

Chapter 14

Knowledge Networks in Nursing



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Abstract In line with the Nursing Now campaign discussed in Chap. 3 of this edition, we provide an update in this chapter and consider how Communities of Practice and associated action projects within the profession of nursing are evolving. We consider how established nursing networks are trying to adapt to the challenges posed by twenty-first century healthcare.

Underpinned by the core values and principles of the Nursing Now campaign, our goal within this knowledge network is to raise the profile and status of nursing worldwide.

Seeking support from the Fulbright Scholarship programme, the authors of this chapter have embraced an opportunity to advance our understanding of informatics in differing contexts and to learn from one another. Through dedicated Community of Practice action group, we discuss and demonstrate the value of direct and indi-

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rect activities explaining how we came to focus on advancing nursing into leadership positions and conducting purposeful research to demonstrate how nurses can have the greatest impact for delivery of Sustainable Development Goal (SDG) 3 by 2030.

Keywords Communities of practice · Digital Health · Knowledge networks in nursing · Health and social care · Education

Key Concepts

Communities of practice

Digital health

Knowledge networks in nursing

Health and social care

Learning Objectives for the Chapter

1. Understand the importance of the nursing contribution to eHealth and Digital Transformation.
2. Review in context this contribution through existing Communities of Practice and evolving new paradigms for collaboration such as Open Innovation 2.0 and Ecosystems in Health and Social Care.
3. Consider the importance of global collaboration through education and research and consider their impact in the context of the profession of nursing.

14.1 Introduction

Education is not the filling of a pail ... but the lighting of a fire. W B Yeats (Education is not the filling of a pail [2020](#))

As was the case in the fourth edition we continue to affirm that education is a catalyst for action and draw on the above quote from Yeats as a gentle reminder that this is the case. We do however consider that in some instances nursing is “stumbling” into practicing in a digital enabled society (see Chap. [16](#)), and for this reason we add an additional quote from Seamus Heaney’s Human Chain poem published in 2010. We believe the opening lines of this verse articulates well nursing engagement in digital health transformation. *Had I not been awake, I would have missed it* (Seamus Heaney [2020](#)). Nursing is preoccupied with daily operations of patient care delivery, and patient safety (see Chap. [9](#)), and so for many practitioners the transformation and impact of digital health has occurred in the background. This we believe needs to change. Policy analysts and health leaders are increasingly

recognising the untapped potential of nursing and the contribution the profession can make to optimise the impact of digital in health and social care. In this chapter, we provide pragmatic examples of where nursing is contributing to the design of systems through knowledge networks. We illustrate research which is actively shaping the development and implementation of eHealth and policy translation in practice. Selecting examples that have used differing approaches, we describe the tactical deliverables which have been realised through the emergence of new roles and nurses who have taken a path of action to address *the winds of change*. Described in Chap. 11 as wide in variety, nursing positions in informatics can vary in type from the unit-based “nurse super user” to “informatics nurse” or at the organizational executive level nurse executive position such as “Chief Nursing Informatics Officer” (CNIO).

Digital literacy has never been more in demand as national eHealth programmes seek to source new and innovative ways to support a decreasing skilled and aging workforce. We argue the case in this chapter that for advancing the profession of nursing leadership and focused purposeful research, new roles as described in Chap. 11 need to be accelerated and underpinned by targeted education further expanded upon in Chap. 15. This is our first principle: the core drivers of change are education underpinned by targeted informatics knowledge and skills. Such an approach can advance and broaden nursings’ adoption and use of digital within the context of health and social care. The State of the World’s Nursing Report 2020 from the WHO originally cited in Chap. 1 of this text, affirms that attention to leadership and digital competencies is now needed to support required nurse-led models of care and advanced practice roles, leveraging opportunities arising from digital health (World Health Organization 2020). Informed by the All-Party Parliamentary Group (APPG) report on global health, nursing will improve health, promote gender equality and support economic growth https://www.who.int/hrh/com-heeg/digital-APPG_triple-impact.pdf?ua=1. (All-Party Parliamentary Group on Global Health 2016).

The focus in this chapter is on ‘real life’ examples of how education and informatics skills are supporting nursing practitioners to become leaders, innovators and educators. It presents a brief summary of established Communities of Practice that are successfully evolving and other examples, which are new. These Communities of Practice are providing tactical deliverables and shaping future leaders within the domain of nursing informing industry and inter-professional teams. Section 14.2 provides a summary overview of the Communities of Practice core mission. It expands the notion of Communities of Practice to include how open Innovation 2.0 as an evolving new paradigm includes ecosystems and networks, which align well with the nursing informatics agenda. In Sect. 14.3, we revisit some examples of Communities of Practice from the fourth edition to demonstrate their progression since 2015. In Sect. 14.4, we introduce new initiatives and explain the importance of global networking.

