'The Perceived impact of Technology Enhanced Learning (TEL) across a new pre-registration nursing curriculum'

Prof Catherine Hayes
Professor of Health Professions Pedagogy and Scholarship, University of Sunderland, UK
Dr Yitka Graham
Associate Professor of NHS and Health Services Engagement, University of Sunderland, UK

Abstract

The construction and labelling of a relatively disparate set of university information technology systems as the "Nurse Navigator System" were routed in the principles of broader design research where methodologies of teaching, learning, and assessment were used to drive educational innovation within and between clinical and academic teaching. In terms of pragmatic design and appearance, this was straightforward; however, the theoretical basis of the design was more complex and rooted in core pedagogic design principles. Responding to the outcome of the initial evaluation of the system was therefore critical in the iterative developmental design of the Nurse Navigator System. Evaluation necessitated the collation of data which could tangibly and qualitatively examine whether expectations of such a conglomerate set of information technology criteria were realistic in practice. This pilot period of adjustment was recognized as a time to allow for configuring, fine-tuning, and assessment of purposefulness to the student cohort using it and in keeping with the need to co-construct learning and resource needs of students in practice. Evaluating the effectiveness of the preliminary pedagogic design of the Nurse Navigator System necessitated reliable indicators of engagement and learning. This research methods case study provides an overview of the qualitative evaluation of the impact of the new Nurse Navigator System using anecdote circles as an alternative to Focus Groups.

Introduction

Responses to educational reform have meant that in terms of the future potential employability of students, there has been a corresponding rise in needs-led curriculum design and new and innovative pedagogic approaches in digital interactivity in U.K. Higher Education (HE) (Tsiotakis & Jimoyiannis, 2016). The new BSc (Hons) in Adult Nursing Practice at the University of Sunderland was designed in partnership with stakeholders from regional trusts, patient care and public involvement representatives, and academic staff with a resultant mission statement of "Education Transforming Care." The aim of developing a digital navigator system was a threefold means of

- Using technology and strategic pedagogic design to simultaneously drive human relationships at the heart of both the patient and student experience;
- Driving an integrated curriculum;
- Maximizing the potential of student nurses to simultaneously be functionally competent and authentic in their provision of care and workforce ready on completion of their studies at the university.

Background Literature

Alongside critiques of HE curricula in relation to their relative complexity, the identification of the critical level, timing, collaboration, and interaction among academic and clinical staff and their students has become increasingly important (Duncan-Howell, 2010). The BSc (Hons) Adult Nursing Practice program was an opportunity to drive authenticity and flexibility in education through the use of the extant operational virtual learning environment (VLE) platforms and learning technology of the institution. It also, most importantly, was an opportunity to personalize opportunities for educators across the program to interact and communicate with one another while in different contextual settings and bases (Chieu & Herbst, 2016). The program was also designed to integrate the co-construction of knowledge from initial evaluation of the program and fostering and advocating social interaction between students, their peers, their clinical educators, and academics (Yen et al., 2012).

Relationships and patterns between points of interactivity online provide an insight into behavioural activity and level of engagement, highlighting the characteristics and the potential for limitation of student online learning activity (Lee & Bonk, 2016).

Strategically, the design of the navigator system focused on three key areas:

1. Learner/people interactivity: the potential for academic staff, students, and clinical mentors and link tutors using the system to communicate and interact with one another regardless of the context of nurse educational provision (clinical or academic);

2. Learner interface: the devices and computer programs that enable processes of interactivity;

3. Learner content: the interaction that takes place between the student and the VLE content of relevance to clinical or academic learning.

Embedding the opportunity for ongoing evaluation and the co-construction of new knowledge with students/academics and clinicians was a priority in the pilot implementation of this project.

