Health, 33(1), pp. 47-50. Available at https://www.ncbi.nlm.nih.gov/pubmed/15053220 (Accessed: 12 Dec 2018).

Ellaway, R., Bates, J. and Teunissen, P. (2017) 'Ecological theories of systems and contextual change in medical education', Medical Education, 51(2), pp. 1250-1259. https://doi.org/10.1111/medu.13406

Esteghamati, A., Baradaran, H., Monajemi, A., Khankeh, H., et al. (2016) 'Core components of clinical education: A qualitative study with attending physicians and their residents', Journal of Advanced Medical Education & Professionalism, 4(2), pp. 64-71. Available at https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4827758/(Accessed: 12 Dec 2018).
Fairbrother, M., Nicole, M., Blackford, J., Nagarajan, S., et al. (2016) 'A new model of clinical education to increase student placement availability: The capacity development facilitator model', Asia-Pacific Journal of Cooperative Education, 17(1), pp. 45-49. Available at https://files.eric.ed.gov/fulltext/EJ1114016.pdf (Accessed: 12 Dec 2018).

Finger, M. and Brand, S. (1999) 'The concept of the learning organization applied to the transformation of the public sector', in Easterby-Smith, M., Araujo, L. & Burgoyne. J. (eds) Organizational Learning and the Learning Organization. London: Sage. http://dx.doi.org/10.4135/9781446218297.n8

Flexner, A. (1910) Medical education in the United States and Canada. Available at http://archive.carnegiefoundation.org/pdfs/elibrary/Carnegie_Flexner_Report.pdf (Accessed: 12 Dec 2018).

Gill, P., Stewart, K., Treasure, E. and Chadwick, B. (2008) 'Methods of data collection in qualitative research: Interviews and focus groups', British Dental Journal, 204(6), pp. 291-295. https://doi.org/10.1038/bdj.2008.192

Gilmour, C., McIntyrea, M., McLellanda, G., Halla, H., et al. (2013) 'Exploring the impact of clinical placement models on undergraduate midwifery students', Women and Birth, 26(1), pp. e21-e25. https://doi.org/10.1016/j.wombi.2012.06.004

Graziano, S., McKenzie, M., Abbott, J., Buery-Joyner, S., et al. (2018) 'Barriers and strategies to engaging our community-based preceptors', Teaching and Learning in Medicine: International Journal, 30(4), pp. 444-450. https://doi.org/10.1080/10401334.2018.1444994

Gruppen, L., Irby, D., Durning, S. and Maggio, L. (2018) 'Interventions designed to improve the learning environment in the health professions: A scoping review', MedEdPublish, 7(3), pp. 73. https://doi.org/10.15694/mep.2018.0000211.1

Gurková, E., Žiaková, K., Vörösová, G., Kadučáková, H., et al. (2017) 'Validating the clinical learning environment and supervision and nurse teacher scale (CLES + T scale) in Slovakia', Kontakt, 20(1), pp. e3-e10. https://doi.org/10.1016/j.kontakt.2017.09.003

Gutierrez, C. and Scheid, P. (2002) The history of family medicine and its impact in the US health care delivery. https://www.aafpfoundation.org/content/dam/foundation/documents/who-we-are/cfhm/FImpactGutierrezScheid.pdf (Accessed: 12 Dec 2018).

Guze, P. (2015) 'Using technology to meet the challenges of medical education', Transactions of the American Clinical Climatological Association, 126, pp. 260-270. Available at https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4530721/ (Accessed: 12 Dec 2018).

Haggerty, J., Burge, F., Beaulieu, M., Pineault, R., et al. (2011) 'Validation of instruments to evaluate primary healthcare from the patient perspective: Overview of the method', Healthcare Policy, 7, pp. 31-46. Available at http://www.medsp.umontreal.ca/IRSPUM_DB/pdf/25357.pdf (Accessed: 12 Dec 2018).