14.2 Communities of Practice

Communities of Practice (COP) are increasingly demonstrating their effectiveness as educational frameworks. As an organic structure, COP present opportunities for informal knowledge exchange and development of social networks. Formally recognised by WHO as effective network and partnership activities, COP also afford a collaborative approach, which in the current economic downturn is pragmatic and purposeful. A core attribute of COP's is the use of tele networking and digital platforms for knowledge transfer and scholarship. Online webinars for example, can be used by nursing communities to come together to share expertise, experience and knowledge in both a synchronous and asynchronous manner. Examples of the Fulbright Scholars' COP featured later in this chapter, include virtual international classroom discussions on pertinent issues that nurses face across three countries: the U.S., Ireland and Saudi Arabia. This sharing of expertise offers a greater potential for knowledge exchange and cultivates innovation to address shared challenges in health and social care in contemporary society. There is a strong association between COP's and the Open Innovation 2.0 paradigm of ecosystems, particularly when it comes to digital innovation and new modes of care delivery (Curley and Salmelin 2018).

The World Health Organisation Strategic Directions Plan for Nursing and Midwifery for 2016–2020 stresses the importance of community partnerships (WHO 2020). Suggesting that they offer innovative approaches for the uptake and acceleration of new knowledge, COP's are demonstrating their effectiveness particularly as agents of change. Key features include their ability to advance teamwork with health care practitioners, increase health promotion efforts, enhance patient outcomes, and build capacity through knowledge exchange to treat disease and rehabilitation programmes (WHO 2020).

Advances in digital offer practitioners a vehicle to develop and sustain COP's and gradually such groups can act as an enabler for the delivery of education and skills training of nurses. Earlier chapters in this edition explained the progression of generations of computing and discussed how fifth generation computing initially introduced in the 1980's is now established within healthcare (see Chap. 2). Such advances in technology are shaping how we communicate, in particular considering how we can provide health and social care through various modes of delivery. Nurse education is no exception to this approach. Technology in education has moved beyond traditional didactic teaching modes to more established constructivist learning approaches (Hussey et al. 2020; Rodger and Hussey 2017). Whether you are dealing with patients or students, learning is increasingly becoming a participatory process to be conducted in partnerships with the participant. An activated participant believes their role is significant, has confidence and knowledge to act, and takes actions to incorporate change for success. A critical success factor that influences communities of practice development within the profession of nursing is the opportunity to co-construct and share knowledge in both formal and informal ways.



Fig. 14.1 Open Innovation 2.0 as an overarching paradigm for COP knowledge exchange. (Adapted from OI 2.0 Curley and Salmelin 2018)

New terms such as the Open Innovation 2.0 paradigm describe the impact of the global economic downturn and include the creation of health ecosystems, which can be linked in structure and form to COP. Common denominators between COP and ecosystems include the sharing of expertise and action to address current and priority health issues, such as Covid 19. Open Innovation 2.0 and ecosystems are identified as a core approach to underpin a new mode of technical and societal innovation that presents opportunities to industry, academia and government bodies to work together to achieve a more focused integrated collaboration. This approach involves co-creation, shared values and acceleration of ecosystems, which can unleash potential for solutions that are based on service improvements which are designed for sustainability. Figure 14.1 provides a summary illustration of Open Innovation 2.0 key attributes. The success of Open Innovation 2.0 in Asia has prompted the European Union Framework Programme for Research and Innovation 2021–2027 (Horizon Europe) to identify this paradigm as an important feature in future research agendas (WHO 2020), (European Commission 2020). Activities within Open Innovation 2.0 are strongly linked to COP and informatics research. Some examples include seeking core patterns that occur in a domain in health, for example transition of care, developing a shared purpose, an agreed plan for adoption and testing. In addition, the approach also endorses using agile production underpinned by data driven approaches. The EU considers such groups as coherent networks that can provide test beds for innovation and reduce risk in deployment of services therefore offering a better return on investment (European Commission 2020).

Focusing on the perspective of nursing engagement in COP's, there is an increasing realisation that action must be taken. The profession needs to contribute to the provision of robust structures to protect the citizens during deployment of health-care systems, which as a consequence of increasing fiscal costs and an increasing

and aging population, is under threat. Chapter 7 notes that nurses hold a unique function as they are the only healthcare professionals to interact with individuals, carers and families on a 24 hour, 7 days a week basis. When one considers the scale of skill hours and the overall projected costs of nursing skill mix within healthcare, it is reasonable to suggest that within this emerging health ecosystem nursing as a profession is potentially vulnerable and so too are recipients of health care.

In Sect. 14.3, we revisit some examples of COP from the fourth edition to demonstrate their progression since 2015. On review of the fourth edition it is encouraging to see that the existing COP's developed are evolving and in good shape continuing to progress. In Sect. 14.4, we introduce some new initiatives which have emerged from the existing COP's in Ireland the U.S. and Saudi Arabia which have been funded and are advancing global collaboration.

14.3 Communities of Practice Revisited from Fourth Edition

In the fourth edition of *An Introduction to Nursing Informatics*, we introduced a number of examples of COP's in Ireland. In this next edition, we revisit some of these networks and consider how they have progressed over the past five years. Table 14.1 provides a summary of the networks and provides an update on their development since then.