Philosophical Backdrop

Social constructivism provides a philosophical backdrop for curricula that shapes and values individuals. In relation to the vision and strategy underpinning U.K. HE provision, the University of Sunderland has a civic responsibility anchored by the human experience rather than one which provides a student education in abstraction from it. As mentioned earlier in the case study, we were keen to implement a mechanism of evaluation that was authentic and reflected the overall ethos of the program in engaging with people, whose work would be at the forefront of patient care. Accompanying this is Weber's assertion that we are "cultural beings" and in this sense the graduates we produce for societal engagement and impact in health care provision lend the world their significance (Bruun, 2016). Perhaps the greatest lesson others might learn from our research is the need to consider the concept of authenticity and to ensure that by claiming to be authentic this is not just a tokenistic form of lip service, which is evident upon dissemination and sharing of their findings. It is also an extremely

pragmatic approach when researchers know their participants because it adds a degree of transparency to the methods being adopted.

Curriculum Design Principles

In keeping with the social constructivist philosophy of an integrated curriculum, the BSc (Hons) Adult Nursing Practice program engenders processes of enculturation into a very specific community of practice that is, nursing. The ethos of this approach stemmed from the co-construction of a curriculum that necessitated it to be content-specific in relation to professional regulation by the Nursing and Midwifery Council (NMC) yet is driven by learning objectives rooted in end what ought to characterize professional practice. This stemmed from its central vision of "Education Transforming Care." This co-construction was the product of a wide-scale scoping exercise with patient carer and public involvement representatives, program stakeholders from regional NHS Trusts, and academic staff. This process involved embedding affective domain learning across all of the constituent modules of the academic program.

Vygotsky's (1978) philosophy and metaphorical "scaffolding" of learning from this permitted a control in the deliverable phasing of developmental progression through the program in which the opportunity to develop and shape culture was also an acknowledged reality. Cultural dependence also had to be shaped between clinical and academic practice, yet situate the student and person-centered experience within it.

At this stage of developing the Nurse Navigator System, it was acknowledged that a social constructivist curriculum

- Contextualizes and frames individual beliefs and values in the context of social situations.
- Focuses on the situated context of knowledge construction. The relative authenticity of the learning context affects students' capacity to engage and transfer acquired knowledge to new settings.
- Ensures focused activities that provide an opportunity for individuals to construct their understanding of reality and roots this in the social process of education.
- Integrates and triangulates authentic assessment processes in relation to the relative progression of cognitive, psychomotor, and affective development.
- Is characterized by critical reflective practice and ongoing processes of reflexivity.
- Is dependent on the effective facilitation of academic and clinical teaching staff, and in this respect, it acknowledges the pedagogic expertise of the facilitator in relation to the content-specific expertise necessary to support students' capacity to learn. The provision of available resources linked to prior knowledge is pivotal to academic development.
- Necessitates access to an IT and traditionally equipped learning environment with access to information retrieval resources and, where appropriate, situated or experiential learning that can support active learning.

- Necessitates the inclusive, co-construction, and collaborative construction of knowledge which can be internalized at an individual level. It embeds an ethos of value and respect, which is embodied in activity, characterized by co-operation, and demands a proactive approach and an ongoing commitment to deep learning.

- Permits the representation of knowledge from an unlimited range of resources and in which the cultural situation or context of that knowledge is significant to the articulation of it.

The construction and labelling of a relatively disparate set of university IT systems (the VLE, E-Portfolios, and Padlet) collectively as the "Nurse Navigator System" were routed in the principles of broader design research where methodologies of teaching, learning, and assessment were used to drive educational innovation within and between clinical and academic teaching. In terms of pragmatic design and appearance, this was relatively straightforward and the process was undertaken by an associate tutor, employed specifically for this purpose.

Research Design and Methodology

The focus of the overarching research methodology was to shape the pedagogic research in this evaluation to provide actionable outputs. Curriculum design of the BSc (Hons) Adult Nursing Practice program was complex and multifaceted. It involved the construction of domain-specific and domain-collective teaching and learning activities. This system of delivery was ensured to be driven by an assessment process which was in turn triangulated by a Practice Assessment Document across all program domains of learning across psychomotor, cognitive, and affective domains. This design involved changeable variables such as people (patient carer public involvement representatives, NHS Stakeholders, and academic staff), infrastructures, processes, policies, professional regulation, and environmental constraints. In adopting Design Research as an overarching methodological approach for this study, there was an increased likelihood of being able to apply the phenomena of complex curriculum justification, design, and development to an observable context. In its rawest form, this was a pragmatic and relatively atheoretical approach, nevertheless underpinned by robust mixed-methods framework. The project was acknowledged and developed as a very small-scale study of the initial BSc (Hons) cohort. As such, no claim of generalisability is made from the study to a wider context. The methodological approach adopted was selected for two main reasons:

1. The approach offered the highest degrees of procedural trustworthiness and authenticity in relation to the data collected in both phases of the research.

