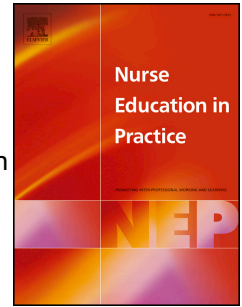


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Online professional development for digitally differentiated nurses: An action research perspective

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ONLINE PROFESSIONAL DEVELOPMENT FOR DIGITALLY DIFFERENTIATED NURSES: AN ACTION RESEARCH PERSPECTIVE

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CONFLICT OF INTEREST

The authors declare that there is no identified conflict of interest.

Potential conflict of interest was mitigated by the first author's employer's ethics committee approval for this research project. Throughout the research there was no organisational influence on the methods or outcomes.

Research Highlights:

- Action research project involving RNs currently working in clinical settings
- Apparent digital skills may belie a RN's actual computer technological ability
- Identification of five key elements influencing effective implementation of online professional development
- Heutagogical learning bypasses a 'one-size-fits-all' approach

Keywords:

Professional Development; Nursing; Online Learning; Heutagogy; Andragogy; Action Research; Qualitative

INTRODUCTION

The public have an expectation that healthcare professionals will be able to provide safe and effective treatment informed by current, best practice therefore it is essential to offer regular, clinically focused, professional development through learning opportunities for nurses to support their skill and knowledge development and to enable them to demonstrate competence. In order to maintain nursing accreditation, RNs internationally are required to maintain their professional knowledge and skills (American Nurses Association, 2001, Nursing and Midwifery Board of Australia, 2010, Nursing and Midwifery Council, 2010, Nursing Council of New Zealand, 2015). Learning opportunities that use the online environment for delivery of professional development are increasingly common for healthcare professionals. This paper reports on a research project based on andragogical principles (Knowles et al., 2011), and enhanced by heutagogy (Blaschke, 2012), in which the learner determines and manages their learning experience. During this project, Registered Nurses (RNs) from a private surgical hospital network took control of their learning within an online environment. The RNs involved were multi-generational (31-60+ years) and digitally differentiated in terms of their level of technological fluency in computer skills; affinity to technology; and view of

online learning's value in their clinical context. Prior to this research project, their experience of professional development was comprised primarily of self-directed learning packages or attendance at training workshops provided either within their hospital or region or, less often, outside of their region. If these learning activities require travel outside of the region, the associated costs can be high and, therefore, prohibitive. In addition, it is often necessary to re-arrange the staffing schedule to allow for the registered nurse's absence from the clinical setting.

Background

The World Internet Project (Smith et al., 2011) has highlighted the exponential uptake in worldwide interconnectedness via the internet, mediated by information technology. A move towards offering online professional development on a variety of technology platforms is supported by the recent iteration of this worldwide project which found that there is increasing access to the internet via mobile phones or tablets (68% and 48% of respondents respectively) (A. Gibson et al., 2013). Moreover, in the literature, there is growing evidence that information technology (IT) will soon be present in all facets of patient care (Byrne, 2012, Hinton Walker, 2010). In addition, the current volume of biomedical breakthroughs and reformatting of knowledge doubles every 20 years (Stewart et al., 2008). In order for healthcare professionals to maintain knowledge currency, they must be conversant with IT resources and be able to access current, evidence-based information to guide their clinical practice. If they are unwilling to embrace emerging technologies, clinicians risk disenfranchisement and marginalisation from ongoing opportunities for professional development and integration of new knowledge into their clinical practice. Facilitating a move towards a learning paradigm in which the learner is active and constructs their knowledge in a supported environment, is important for transformative learning to occur (Barr & Tagg, 1995, Jönsson, 2005).

Rather than being a homogenous group with similar learning needs, the RN population incorporates diverse generational characteristics and levels of technological fluency (Myrick et al., 2011, Roberts, 2005) which is termed here as 'digital differentiation'. The millennial generation (born

1982 – 2002) has very different educational expectations from its predecessors and Meister and Willyerd (2010) asserted that millennials desire activities that will develop their technical skills and self-management whilst capitalising on their creativity and innovation. They have a propensity for computer-mediated social interactions and, as such, have been termed 'digital natives' (Prensky, 2001, p.1) whereas the majority of the New Zealand and international, nursing workforce is what Prensky (2001) has termed 'digital immigrants' (p.2) and were born prior to a technology-mediated environment. They have differing levels of skills dependent on their level of exposure and typically see technology as a 'tool' to be used and therefore the types of activities offered for professional development will need to address these diverse, generational, learning needs.