14.4 New Research Initiatives Influencing Knowledge Networks Through the Center for eIntegrated Care

Case 1: Nursing Engagement in Health Informatics System Development

Authors Dr Subhashis Das, Ms Anne Spencer and Dr Pamela Hussey

The EHR insight COP identified that there was at the time a pressing need at the European level to have interoperable models, which can provide mechanisms to access or provide EHR data within a distributed record system. Today in 2020, this need prevails and as a consequence a core mission of the CeIC research center is to advance eIntegrated care in order to improve health and wellbeing. The specifics of interoperability are expanded upon well in Chaps. 2, 5 and 6. Here we provide a concrete examples of how CeIC is advancing this agenda through knowledge networks using ontology in partnership with the Adapt Research Center Programme (The Adapt Research Center Ireland 2020). The term ontology in computer science can be described as a formal representation of knowledge by a set of concepts within a domain (in this case health and social care) and the relationships between those concepts. Here we provide a short summary of our work on ontology development, the purpose of which is to advance knowledge on health informatics standards for continuity of care. We also provide a second example of implementation research which responds to the Covid 19 epidemic in progress with our community partners.

Table 14.1 Summary of COP Progression 2015–2020

Network project name 2015	Current progress 2020	Comment and links
Partners CT COP this project focused on development of concepts and terminology for shared assessment tools using participatory action research methods.	The Partners COP has evolved to become a funded research center. An interdisciplinary team launched the Center for eIntegrated Care (CeIC) in 2017. At the time of writing this report there are 19 primary investigators who are researching various projects. Some examples of projects include investigating the use of digital smart devices in the home, creating care transition data catalogues and promoting the use of health informatics standards for terminology and information modelling services.	To review the work of the Center for eIntegrated Care please see the website https://www.dcu.ie/ceic (Hussey 2020). A summary of the work that directly relates to the partners CT project can be accessed from this link https://www.mdpi.com/2227-9709/6/3/37/htm (Hussey and McGlinn 2019)
Mental Health Trialogue This is a network established to promote and empower communities about mental health	Mental Health Trialogue Network continues to grow and has a dedicated website and associated Facebook page. There is also now a dedicated recovery college which provides an empowering and educational approach to mental health and wellbeing.	The link to the Mental Health Trialogue is available from https://trialogue.co/ (Mental Health Trialogue Ireland [Internet] 2020) The link to Dublin North Recovery College is http://recoverycollege.ie/ (The Recovery College Dublin North Ireland 2020)
Bone Health in the Park This is a community of practice led by Ms Daragh Rodger ANP in Dublin North Community Services	Bone Health in the ParCOP has progressed and offers a number of bone health promotion educational resources from the home landing page of the website which has been widely accessed (over 20,000 hits globally a year). The COP also won a national Irish Health Care Award in 2016.	The link is https://www.bonehealth.co/ (Bone Health in the Park 2020). Additional projects in Intellectual Disability Services relating to bone health are also available from www.happybones.ie (Happy Bones 2020)
EHR Insight This COP was devised in 2013 by academics across a number of institutions in Dublin	Today EHR Insight Community of practice has progressed to more formal engagement in Health Informatics Standards Development and individual funded research project. The focus remains the same to advance students understanding of electronic health records.	An example of the research that is currently in flight in this COP is discussed in Sect. 14.4 under research.

Example 1

An ontology for Continuity of Care

The Ontology of Continuity of care (ContSOnto) is an emerging research area consisting of the extension of a healthcare ontology to inform the continuity of care

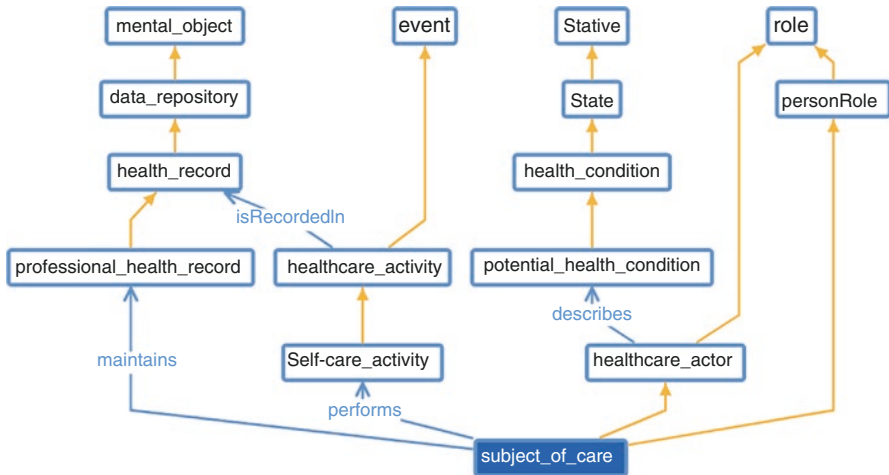


Fig. 14.2 Formal relationships in Webprotégé and ISO 13940 (Systems of concepts for continuity of care 2018)

domain. This field is positioned at the confluence of health informatics, nursing informatics, process modelling, and artificial intelligence.