2. In comparison with observational and longitudinal studies, it offered a very practical and straightforward means of data collection and analysis in the context of an initial pilot study.

Method

The word anecdote (certainly within the context of qualitative research) can often be associated with research that has no scientific underpinning or capacity for analysis, beyond hearsay. However, we adopted methods, which emphasized the authenticity of the data we were collecting but at the same time ensured its analytical integrity and

worth as a robust piece of qualitative research. A theoretical framework was something we were convinced would provide us with this degree of integrity, as outlined below.

Research Phase 1

Students of the BSc (Hons) Adult Nursing Practice program in the Faculty of Health Sciences and Wellbeing were recruited purposively to the investigation. This sampling technique was adopted on the basis that students undertaking this specific program were experienced to answer questions about the initial piloting of the Nurse Navigator System. The process of participation was entirely voluntary and students were invited to participate via invitation. The sample was made up of 21 students entering Semester 2 of their studies in the academic year 2016-2017. The study was cross-sectional and descriptive in design, with data collected via a specifically adapted version of the Clinical Learning Environment Inventory (CLEI), which was adapted to capture student perceptions of the usefulness of the Nurse navigator System to their potential employability in the context of nursing practice (Moos, 1980). The adaptations captured student perceptions about the extent to which the Nurse Navigator System prepared students in terms of graduate employability. The questionnaire consisted of 29 questions which asked students to respond with an opinion as to whether they agreed with the level to which they agreed or disagreed with core statements of their use of the system. These values were correlated with the dimensions seminally outlined by Moos (1980) and mapped against 15 core skills in relation to:

- Individualisation—the degree of autonomous practice that the Nurse Navigator affords students in their everyday student experience;

- Innovation—the degree to which new approaches to learning technologies can be implemented;

- Involvement—how much students actually use the Nurse Navigator to contribute to their studies across the BSc (Hons) Adult Nursing Practice program;

- Personalisation—how much of an opportunity each student is afforded in individualizing their Nurse Navigator experience;

- Task Orientation—how clear and well organized learning and teaching resources are across the Nurse Navigator System;

- Satisfaction—the degree to which personal and professional development has taken place as a result of using the Nurse Navigator System.

The 15 core skills, which were developed from and overarched Moos's dimensions, became the focus of the study. Student perceptions of each were gathered to illuminate the extent to which students felt that the Nurse Navigator System had affected the development of their

- Active listening skills;
- Classroom management;
- Communication skills;
- Confidence;
- Creativity;
- IT skills;

- Independence/capacity to learn autonomously;
- Initiative;
- Leadership;
- Professionalism;
- Reflection;
- Research skills;
- Self-esteem;
- Teamwork.

A total of 14 usable responses (response rate 66%) were obtained from 21 BSc (Hons) Adult Nursing Practice students.

Phase 2: Research Design and Execution

"Anecdote Circles" in Action

Anecdote circles were adopted as a deliberate alternative to focus groups for this research evaluation project (Ali, 2014; Lugmayr et al., 2016). Little documented in the context of pedagogic research, they appeared to offer a means of authentic informality where students could voice their opinions inclusively and honestly in a manner which reflected the ethos of the Nurse Navigator System (i.e., social interactivity). The issue of the researchers also being teachers of the students meant that this approach could be conducted with a degree of authenticity and credibility on behalf of the researchers too.