AIM

Through exploration of RNs' experiences of online learning, the aim of this paper is to identify a strategy for effective implementation of online professional development activities. The research question is "What learning strategies would best support digitally differentiated nurses using the online environment for professional development activities?"

RESEARCH DESIGN

Action research was selected as an appropriate methodology to guide this study because it brings participants into the research arena as co-researchers and focuses on discovering practical solutions to concerns raised by the participants and their community of practice (Reason & Bradbury, 2008). Over the course of the project, the participants collaborated in small groups to firstly identify potential professional development topics that would be relevant to an RN new to their clinical environment, and secondly, to develop online learning activities suitable for their colleagues that were focused on these identified areas of learning need. Key features of action research are the

cyclical process of action, reflection, idea generation and co-creation of knowledge (McNiff & Whitehead, 2010). Furthermore, there is an ethical commitment to a democratic, public and collaborative generation of knowledge that facilitates transformations in practice (Holly et al., 2009).

Testing for relevance within a practice environment is a distinct feature of action research (Kemmis & McTaggart, 1988) in which the ultimate goal is to enable practitioners, in collaboration with researchers, to set the agenda, create solutions to issues they have identified, and improve their situation in an ethically sound manner (Holly et al., 2009). This action research intentionally included an andragogical approach in which the learning designer provides a topic of interest to the learner and manages the process, in terms of scope and outcomes, but allows the learner to drive the process according to personal learning needs. However, as the research proceeded, an even richer learning outcome was achieved through a heutagogical approach in which the learner engages with a topic from their context and their awareness of how they best learn and what they wish to learn both drives and mediates the learning experience (Hase & Kenyon, 2001). Blaschke (2012) asserts that such an approach is well-suited to the online environment in which mature learners are not only developing competency for specific knowledge or skills but also developing transference capability to unfamiliar situations and an awareness of how each individual prefers to learn. Inherent in this process is the situational knowledge that each participant brings to the research process and outcomes (Greenwood & Levin, 2008). Thus, throughout this research, the participant RNs, who were all involved in clinical practice, developed, trialled and interrogated emerging ideas, evaluating them for implementation, validity and veracity.

Integral to the action research process is the importance of the participants' prior knowledge and experiences which mediate, validate, provide re-interpretation, and enable transformation of understanding as the data emerges within the research (Mezirow, 2000). At one point, a participant using her prior knowledge realised that a video being considered as a demonstration of a surgical procedure had been misnamed on the internet site and was in fact demonstrating an entirely different procedure. Through such acts of critical reflection and the interrogation of hunches and

possibilities, discoveries about the topics become evident (Guba & Lincoln, 2008) and the process of developing ideas, planning and implementing them, making observations, and interrogating the outcomes occurs in a cyclical fashion depicted below (Figure 1). This action research spiral (Holly et al., 2009) is repeated throughout the research process.

Insert Figure 1: Action Research Spirals here

(Source: Adapted from McNiff (1988, p. 22)

Approval for the study was gained from the University Human Ethics Committee and the hospital network's National Clinical Medical Committee and participants were recruited from within the private surgical hospital network. In accordance with action research theory involving practitioners as co-researchers (Greenwood & Levin, 2008, Holly et al., 2009, McNiff & Whitehead, 2010), inclusion criteria required that RNs were working in surgical wards, operating rooms (OR), or post-anaesthesia care units (PACU). An information poster and brochure were displayed in four hospitals and potential RN respondents were asked to contact the researcher by phone or email. All RNs who responded were sent a descriptive questionnaire regarding their previous experience with computers and the online environment. A representative sample of participants (10) were selected from these respondents to provide a range of experience (with a cross-section of computer affinity, educational background, and current employment) in one of the three, previously stated, clinical environments. The participant ages ranged from 31 to over 60.

Insert Table 1: Participant Demographics Survey here

Nurse educators were excluded from participating as their prior involvement in the preparation and delivery of professional development material may have unduly influenced the research outcomes.

Data collection

Data collection occurred over a 16 month period with six focus group meetings and incorporating multiple methods of data collection including questionnaires, field notes, meeting transcripts, research journaling and participant verification, which provided a broad range of perspectives. The aim of using focus groups was to generate knowledge related to learning strategies that worked for the participants currently working in clinical environments and, by generalisation, to similar RNs. These meetings provided a collaborative and supportive environment, which facilitated discussion on issues and barriers influencing involvement with online professional development, examined current examples of professional development, challenged perceptions, developed new ideas for professional development activities, and provided a space for reflection. In this way the process of data collection followed the action research spiral of interrogating ideas, actions, observations and reflections (Holly et al., 2009, McNiff & Whitehead, 2010). Outside the meeting times, interaction with group members in the online environment was encouraged, providing participants the opportunity to enhance their confidence and skills within the online learning site. The learning management system used was MOODLE and this provided a platform for discussion forums between all participants and, also, individual group discussions around the learning material that each group began developing. A wiki on the MOODLE learning platform was set up for each group to collaboratively plan learning content specific to their clinical area.