This research relating to ContSOnto is underpinned by a health informatics standard ISO 13940 Systems of Concepts for Continuity of Care (Systems of concepts for continuity of care 2018). ContSOnto focuses on how information flows from different information systems across and between services for clinical applications and health care professionals to use. Figure 14.2 provides an illustration of how the different classes and relationships in the standard are represented. Subject of care refers to the individual service user and health care actor which can be human or non-human, for example, a health care professional or an organisation.

Example 2

Covid 19 Planning and deployment of Higher Care Area using Technology

The second exemplar we wish to demonstrate is in response to the Covid 19 pandemic and links to ontology development work discussed above and in flight in CeIC. A short description of the clinical issues faced by nursing teams is expanded upon.

COVID 19 as a virus has gripped the world population to reach a Global pandemic status by March 2020. European data has shown older persons, and marginalised groups such as those for example with chronic conditions and an intellectual disability are the most vulnerable populations in terms of impact and mortality. In particular, there are many challenges facing service providers caring for people with an intellectual disability in community residential houses, the reality being faced is that health care resources are finite and the impact of how this virus may impact upon an individual's physical and mental health is still unknown. Many service users have complex pre-existing physical conditions and behavioural problems, which add to the care challenges faced in respect of diagnosing and subsequently

caring for them. To pre-empt some of the issues, we are looking to be proactive in two key ways firstly by transforming one of the day service centres into a designated 'higher care area' purposefully designed and managed by their own care team. The aim is to care for service users who are not able to self-isolate or who are displaying symptoms / confirmed as having Covid19. Where possible, the aim is to care for service users in their own home but this may not be achievable for numerous reasons. A diagrammatic overview of the design is available below in Fig. 14.3. Secondly, based on the defined needs and requirements of our partner services, we are now building an ontological conceptual model through which we are able to explicitly connect who are the healthcare actors (i.e. carer, healthcare professional or healthcare organization) collecting, observing and analysing data on which a subject of care i.e. service user and mobile app can collect real time clinical information from the observation of the service users in a timely evidence based and robust manner. One example will take the form of an early warning system. The impact of this initiative will be to assist with clinical decision making and flag service users whose physiological status is changing. This approach in essence leaves the IoT (inanimate entities) to record observations of service users and support medical and nursing practitioner's clinical decision making in a timely way.

Case 2: International Collaboration: Nursing Engagement in Health Informatics in Ireland

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This exemplar outlines the abilities of a scholarship team as a community of practice to advance and share nursing knowledge between countries. A scholarship team is defined in this context as a network of scholars coming together, either in person or virtually with technology, sharing expertise for a common purpose, to promote scholarly work to advance the nursing profession. Communities of practice can be expanded globally with the use of technology and can impact the local and global context. Our scholarship team developed a unique approach to international work via a group process with the support of the Fulbright Scholarship Program, to promote advanced nursing practice education in Ireland. This exemplar community of practice includes a network of scholars from Grand Valley State University (GVSU), University of Detroit Mercy (UDM), George Washington University (GWU) in the U.S. and Dublin City University (DCU) in Ireland. The team used digital technology to conduct meetings and connect colleagues across the world. Dr. Dianne Conrad and Dr. Rosanne Burson were awarded Fulbright Scholarships to Ireland for academic year 2019–2020, assisted by this international scholarship team.

The scholarship team model consists of core components to assure that the community of practice thrives and includes members who:

- (a) use a relationship-based approach,
- (b) intentionally select a diverse group of team members who contribute their unique talents and perspectives,
- (c) trust each other,
- (d) have willingness to embrace critique,
- (e) have a desire to develop a work environment that focuses on systems-level thinking, innovation, and synergy, and