Hunt, D., Milani, M. and Wilson, S. (2015) 'Dedicated education units: An innovative model for clinical education', American Nurse Today, 10(5). Available at https://www.americannursetoday.com/dedicated-education-units-innovative-model-clinical-education/ (Accessed: 12 Dec 2018).
Kamal-El Sayed, S. (2018) 'Using and combining learning theories in medical education', Medical Science Educator, 28(1), pp. 255-258. Available at https://link.springer.com/article/10.1007/s40670-017-0519-9 (Accessed: 12 Dec 2018).

Kelly, L., Walters, L. and Rosenthal, D. (2014) 'Community-based medical education: Is success a result of meaningful personal learning experiences?', Education for Health, 27(1), pp. 47-50. https://doi.org/10.4103/1357-6283.134311

Kofman, F. and Senge, P. (1993) 'Communities of commitment: The heart of learning organizations', Organizational Dynamics, 22(2), pp. 5-19. Available at https://bhavanalearninggroup.com/wp-content/uploads/communities-of-commitment.pdf (Accessed: 12 Dec 2018).

Kolb, D. (1984) Experiential learning: Experience as the source of learning and development. Englewood Cliffs (NJ): Prentice Hall. Available at https://learningfromexperience.com/downloads/research-library/experiential-learning-theory.pdf (Accessed: 12 Dec 2018).

Kolb, D., Boyatzis, R. and Mainemelis, C. (1999) 'Experiential learning theory: previous research and new directions', Perspective on Thinking, Learning, and Cognitive Styles, 1(8), pp. 227–47. https://doi.org/10.4324/9781410605986-9

Kosunen, E. (2008) Teaching a patient-centred approach and communication skills needs to be extended to clinical and postgraduate training: A challenge to general practice,' Scandanavian Journal of Primary Health Care, 26(1), pp. 1-2. https://doi.org/10.1080/02813430801906399

Lave, J. and Wenger, E. (1990) Situated Learning: Legitimate Peripheral Participation. Cambridge (UK): Cambridge University Press.

Lekkas, P., Larsen, T., Kumar, S., Karen, K., et al. (2007) 'No model of clinical education for physiotherapy students is superior to another: A systematic review', Australian Journal of Physiotherapy, 52, pp. 19–28. https://doi.org/10.1016/S0004-9514(07)70058-2

Leo, J., May, K. and Bird, A. (2014) 'Evaluation of a pilot model of clinical placement for expanding podiatry student capacity within a public hospital', MedEdPublish, 3(16), pp. 1-13. http://dx.doi.org/10.15694/mep.2014.003.0016

Mantazavinou, A., Gudapakkam, S., Ranger, B. and Olson, K. (2018) 'Health hackathons drive affordable medical technology innovation through community engagement', Technologies for Development, pp. 87-95. https://doi.org/10.1007/978-3-319-91068-0_8

Masic, I., Pandza, H., Toromanovic, S., Masic, F., et al. (2011) 'Information technologies (ITs) in medical education', Acta Informatica Medica, 19(3), pp. 161-167. https://doi.org/10.5455/aim.2011.19.161-167

McGaghie, W. (2015) 'Mastery learning: It is time for medical education to join the 21st century academic medicine', Academic Medicine, 90(11), pp. 1438-1441. https://doi.org/10.1097/ACM.0000000000000911
Miles, A., Elliott, J. and Caballero, F. (2015) 'Towards a person-centered medical education: Challenges and imperatives', *Educacion Medica*, 16(1), pp. 25-33. https://doi.org/10.1016/j.edumed.2015.05.001

Miller, A. and Archer, J. (2010) 'Impact of workplace based assessment on doctors’ education and performance: A systematic review', *British Medical Journal*, 341. https://doi.org/10.1136/bmj.c5064

Murray, E., Gruppen, L., Catton, P., Hays, R., *et al.* (2000) 'The accountability of clinical education and assessment', *Medical Education*, 34, pp. 871-879. Available at https://pdfs.semanticscholar.org/12a4/e02f2fbc3686723b034222d1380f3c84c949c.pdf (Accessed: 12 Dec 2018).