Data analysis

Focus group meetings were audio recorded and transcribed verbatim following each session. In addition, researcher notes of each meeting provided supplementary data with each transcript. Analysis involved sorting, coding, questioning, comparisons and speculation of data (Holly et al., 2009). A synthesis of concepts, phrases and key aspects from the transcripts revealed both explicit

and implicit themes which were discussed at subsequent focus group meetings for participant verification.

This consensus-gaining in a collaborative environment enables testing and verification of the analysis and establishes a claim to truth for the findings (Joffe & Yardley, 2004). During the refractive process of crystallisation (Richardson & St. Pierre, 2005), these views emerge as multiple understandings of reality to provide a complex, yet thoroughly subjective, understanding which would be interrogated and deconstructed to develop a clearer understanding of effective, online professional development practices. In contrast to traditional, social scientific research which emphasises neutrality and the researcher's values not influencing the process or outcomes (McNiff & Whitehead, 2010), action research incorporates foundational values that democratise the process through the use of consensus which moderates the potential for researcher bias (Holly et al., 2009). These values include collaboration, trust, respect, creativity, and experimentation, in combination with principles of heutagogy (Blaschke, 2012, Hase & Kenyon, 2001) and an awareness of the imperative for participation. These aspects are integral to this action research project and set the foundation for not only the data collection, but also the results of the data analysis.

RESULTS

The data analysis was considered in three, iterative phases. Each phase contained one or more focus group meeting cycles. These iterative phases are shown in Figure 2.

Insert Figure 2. Online Professional Development - Action Research Spiral

Phases here

The first iteration focused on the setup phase and included the planning time as well as the first two focus groups. This period established foundations for the research including philosophical and operational aspects. It enabled the dissemination of information about the research to relevant people: participants, department managers and the hospital managers. In each cycle of action research the emergent themes from focus group meetings were taken back to the subsequent meeting. Within the setup phase the emergent themes of presentation of content, feeling safe and learner characteristics were reviewed.

The collaborative phase included focus groups three through to five. It involved participants, as subject matter experts conversant with their clinical environment, working collaboratively in clinical, specialty-focused groups. They used a discussion forum, emails, a collaborative wiki and some face-to-face sessions and the wiki provided an online space in which each group member could add learning content ideas, communicate with each other regarding this, and see the overall progress of their ideas taking shape.

I have added another possible objective which could be more appropriate... based on chunks 3 and 4. If we keep the second learning objective we will end up adding patient positioning as another chunk. What do you think? (Lorraine)

The benefit of having all of this information in one location on the wiki means that each participant can access, see and comment on the most 'recent' versions of learning materials. Sections of the wiki were used to separate the proposed learning material into discrete chunks of content. A Word flowchart was used to sequence the content allowing participants to systematically plan what learning activities or resources they would include in their online learning project. The researcher acted as a forum moderator, mentor and cheerleader for participants as they ventured into the, sometimes uncharted, territory of the online environment.

During this phase each group began a heutagogical process of learner generated content to develop specialty-specific online learning activities in which they identified the subject, context, topics, pre-requisite skills and knowledge and the most appropriate type of learning activity for this content. Contingent with this was a review of how to develop learner-focused learning objectives. Each group was provided with a template for developing their project enabling them to map out each of these aspects and, for one group, this resulted in video recording the instrument trolley set-up for a basic orthopaedic surgical case. They also developed a learning activity that reviewed the types of surgical instruments used and then quizzed the learner.

Another group located journal articles which provided basic information on anaesthetic induction agents, their use and influence on patients recovering from anaesthetics. The surgical ward group's learning activity, which focused on post-operative haemorrhage, began with a review of anatomy and physiology using links to YouTube videos, and included the influence of pre-existing conditions and of over the counter medications that patients may have used prior to their surgical procedure. Each of these topics and subsequent e-learning activities were established and developed within the wiki by the research participants based on their awareness of the clinical learning needs of a registered nurse new to their clinical environment. From the contents of these wikis, a MOODLE lesson activity was developed to create the online learning activities for each specialty group. Subsequent focus group meetings explored emergent themes from phase two, including access to resources, presentation of content into discrete topic chunks (See figure 3), competency-based learning outcomes, feeling safe and managing anxiety, and professional development.