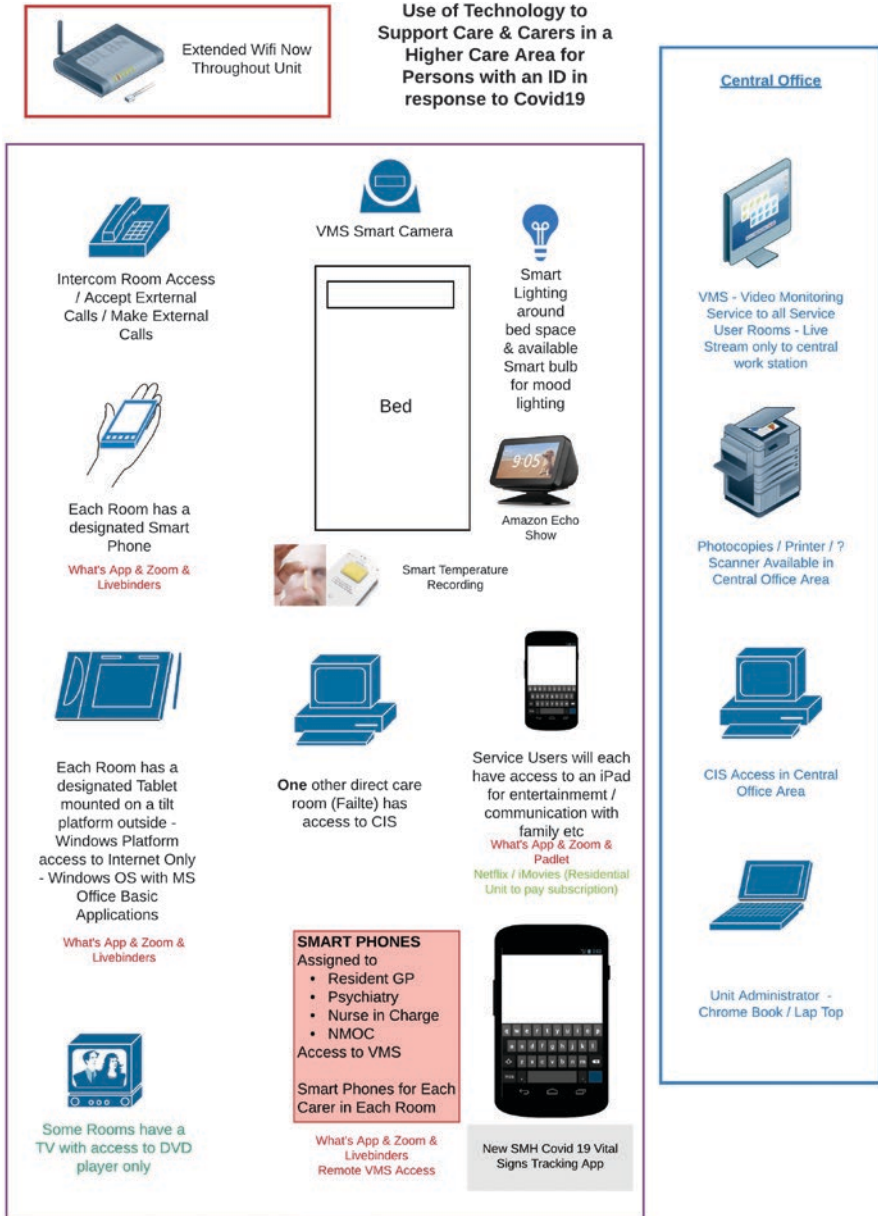


Fig. 14.3 Covid 19 higher care area overview



Fig. 14.4 Scholarship team components

(f) prioritize protected time for intra- interprofessional collaboration. (See Fig. 14.4, Scholarship Team Components)

By addressing the critical components identified within this model, one can reasonably expect to *experience high-quality, consistent scholarly output that collaboratively addresses the complexities of healthcare delivery*.

The scholarship team is *relationship-based* with an emphasis on shared, intentional communication to enhance the connection between team members. There is a sense of support that permeates the team. All members are focused on optimal results as a team, rather than the success of the individual. With this attitude in mind, all work critiques are honest, thoughtful, and non-political. Each individual is valued for their contributions and their particular view and expertise. Over time, this approach creates an environment of *trust* that continues to build and deepen,

allowing team members to have a *willingness to embrace critique* to grow personally and professionally.

An important component of the scholarship team is that it is *intentionally formed*, with a *diverse group of team members who contribute their unique talents and varied perspectives*. By utilizing team members with different experiences and strengths, the group creates a very wide lens to view each topic of scholarship. For example, our core team incorporates the views of an executive, clinical nurse specialist, and nurse practitioner, as well as academics and informatics experts to incorporate various aspects of advanced nursing practice. In addition, each team member has personal writing and presenting strengths that contribute to the team as a whole. The team is semi-permeable, meaning that team members work together depending on the project and opportunity at hand. For some projects, only two members of the core team are required; members choose to participate based on availability, topic interest, or other needs. At times, project support is required where additional members with certain intra or interprofessional expertise are added to the team for specific contributions. For example, certain projects require team members with content expertise in finance or statistics; their experience and interest bring strength to the final product. Feedback from these additional team members have demonstrated understanding, excitement and appreciation of the collaborative scholarship team approach.

A scholarship team comes together with planned, periodic meetings, virtually with technology or in-person, with the unique need to engage in scholarship within the context of practice. The team generates and disseminates scholarship work—through presentations, publishing, and other scholarly work in practice. A team approach to the dissemination and publication of scholarly work can enhance productivity by allowing team members with unique expertise to collectively contribute (Tschannen et al. 2014).

The fertile *relationship-based team creates an environment that invites innovation and synergy*. Ideas bud and develop within team conversations and the writing process that contributes to the final product in a way that creates more impact than any individual contribution. There is an excitement and an energy that is released as the team interacts and creates new ideas. The collaboration required in these sessions further builds both the quality of the product and feeds the team relationship.

The intentional work within a scholarship team results in a very high quality and consistent level of scholarship output. Our team has noted that the individual tends to experience an ebb and flow to work output that can lead to a variability in scholarly product output. The ebb and flow phenomenon can be attributed to environmental factors, such as other work and family responsibilities or personal factors, such as fatigue and motivation. The scholarship team approach accommodates for these naturally occurring inconsistencies in scholarly output experienced by the individual. For example, team members share the workload by taking the lead on projects on a rotational basis. This occurs in both planned and unplanned situations. The lead team member initiates the development of the product and is responsible for dissemination activities. The team meets periodically *with planned, protected time for*

collaboration to assess needs and direction of topics for presentation, writing, and consultation and sets timetables for review and team input. In this way, each team member contributes to the development of the project. A variety of methods are used to edit and further refine work, such as a round-robin approach to review a presentation or manuscript prior to submission. The goal is to continue the high output of the group, with each individual contributing to their highest level of ability at the time.