Niederhauser, V., Schoessler, M., Gubrud-Howe, P., Magnussen, L., *et al.* (2012) 'Creating innovative models of clinical nursing education', *Journal of Nursing Education*, 51(11), pp. 603-608. https://doi.org/10.3928/01484834-20121011-02

Nolinske, T. (1995) 'Multiple mentoring relationships facilitate learning during fieldwork', *American Journal of Occupational Therapy*, 49(1), pp. 39–44. http://dx.doi.org/10.5014/ajot.49.1.39

Öhman, E., Alinaghizadeh, H., Kaila, P., Hult, H., *et al.* (2016) 'Adaptation and validation of the instrument clinical learning environment and supervision for medical students in primary health care', *BMC Medical Education*, 16(308), pp. 1-8. https://doi.org/10.1186/s12909-016-0809-8

O’Keefe, M., Wade, V., McAllister, S., Stupans, L., *et al.* (2016) 'Improving management of student clinical placements: Insights from activity theory', *BMC Medical Education*, 16(1), pp. 219. https://doi.org/10.1186/s12909-016-0747-5

Olson, K., Walsh, M., Garg, P., Steel, A., *et al.* (2017) 'Health hackathons: Theatre or substance? A survey assessment of outcomes from healthcare-focused hackathons in three countries', *BMJ Innovation*, 3(1), pp. 37-44. https://doi.org/10.1136/bmjinnov-2016-000147

Pantelidis, P., Chorti, A., Papagiouvanni, I., Paparoidamis, G., *et al.* (2017) 'Virtual and augmented reality in medical education'. *Medical and Surgical Education*. https://doi.org/10.5772/intechopen.71963

Phillips, K. and Aktan, N. (2017) 'Clinical education and student satisfaction: An integrative literature review', *International Journal of Nursing Science*, 4(2), pp. 205-213. https://doi.org/10.1016/j.ijnss.2017.03.004

Pincavage, A., Rabia, R., Arora, V., Oyler, J., *et al.* (2013) 'Resident education in free clinics: An internal medicine continuity clinic experience', *Journal of Graduate Medical Education*, 5(2), pp. 327–331. https://doi.org/10.4300/JGME-D-12-00127.1

Rodger, S., Webb, G., Devitt, L., and Gilbert, J. (2008) 'A clinical education and practice placements in the allied health professions: An international perspective', *Journal of Allied Health*, 37(1), pp. 53-62. Available at https://www.ncbi.nlm.nih.gov/pubmed/18444440 (Accessed: 12 Dec 2018).

Rolleston, H. (1939) 'The history of clinical medicine (principally of clinical teaching) in the British Isles', *Proceedings of the Royal Society of Medicine*, 32(9), pp. 1185-1190. Available at https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1997910/?page=1 (Accessed: 12 Dec 2018).
Ryan, M., Leggio, L., Peltier, C., Chatterjee, A., et al. (2018) 'Recruitment and retention of community preceptors', *Pediatrics*, 142(3). Available at [http://pediatrics.aappublications.org/content/142/3/e20180673](http://pediatrics.aappublications.org/content/142/3/e20180673) (Accessed: 12 Dec 2018).

Salminen, H., Öhman, E. and Stenfors-Hayes, T. (2016) 'Medical students' feedback regarding their clinical learning environment in primary healthcare: a qualitative study', *BMC Medical Education*, 16(313). [https://doi.org/10.1186/s12909-016-0837-4](https://doi.org/10.1186/s12909-016-0837-4)

Salminen, H., Zary, N., Björklund, K., Toth-Pal, E., et al. (2014) 'Virtual patients in primary care: Developing a reusable model that fosters reflective practice and clinical reasoning', *Journal of Medical Internet Research*, 16(1), pp. e3. [https://doi.org/10.2196/jmir.2616](https://doi.org/10.2196/jmir.2616)

Schwartz, A. (2014) 'NP students and family medicine residents model the future of health care', *Science of Caring*. Available at [https://scienceofcaring.ucsf.edu/education/np-students-and-family-medicine-residents-model-future-health-care](https://scienceofcaring.ucsf.edu/education/np-students-and-family-medicine-residents-model-future-health-care) (Accessed: 12 Dec 2018).