Insert Figure 3. OR Lesson Flowchart - here

The closure phase included a final focus group with a subset of participants reflecting on the research outcomes and implications for the development of future, online learning activities. This last iteration also included thematic analysis of the data in order to establish a contextual

understanding. This analysis identified five conceptual elements that influence the effective implementation of online professional development (see figure 4) which are discussed in detail below.

Insert Figure 4: Effective implementation of online professional development here

Recognising the reality of work-based, online learning.

It's a bit hard' cos I mean, there may be half an hour that you've got between patients or your patient in theatre and coming back and you've just got onto your, whatever you're looking up and doing whatever and then you've got to go fetch a patient from theatre. So you've got to log off, just what you manage to do, you've got, in between and you might be in the middle of a programme somewhere and have to give that up. (James)

The practicalities of accommodating online learning in the workplace around a clinical workload were challenging. For some participants this required finding a quiet, uninterrupted place to engage with the learning resource. Access was dependent on computer availability, sometimes only occurring after a clinical shift. In one facility, staff commonly accessed the learning resources after 7:30 in the evening from both home and from work. Influential factors, in addition to the accessibility of learning technology, were time, financial and technical support allocations.

The research group highlighted the benefit of having professional development or study leave arranged with their employer ahead of time. This might depend on which activities were mandatory for all, compared to those essential for a specific person's role, or those undertaken for personal professional development. In order to support transition to an online learning environment, it is important to have Information and Communication Technology (ICT) support in the form of an accessible and available help desk, online video tutorials, and the option for new-to-online learning

face-to-face tutorials for those staff who might require this support. The inclusion of these types of elements that enhance social cohesion before an online course occurs, are recommended. It emerged that the provision of online learning was especially useful for night staff, a traditionally difficult to reach group for professional development activities. The availability of an online forum to provide ongoing conversations between staff and clinical experts can provide an excellent professional development resource as staff can access it at any time and read through the previous discussions.

Establishing the ideal online learning environment

A number of suggestions came from the participants during the action research process in relation to what they considered would exist in the ideal learning environment. These were an online learning environment that provided a direct link from the online learning site to the clinical facility's intranet policy and clinical guideline documents and was accessible from either outside or inside the hospital on any internet capable device which would enable staff to use mobile devices as well as personal or onsite computers for learning. In addition, provision of sufficient quantity of facility-provided computers, ideally, situated in a quiet place, somewhat separated from the clinical space, would enable staff to focus on their learning for a period of uninterrupted time.

“I think that you need to remove yourself from the work environment into a separate room or office to get any kind of focus happening, because you are constantly distracted otherwise” (Maggie).

Facilitating transformation to online professional development

Discussions during the focus group meetings highlighted the transformative changes that were possible, not only for the participants individually, but also for their department. These occurred in three distinct strata: personal experience of the online environment, personal professional development in relation to technological skills and content knowledge in their chosen topic, and awareness of the varying levels of content required for their colleagues' learning and development needs. Within the learning activities that each specialty group created, there were pathways through the content that online learners could choose depending on their level of knowledge and expertise.

They went through everything you needed to know before you [administered] blood. Why ... what ... how to actually collect blood and prepare to give it to a patient.... They went through it all first and then you got yes/no answers, but if you got no, you could go back and look at what the right answer was... that was really good. (Tosca)

These offered learners pathways to basic anatomy and physiology information or to resources and then questions on the topic, through to websites with articles, videos or animations providing content information. The pathways chosen depended on the learner's needs and allowed the andragogical principles espoused by Knowles et al. (2011) to advance to heutagogical learning (Blaschke, 2012). This heutagogical approach acknowledges that learners autonomously decide what professional development opportunities will best develop their skills and knowledge, and their optimal pathway to achieve these (Blaschke, 2012).

Developing ICT competency in the online learning environment

"My fear of computers is really quite huge and I'm always scared I'm going to do something and wipe what I've done" (Bella).

For some participants, an underlying fear in the ICT environment was a barrier. The provisions of a helpdesk, and face-to-face and video tutorials showing how to access the online site, were deemed to be essential for development of competencies to enable access, and use of, learning resources in the online environment. In a hospital setting, such as this research environment, some of this service was provided by the company hosting the Learning Management Site (LMS), whilst the organisation provided learning development opportunities for nurse educators to subsequently, act as workplace champions.