The scholarship team composed of *intra and interprofessional members has the potential to impact not only the profession of nursing but improve healthcare delivery of organizations with innovations that facilitate timely translation of evidence to practice*. Moreover, the scholarship team can impact the Quadruple Aim (Bodenheimer and Sinsky 2014) goals of improving the patient experience of care, improving the health of populations, reducing the per capita cost of health care, and optimizing the clinician experience, by supporting team members in their efforts to improve evidence-based healthcare delivery. The scholarship team evolves the singular and perhaps lonely act of scholarly activities, such as writing, into an exciting, interactive, and collegial experience that positively impact academia and practice. Teams need to use ‘overall big picture’ thinking that incorporates the needs of the system and individual patient. The healthcare environment of today requires a diverse scholarship team that can collaboratively address the complexities of healthcare delivery.

Technology has opened up an opportunity to network and collaborate with just a touch of a digital link. Use of these digital tools increases the reach in academia, practice and education. For example, our team began with monthly digital meetings to discuss global health. The team included colleagues from two universities in Michigan (GVSU and UDM), one in Washington, DC (GW), and another in Ireland (DCU) and Saudi Arabia. The group developed a mission statement and purpose to stay focused in our discussions. Review of the current evidence around the need for health system change and population health ensued. As time evolved, an understanding of the similarities and differences in healthcare delivery and graduate nursing education between the USA and Ireland emerged as a topic of interest.

The scholarship team members provided a network of contacts internationally, which facilitated a request for a letter of support from Dr. Pamela Hussey at Centre for eIntegrated Care (CeIC) at DCU. The group identified two members who had the time-based ability to function on the ground in Ireland through a sabbatical leave of absence from their roles in academia. It was determined that the two members would apply for a sabbatical and work together consecutively. One member started in Fall of 2019 and second member continued the work in the Winter 2020. Both members participated in project progress through the entire experience. This occurred via participation in DCU team meetings and developmental work through digital meetings that occurred irrespective of who was physically present in Ireland. Monthly Global Scholarship Team meetings continued with the aid of digital technology to keep the team informed and solicit input of team members on activities. For example, the team reviewed institutional review board (IRB) documentation, as

well as abstracts and literature review progress from the graduate assistant student who was brought into the group to learn from the experience of international scholarship work.

Both sabbatical participants were able to secure Fulbright Scholarship grants to support the sabbatical work. Shortly after World War II, U. S. Senator J. William Fulbright sponsored the legislation that laid the foundation for the Fulbright Program. The Fulbright basic objective is *to promote mutual understanding between the people of the United States and the people of other countries. Senator Fulbright believed that, through educational exchange, people would better understand citizens and cultures of other nations.* Fulbright scholarships are competitive individual applications. Within this endeavour, the sabbatical members of the team applied individually, but included objectives in their applications that built on each other's proposed work and highlighted the team approach. Through Fulbright support, both team members were able to implement the plan as envisioned (Fulbright 1. US Awards 2020).

The use of the digital environment was extensively used during the implementation phase. The global team was tapped for input on an IRB application related to the environmental assessment of practitioners, academics, and policy experts in Ireland. Additionally, virtual classroom education sessions, linking graduate nursing students from Ireland and the U.S. were accomplished. Global experiences for students will be a sustainable opportunity through the use of digital environments. Finally, after assessing policy makers in Ireland's needs to promote nursing informatics, a project was initiated to develop informatics competencies with the Health Service Executive of Ireland and a national leadership team. This work was accomplished through the aid of the virtual environment to produce scholarly output and enlist the continued support of the scholarship team members.

During the second half of the sabbatical experience, the Coronavirus (COVID-19) pandemic evolved and affected the ability to remain as visiting scholars to Ireland. However, because of digital capabilities that had been developed previously, the team was able to continue with the planned projects. This included presentations in the classroom to students, work on informatics competencies, and ongoing relationship development for future nursing scholarship opportunities.

This exemplar identifies the strengths of working together, even over distances, and through unforeseen difficulties, to maintain relationships, continue projects and develop new potentials for nursing, patients and healthcare utilizing digital tools and technology. In this way, global communities of practice with a focused agenda and scholarship team-based structure can assist in the delivery of progressing the nursing profession and improve healthcare delivery.

Case 3: Nursing Informatics and Progression of Nursing Informatics Skills in an ANP Programme in Saudi Arabia

Authors Dr Catherine Corrigan and Dr Pamela Hussey

In 2017, Dublin City University in collaboration with Princess Nourah Bint Abdul Rahman University in Saudi Arabia implemented a post graduate programme of study for Nursing in a public women's university located in Riyadh, the capital of

Saudi Arabia (Princess Nourah 2020). Princess Nourah Bint Abdul Rahman University is the largest women's university in the world. The university registered 38 students in the first cohort that graduated in the Autumn of 2019. A key focus for the educational programme was to educate women to become advanced nurse practitioners.