Pre-Stage Planning

This involved establishing a series of straightforward guidelines for the participants in the study. They were stated at the beginning of each anecdote circle and also at any stage where it was felt that they were being breached or needed to be reminded of the process. In the case of the anecdote circle case study here, these guidelines were as follows:

■ Focus on giving us some examples of your experience here and how it might link to stories from [nursing] student placement experience.

■ Please try not to interrupt others as they are in the middle of their stories as this will stop the "flow" of what they are thinking and articulating to us.

■ Don't be afraid if we have a gap in the flow of our stories; there is no pressure on you to speak continually.

■ If you feel the need to contradict someone, then try to put your perspective across instead.

At this stage, content validity checks were also undertaken as an ongoing process so that at the end of each story with the students, it was certain that interpretation of intended meaning could be assured. This was deemed important in relation to the immediacy of the interpretation and the potential to lose valuable information.

In addition, a series of intuitive probes was integrated, which could be used to further encourage the conceptual depth of student narratives and stories to deepen further. These were as follows:

■ “Can you tell us a bit more about that . . .?”

■ “Where did that experience come from, can you tell us a bit more?”

■ “Have you got any examples of that from [nursing] student experience that you can bring to that?”

Stage 1

This phase was an opportunity to establish what the exact themes of the evaluation would become—it can also be termed an “anecdote-elicitation” session. Being strategic here in terms of controlling how many themes for discussion are both wanted and necessary in the study is important. For the purposes of this evaluation, there was a deliberate focus on two story questions, namely, critical reflection and reflexivity.

Stage 2

This stage involved extending discussion to the context to employability. In this instance, it was “Tell me about to what extent using the Nurse Navigator System has made an impact on you preparing to become an employable nurse.”

This necessitated, first, facilitating the group in establishing their operational definitions of both terms. In some instances, there was discussion and disagreement about what it meant to each of them, including the following terms:

■ Employability
■ Prospective work roles
■ Contribution to daily student experience
■ Social networking
■ Barriers and facilitators of practical usage
■ Professionalism
■ Nurse identity

As these words had such a resonance with the participants, they were deliberately integrated into the questions.

Stage 3

In terms of the question, it was necessary to elicit emotion in the participant’s responses, so emotional words of extreme were that which would help them to relate the context of what they were doing to their real experience in practice. Part of this process is to deliberately incorporate a scale of emotion with both extremes of it into the questions. This was primarily to provide extreme binary terms so that ultimately the storytelling process would not become overly skewed by the tone of the question and allowing them to position themselves on a continuum of choice and contemplation in terms of how they reacted and engaged with the elicitation question.

Stage 4

This stage necessitated building the actual elicitation question. In accordance with the published evidence base on anecdote circles, a process of image building was combined with the concept of emotion. This was to ensure the participants had a specific “anchor” for their stories in being able to build their stories and regale their anecdotes comfortably.

It started with “Think about when you first used the Nurse Navigator System in practice—what did it remind you of . . .”

Then, “Think about using the Nurse Navigator System when you’re out there on clinical placement . . .”

Then, “Consider . . . how this differed to being on campus during your academic blocks for a minute . . .”

Emotive words were then integrated into these questions:

When were you apprehensive, certain, confident or unsure about using the Nurse Navigator System in practice.

As recommended in the literature, a spectrum of emotions was incorporated so that this increased the chance of a memory being triggered by the question.

Stage 5

Once the group had settled, they were asked the first prompting questions.

Data Analysis

Braun and Clarke’s (2006) six-phase approach to thematic analysis was adopted as a systematic, yet recursive, approach to inductive qualitative analysis. In accordance with recommendations of the process, data were not viewed in a linear fashion and ideas were extracted as they emerged during the process of interpretation (often after visiting and re-visiting particular transcripts), and the researchers proceeded to the next phase where appropriate.

Phase 1

This entailed familiarization with the data set where the researchers immersed themselves in the data collected via extensive reading and re-reading of the transcribed information from the data collection. This was a process undertaken by two researchers (CH & YG) where a consensus could be reached between those themes independently found to be most commonly occurring.