Sevenhuysen, S., Skinner, E., Farliea, M., Raitmana, L., et al. (2014) 'Educators and students prefer traditional clinical education to a peer-assisted learning model, despite similar student performance outcomes: A randomised trial', *Australian Physiotherapy Association*, 60(4), pp. 209-216. [https://doi.org/10.1016/j.jphys.2014.09.004](https://doi.org/10.1016/j.jphys.2014.09.004)

Sevenhuysen, S. and Haines, T. (2011) 'The slave of duty: Why clinical educators across the continuum of care provide clinical education in physiotherapy', *Hong Kong Physiotherapy Journal*, 29(2), pp. 64-70. [https://doi.org/10.1016/j.hkpj.2011.06.002](https://doi.org/10.1016/j.hkpj.2011.06.002)

Sharma, N., Doherty, I., and Dong, C. (2017) 'Adaptive learning in medical education: The final piece of technology enhanced learning?', *Ulster Medical Journal*, 86(3), pp. 198-200. Available at [https://www.ncbi.nlm.nih.gov/pubmed/29581634](https://www.ncbi.nlm.nih.gov/pubmed/29581634) (Accessed: 12 Dec 2018).

Silver, J., Binder, D., Zubcevik, N. and Zafonte, R. (2016) 'Healthcare hackathons provide educational and innovation opportunities: A case study and best practice recommendations,' *Journal of Medical Systems*, 40, pp. 177. [https://doi.org/10.1007/s10916-016-0532-3](https://doi.org/10.1007/s10916-016-0532-3)

Smith, M. (2001, 2007) 'The learning organization: Principles, theories and practice', *The encyclopedia of informal education*. Available at [http://infed.org/mobi/the-learning-organization/](http://infed.org/mobi/the-learning-organization/) (Accessed: 12 Dec 2018).

Stewart, T. and Wubbena, Z. (2014) 'An overview of infusing service-learning in medical education', *International Journal of Medical Education*, 5, pp. 147-156. [https://doi.org/10.5116/ijme.53ae.c907](https://doi.org/10.5116/ijme.53ae.c907)

Teherani, A., Martimianakis, T., Stenfors-Hayes, T., Wadhwa, A., et al. (2015) 'Choosing a Qualitative Research Approach', *Journal of Graduate Medical Education*, 7(4), pp. 669-670. [https://doi.org/10.4300/JGME-D-15-00414.1](https://doi.org/10.4300/JGME-D-15-00414.1)

Tobin, G. and Begley, C. (2004) 'Methodological rigour within a qualitative framework', *Journal of Advanced Nursing*, 48, pp. 388–396. [https://doi.org/10.1111/j.1365-2648.2004.03207.x](https://doi.org/10.1111/j.1365-2648.2004.03207.x)

US Department of Health and Human Services. (2018) *Enhancing community-based clinical training sites: Challenges*
and opportunities. Available at https://www.hrsa.gov/sites/default/files/hrsa/advisory-committees/community-based-linkages/reports/sixteenth-2018.pdf (Accessed: 12 Dec 2018).

Vieira, J. (2008) 'The postgraduate hospital educational environment measure (PHEEM) questionnaire identifies quality of instruction as a key factor predicting academic achievement', Clinics, 63(6), pp. 741-746. https://doi.org/10.1590/S1807-59322008000600006

Yin, R. (2009) Case study research: Design and methods. 4th Ed. Thousand Oaks (CA): Sage Publications, Inc.

Yin, R. (2012) Applications of case study research. 3rd Ed. Thousand Oaks (CA): Sage Publications, Inc. Available at http://www.sagepub.com/sites/default/files/upm-binary/41407_1.pdf (Accessed: 12 Dec 2018).

Yusoff, M. (2012) 'The Dundee ready educational environment measure: A confirmatory factor analysis in a sample of Malaysian medical students', International Journal of Humanities and Social Science, 2(16). Available at http://www.ijhssnet.com/journals/Vol_2_No_16_Special_Issue_August_2012/33.pdf (Accessed: 12 Dec 2018).

Appendices
None.

Declarations
The author has declared that there are no conflicts of interest.

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Ethics Statement

This paper did not need ethics review as it is a literature review.

External Funding

This paper has not had any External Funding

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