Fast-paced changes in the cultural, economic and political arenas are occurring in Saudi Arabia. This movement can be greatly attributed to the *2030 Saudi Vision* that has the overarching goal for the country to be an 'exemplary and leading nation' (Saudi Vision 2030). *The National Transformation Program* that is part of the *Saudi Vision 2030* has 'transforming healthcare' as its first goal. This led to a critical focus on the education of healthcare workers and aligns with Sustainable Health Goal No. 4 *Quality Education* (United Nations Sustainable Development Goals). This applies to Saudi nursing nationals in particular, who currently occupy 50% of the nursing workforce (Alboliteeh et al. 2017). The opportunity to expand the nursing profession to the advanced practice level in collaboration with the largest women's university in the world presented itself.

Assessing the service need in the community is paramount to align the meaningful contribution of advanced practice nursing education. The impetus for introducing an advanced nursing practice programme was to progress primary care that is currently used principally for screening and immunizations. The advanced practice nursing program is a broad-based knowledge curriculum that equips nurses to practice in the community—identified as one of the key areas most in need of healthcare improvement in Saudi Arabia. Secondly, Saudi nurses who are relatively inexperienced and with variable levels of education (Alboliteeh et al. 2017), were in need of clinical leaders equipped with the knowledge, skills and attitudes necessary to engage in leadership activities such as process improvement initiatives, policy change and research. Additionally, nurse leaders are required to work with multiple stakeholders to include those who struggle with change (O'Rourke and Higuchi 2016).

Nursing in some cases is not viewed positively in Saudi Arabia because of gender desegregation, family and cultural values (ALYami and Watson 2014). Although somewhat aware of the challenging landscape, nursing academics ventured to Saudi Arabia from Ireland to begin the advanced practice nursing programme—the first of its kind in the country. Programme competencies and clinical hours aligned with international nurse practitioner standards affording graduates eligibility to apply for registration in other countries. Although the advanced nursing practice concept is spreading globally, it is still relatively new. Programme delivery was unique in that there is not an abundance of doctorate prepared, female, advanced practice nurses with academic experience (required attributes) in the world, available to travel to and reside for defined periods in Saudi Arabia. Nevertheless, with an understanding that 'flexibility is key' a team of highly experienced academics, most of them practicing nurse practitioners, was created to deliver the programme.

Face-to-face is the prescribed method of delivery of education in Saudi Arabia, which meant that intense delivery of modules over a three-week period was warranted. Students were financially supported to take off work for the entire 2-year

duration of the programme enabling them to focus solely on their scholarly obligations. On the ground personnel included Dublin City University faculty that taught modules and managed the clinical component (two 9-week long modules) in collaboration with the local university. Additionally, adjunct professors that included doctoral prepared advanced practice nurses from Ireland and America flew to Saudi Arabia for intense delivery of modules. Obtaining clinical preceptors was particularly challenging because of the lack of understanding of the role of advanced practice nurses amongst the nursing and medical professionals as well as other members of the interdisciplinary team. We sought out clinical partner organizations with an interest in participating and being part of the student experience and instructed the students to request to join healthcare teams during rounds and ask questions. Their presence was quickly noticed, and physicians began to facilitate a variety of learning experiences for the students.

Although face-to-face was the preferred method of delivery with the majority of instructors flying in from the US to deliver content, information technology was incorporated into the programme. Remote communication included a presentation by the Librarian at the university in Ireland and a team member graded remotely from New York. Some students completed clinical hours in a 'digital hospital' that was entirely paper free and the government in Saudi Arabia is emphasising the need to incorporate information technology to the healthcare sector (Al Kuwaiti et al. 2018). In addition, student proposals were supervised remotely by a team of doctorally prepared advanced practice nurses. This adjunct faculty worked completely online with the students from their home countries. Student proposals were developed using digital tools that included the Google Classroom, and a digital platform to facilitate teleconference meetings to discuss progress. The student shared the written proposal on a Google Document where the supervisor could then review and make comments prior to meeting through teleconference meetings. In this way, communication was enhanced and students developed their proposals with significant verbal and written guidance. These factors and the recent Coronavirus pandemic forced a decision to convert the programme (except for clinical evaluations) to an online format in the spring of 2020. The programme team also identified the need for an *Informatics in eHealth* module to be incorporated into the future delivery of the programme. Telehealth was a particular interest of one of the students who expressed a need to improve the health and well-being of people living in remote areas in the desert along the Yemen border. The student joined with a Global Team from the U.S. to discover the possibilities for her innovative plan that aligns with the Sustainable Development Goal No. 3 *Good Health and Well-Being* (United Nations Sustainable Development Goals).