Phase 2

Data were coded: this involved creating and identifying themes that came from analysis of the data sets. This subsequently guided analysis and provided a systematic approach at a semantic and conceptual level, which could be mapped against extant published literature. This was achieved by manually coding every data item and completed by the two researchers involved, collating every element together so that it could be independently checked for inclusion in the overall findings by both.

Phase 3

This entailed exploring the data for the specific themes identified in Phase 2 of the data analysis, defined in accordance with Braun and Clark (2006) as “coherent and meaningful patterns in the data” of direct relevance to the research aim. If a theme emerged from more than 10% of respondents, it was deemed to be meaningful to the study. Its coherence was judged on the basis of non-ambiguous articulation of student

perceptions. As there was a degree of diversity in the questions asked, this meant that 100% of respondents contributed to at least four themes.

Phase 4

This stage involved reviewing the emergent themes. It provides a means of checking that these were relevant to the data extracts when they are taken in abstraction from the complete data set.

Phase 5

Providing a definitive theme for each one that has emerged from the study entails defining the overall findings so that each can be individually examined.

Phase 6

This stage involved analysing the themes relative to one another in terms of their rate of occurrence and writing up the findings in relation to this. It also involved merging analytical narratives and examining this in relation to the existing published evidence base.

Findings and Discussion

The findings from the study have clear implications for nursing curriculum design alongside which, they provide evidence of theoretical consistency with extant literature in the field of technology enhanced learning. In the context of experiential learning whilst on clinical placement, the integration of the Nurse Navigator was undoubtedly functionally limited by the firewall security systems in local NHS Trusts where the practical elements of programme delivery take place, as illustrated by student comments,

> "There's no point in even trying, when there's a Firewall and there's just such a difference between Trusts that you might as well not bother sometimes… mobiles are better but it doesn't always look great if you're on a mobile in the middle of a ward" (Student A)

and

> "…don't talk about the Firewall…just don't go there, I mean I know it has to be there, it just stops everything" (Student B)

The context of technology enhanced learning as an adjunct to and sometimes integral part of inquiry based learning across a newly developed curriculum was indicative of the need for less didactic approaches to learning.

It became apparent in relation to the relative age of students, this was also a general indicator of their capacity to use technology seamlessly within their studies or whether it was perceived as another skill set to be learned or potentially even a barrier to the immediacy of learning. This is consistent with the findings of other current authors in the field of technology enhanced learning (Henderson, Selwyn and Aston, 2017) and also the students themselves,

> "It's taken me a while to get there but I do Facebook now and most platforms have the same sort of set up… we had nothing like this when we were younger and I suppose if it is used properly, it really adds to what you can learn on the job and in the classroom" (Student C)

and

> "It's just what we always do, I mean we've grown up with this stuff, so we think nothing of it – using it for Uni is different but it would definitely be better as an app" (Student D)

Since the curriculum adopted a blatant social constructivist philosophical stance, it was also apparent that mature students were more conditioned to didactic teaching and learning approaches, whereas younger students were less conditioned to teacher centred learning and were more flexible in their capacity to take risks in the context of technology enhanced learning, again these findings were consistent with those of another author in the field (Hampton, 2017).

Our results were consistent with the stance that technology enhanced learning has a tangible impact on the socio-cognitive learning of students by providing a mechanism for engaging with decision making, problem solving and reflexive praxis. In particular, the Nurse Navigator System was perceived as a mechanism of enhancing the potential for the establishment of communities of practice in which the co-construction of meaningful knowledge about patient care could be established (Pimmer and Pachler, 2013). This was illustrated clearly via some of the thoughts students expressed in the anecdote circles,

> "It definitely made a difference to catch what you were thinking about there and then. It's like sometimes you go off and you try to remember things but you forget some of the important bits and then after you've done the reflection bit you realise you've missed it off – with this, it's different, you get it done there and then and it's just there for you to use when you want to. It makes a massive difference to what you take in and what you've got left to make sense of" (Student E).

In common with the extant literature it is apparent that those nursing students, whose main technological equipment consists of a mobile phone, are content to socially interact and embed educationally focused conversation and social media apps to their learning on a daily basis (Curran et al, 2017). This is perceived as a social norm in the cohort who acted as participants in this study.

> "It's just part of what you'd do anyway…. Isn't it?" (Student E)

How they do this is inherently linked to how much they already know about using technology, which makes an app far more convenient than several different platforms being integrated into one conceptual model, as in the Nurse Navigator's original format (Webb et al, 2017). It is interesting that even though clinical placement is an integral part of formal learning in practice, that because of enhanced social interactivity in the context of patient care, nursing students regard this as being 'informal learning' and

that this context is where they learn best. The situated nature of their learning arguably gives authenticity to their transferrable learning in practice and actively contribute to the context of both lifelong learning and widening participation where entry level behaviour can distinguish student profiles quite distinctly in the earliest stages of the BSc (Hons) Adult Nursing programme, students articulated this too,

> "It's like there's a real difference between where we all were when we started and where we are now…do you know what I mean?... Like when we first arrived it was dead obvious that some people had already worked in care and knew a lot of stuff – I think having the information available was a big help and you felt like when you were away from the Uni you still had that sort of relationship with people where you could, like, ask – even if it was via a mobile and it was like it was fine because we were allowed to use them – not where the patients were like, but it was good!" (Student F)

The majority of nurses in the group could not define what was actually meant by the term 'active listening skills' – this is where the use of an anecdote circle rather than a formal focus group provided them with a forum to identify what was perceived as an ambiguous term and allowed the facilitators of the anecdote circle to clarify operational definitions for the purpose of the research. Once this had been clearly established as the capacity to hear and extract the most salient aspects of a dialogue or discourse, all students agreed that the use of the Nurse Navigator provided them with an active forum to both be heard and to be able to co-construct knowledge with others for use in the context of experiential learning,

> "It just gives you a chance to think when you're there, instead of storing it all up for later" (Student G)

Central to this was their confidence and initiative in being able to extend and articulate meaning both to each other and to the people within their care, whom they regarded as an integral part of the learning experience, whether in the context of experiential learning in local NHS Trusts or in academic classroom based teaching sessions. Classroom management needed to be constructively aligned with the specific learning outcomes of modules if this was to happen though, and several students reported that they felt 'out of sync' with what was being taught and how they were learning. It is apparent that an awareness of domain specificity by facilitators of teaching sessions is pivotal to this, since this has ramifications of the subsequent capacity of students to transfer knowledge, skills and values to other situational contexts,

> "Being really hands on and being with people is where it matters though, it matters because how you treat people matters – so it's like its technology but it isn't about the technology it's about making you communicate better" (Student H)

Creativity was not seen as being integral to the experience of using the Nurse Navigator system, although students could perceive why aspects of this may be important in practice. It is arguable that leadership and professionalism are in a stage of early

development with students in the initial stage of a degree programme, but the Nurse Navigator was perceived to have impacted positively on the potential for comradery rather than teamwork. As the Nurse Navigator was used via the internet, the capacity to research new or unfamiliar areas of knowledge online, was deemed to be a positive aspect of using the platform in practice. All students reinforced that they would much prefer an app for this to happen in practice. Experiential learning on placement with the Nurse Navigator System available gave a formalised reason for student nurses to interact at the point of care, using mobile technology that may not otherwise have been acceptable in the context of the workplace. A classic example of this is the use of mobile phones. In some hospital areas though, mobile phone use is restricted and it quickly became apparent that clear parameters of acceptable use, in relation to both data confidentiality and moral and ethical acceptability are necessary. This raises important questions for future research about the place of social interactivity and how this can be operationally defined in the context of professional practice for healthcare education, where apps are being used to increase engagement.

This work echoes the seminal work of Lave and Wenger (1991). In this sense nurse education is still wholly reliant on the formulation of a Community of Practice with established and practising nurse mentors yet highlights the paradigmatic shift and influence of technology enhanced learning over the last ten years in practice. It is likely that as learning evolves that the contextual significance of where people learn will increase in relation to this. In relation to learning environments, this also has broad implications for the consideration and place of tacit knowledge in the context of social interactivity in technology enhanced learning. Most notably, it highlights that accessibility to knowledge is no indicator of its correct or appropriate application to practice and maintains its position as an adjunct to yet an integral part of how people learn in 'situ'.