The Arab world is lagging in nursing education; nevertheless, there is an obvious starvation for knowledge to positively impact health outcomes. Despite the many challenges, the programme has survived and is thriving; albeit within a steep learning curve while both cultures strived to understand each other and deliver a rigorous programme that upheld best international standards. The rewards to date have been great as faculty staff see the motivation inspired by the female students who expressed feelings of empowerment with knowledge gained; not only from an

academic perspective, but personally and professionally as well. Over time we believe that graduates of the programme will positively impact on health outcomes within the country.

Navigating unknown waters requires some knowledge of support systems, for instance fiscal support; certain personality traits; flexibility, and a willingness to become culturally aware within a predominately male-orientated society. Transformational leadership can be applied to primary care setting; it has the potential to motivate Nurse Practitioners (NPs), and promote NP practice to achieve the collective purpose of ensuring better care for patients and improved health outcomes (Poghosyan and Bernhardt 2018).

Advanced practice nurses are positively effective from patient care to policy change, as the drive toward population health initiatives evolves. In a vision for the future, the advanced practice nurse working in Saudi Arabia will have the attributes to function as change agents with a solution-orientated approach, especially within the community care setting where they will be equipped to develop new models of care, using digital tools (Nursing Now 2020) to meet the service needs of local and national populations with the support of a globally dedicated community of practice group.

14.5 Conclusion

Nursing and its future use of technology within the scope of healthcare delivery needs to be managed carefully and strong leadership is now required. The WHO State of the World's Nursing Report 2020 (World Health Organization 2020), emphasizes the importance of nursing education regarding both leadership and digital competencies to promote the improved quality of healthcare delivery worldwide. In this edition Chaps. 3, 11, and 15 identify the importance of education on informatics, and the training of nurses on *digital literacy and leadership skills*. Delivery of such skills and understanding their value will enable nurses to protect not only the profession of nursing, but also the health Ecosystem that is increasingly under threat and the individuals who use this ecosystem. Much is written reporting nurses as knowledge workers in eHealth care who through a process of assimilation convert data to information—information to knowledge and with experience, convert knowledge in context to progress the profession (Matney et al. 2010). By considering health as an ecosystem and embracing Open Innovation 2.0 methods, it offers the profession of nursing opportunities to innovate and provide new ways of working in a digital enabled health care setting.

Education, particularly in nursing informatics is a key requirement and should underpin all undergraduate and postgraduate programmes. It is however critical that the impact of educated nurses is seen and recognised in the wider context. Forming knowledge networks in nursing, utilizing leadership and digital tools, enable communities of practice with teams of nurses not only to deliver high quality, evidence-based care, but also generate timely, practice-based knowledge to promote the profession of nursing. We finish this chapter on a cautionary note revisiting the

poem by Seamus Heaney from the beginning of the chapter which the authors consider holds an important message for the profession at this time.

Had I not been awake I would have missed it,
 It came and went too unexpectedly
 And almost it seemed dangerously,
 Hurling like an animal to the house,
 A courier blast that there and then
 Lapsed ordinary. But not ever after.
 And not now. (Seamus Heaney 2020)

Questions

1. Discuss the role of the COP in the accelerating service improvements for technology adoption in Health and Social Care.
2. Do you think the feature of the Open Innovation 2.0 paradigm and COP are aligned? Discuss the key features on where there is overlap between them?
3. Learning activity—Select one of the COP websites listed in Table 14.1. After reviewing the resources on this website, consider how you would create a community of practice within your own practice domain. Identify the topic what resources you would need and who you would ask to join your knowledge network.

Answers

1. The role of COP primarily offers an opportunity for knowledge exchange and the sharing of innovative solutions through collaboration and team work. COP's provide a pragmatic and purposeful approach using tele networking and digital platforms for knowledge transfer and scholarship. Online webinars for example, can be used by nursing communities to come together to share expertise, experience and knowledge in both a synchronous and asynchronous manner.
2. Yes, Open Innovation 2.0 and COP are primarily focused on knowledge exchange team work and innovation. Innovation 2.0 is particularly suited as a paradigm to underpin digital and data driven solutions underpinned by a developed Ecosystem that includes both industry academia and government agencies.

Glossary

ANP Advanced Nurse Practitioner

APPG All-Party Parliamentary Group

Asynchronous A term used in association with communication online the term refers to data which is transmitted intermittently rather than in a simultaneously in real time

Community of Practice An informal network of individuals who share a concern or passion for something and who usually need to advance their own knowledge, experience and skills with each other

ContSonto A research initiative engaged in the development of an Ontology of Continuity of care based on an ISO Standard ISO 13940 Systems of Concepts for Continuity of Care

DNP Doctorate of Nursing Practice

Enabling technologies Equipment or method that allows the user to combine or use stand alone technologies to enhance performance and capabilities

OI 2.0 Open Innovation 2.0, a core approach to underpin a new mode of technical and societal innovation that presents opportunities to industry, academia and government bodies to work together to achieve a more focused integrated collaboration

PAHO Pan American Health Organization

Synchronous A term used in association with communication online the term refers to data which is transmitted in real time simultaneously

Trialogue A dialogue or meeting between three people or groups

Web 2.0 The second stage of development of the Internet, includes the migration from static web pages to dynamic or user-generated content and the growth of social networking.

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