Conclusion

The concept of social interactivity for affective domain learning was impacted positively upon by the integration of technology enhanced learning (ie the Nurse Navigator System). Pivotal to the success of this, though, is the capacity of clinical and academic staff who can facilitate this sufficiently well in practice and a period of preparation for students so that they can understand the distinction between cognitive, psychomotor and affective domain learning and the places and integration of each across an academic curriculum. Not only does this impact upon the concept of social interactivity, it also provides a mechanism by which formal assessment processes can drive learning and teaching in the context of clinical and professional nursing practice across the curriculum. The provision of an App, though, rather than a series of platforms, which when working in conjunction with each other have a collective name is perceived as being better.

References

Ali, I. (2014). Methodological approaches for researching complex organisational phenomena. Informing Science: The International Journal of an Emerging Transdiscipline, 17, 59-73.

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. Qualitative Research in Psychology, 3, 77-101.

Bruun, H. H. (2016). Science, values and politics in Max Weber's methodology: New expanded edition. Abingdon, UK: Routledge.

Chieu, V. M., & Herbst, P. (2016). A study of the quality of interaction among participants in online animation-based conversations about mathematics teaching. Teaching and Teacher Education, 57, 139-149.

Curran, V., Matthews, L., Fleet, L., Simmons, K., Gustafson, D. L., & Wetsch, L. (2017). A Review of Digital, Social, and Mobile Technologies in Health Professional Education. *Journal of Continuing Education in the Health Professions*, *37*(3), 195-206.

Duncan-Howell, J. (2010). Teachers making connections: Online communities as a source of professional learning. British Journal of Educational Technology, 41, 324-340.

Hampton, K. N. (2017). Studying the Digital: Directions and Challenges for Digital Methods. *Annual Review of Sociology*, (0).

Henderson, M., Selwyn, N., & Aston, R. (2017). What works and why? Student perceptions of 'useful' digital technology in university teaching and learning. *Studies in Higher Education*, *42*(8), 1567-1579.

Lave, J., & Wenger, E. (1991). *Situated learning: Legitimate peripheral participation*. Cambridge university press.

Lee, J., & Bonk, C. J. (2016). Social network analysis of peer relationships and online interactions in a blended class using blogs. The Internet and Higher Education, 28, 35-44.

Lugmayr, A., Sutinen, E., Suhonen, J., Sedano, C. I., Hlavacs, H., & Montero, C. S. (2016). Serious storytelling—A first definition and review. Multimedia Tools and Applications, 76, 15707-15733.

Moos, R. H. (1980). Evaluating classroom learning environments. Studies in Educational Evaluation, 6, 239-252.

Pimmer, C., & Pachler, N. (2014). Mobile learning in the workplace: Unlocking the value of mobile technology for work-based education. *Increasing access through mobile learning*, 193-203.

Silverman, D. (Ed.). (2016). Qualitative research. Thousand Oaks, CA: SAGE.

Tranfield, D., & Starkey, K. (1998). The nature, social organization and promotion of management research: Towards policy. British Journal of Management, 9, 341-353.

Tsiotakis, P., & Jimoyiannis, A. (2016). Critical factors towards analysing teachers' presence in on-line learning communities. The Internet and Higher Education, 28, 45-58.

Vygotsky, L. S. (1978). Mind in society: The development of higher psychological functions. Cambridge, MA: Harvard University Press.

Webb, L., Clough, J., O'Reilly, D., Wilmott, D., & Witham, G. (2017). The utility and impact of information communication technology (ICT) for pre-registration nurse education: A narrative synthesis systematic review. *Nurse education today*, *48*, 160-171.

Yen, J. Y., Yen, C. F., Chen, C. S., Wang, P. W., Chang, Y. H., & Ko, C. H. (2012). Social anxiety in online and real-life interaction and their associated factors. Cyberpsychology, Behavior, and Social Networking, 15, 7-12.