Participants highlighted the benefit of including social elements that can add the feeling of group camaraderie with consequential development of confidence within the online environment. A participant (Lockie) suggested the benefit of a workplace champion to support, guide, encourage and provide tangible assistance as required. For those participants who were able to access a computer within the workplace they, at times, contended with some colleagues who saw this behaviour as irrelevant to a clinical context.

Acknowledging organisational imperatives

Within a clinical work environment, there is the constant pressure to ensure that staff are productive and that patients are cared for in a safe and effective manner. Participants reported a prevailing assumption in the clinical setting that a staff member sitting at the computer was accessing social media or online purchases and rarely was it presumed that they were engaged in professional development or using databases to search for clinically relevant information.

“Other people I’m working with just don’t get it... people think you’re wasting time. And you have this guilt thing about ‘I should be doing something else, like restocking” (Maggie).

Participants saw an opportunity for a change in mindset so that access to computer-based learning activities was seen as valid, important and integral to daily activity.

These results highlight that, in order for staff to engage with online learning activities, there needs to be a reliable and easily accessible ICT support. Furthermore, the benefits of involvement

need to counter-balance any perceived negative outcomes (Macleod & Zimmer, 2005), and staff and management will need to proactively seize the professional development opportunities that online activities can offer.

DISCUSSION

This study identified five key elements to support digitally differentiated nurses to flourish in the online environment. Whilst the online environment provides access to learning material anytime, anyplace, at any pace and in any content area (Stiles & Orsmond, 2002), the participants highlighted the challenges this presented in a busy, clinical setting. Therefore, online learning designers, subject matter experts and the clinical organisation must reorient their planning and implementation of learning initiatives to produce educational strategies to support a multi-generational, nursing workforce in the online environment. Due to time and staffing and financial constraints, traditional methods of content and delivery will increasingly become obsolete.

This action research facilitated observation, reflection, planning and action (McNiff & Whitehead, 2010, O'Leary, 2004) in order to provide an opportunity to construct and test emergent ideas and identify recommendations for future professional development. Rather than offering traditional 'one-size-fits-all' professional development activities, the online environment enables tailoring of the learning dependent on the learner's current knowledge and prior learning. Using andragogical (Knowles et al., 2011) and heutagogical (Blaschke, 2013) approaches that focus on the learning needs of adults will enable learners to direct and manage their own learning. As each learner's ability to navigate successfully in the online environment will be different, it would be important to assess the learner's readiness for, and current skills with, online learning. In addition, the provision of appropriate scaffolding, particularly for digital immigrants, can enable them to gain confidence and develop online learning skills.

The findings of this study support the importance of providing helpdesks, tutorial groups and tutorial videos in order to facilitate the development of online ICT competence (Atack, 2003, J.

Gibson et al., 2006, Sweeney et al., 2008, Wilkinson et al., 2004). Provision of a workplace champion is supported by Lee (2011) who suggested that coaching and mentoring, when offered at critical moments, might enhance changes in practice. Clinical educators, learning designers and subject matter experts will need to incorporate varying levels of support for learners in order to enhance developing self-efficacy in this learning medium (Myrick et al., 2011). As RNs develop their skills and, thereby, their belief in their own ability, this will enable them to push through moments of self-doubt or ill-ease within the online environment.

Learners can drive their knowledge development in a heutagogical way when content is presented with pathway options for them to choose from, dependent on their current level of knowledge and learning needs, combined with flexibility to adjust the pace and timely feedback to reinforce instantly the correct answer or to guide misunderstandings. A heutagogical foundation (Blaschke, 2012) to professional development activities has heightened potential to prepare learners for acquiring current, best-practice information in a constantly changing healthcare environment. Moreover, it will be in a manner that is educationally suited to their specific learning needs and with direct relevance to what they self-identify as clinically significant.

Developing ICT competency in OLL environment

I've got a little laptop, it sounds great doesn't it and its Wi-Fi and I haven't a clue how to make that work. It's got Skype and [I] haven't got a clue how to make that work! It sounded good when I was buying it but I'm not using any of it, haven't got a clue. (Bella)

Throughout this research project it became apparent that it was erroneous to assume staff, who regularly use ICT in their personal or clinical environments, would also be competent in finding and retrieving current, best-practice information. The data suggested that it is imperative firstly to enable staff to determine their own current level of skill and then to support them in identifying additional learning to assist their competency development. An initial ICT skills' analysis would help to indicate areas of strength and potential for development. In this way, what was previously a

potential barrier could become an enabler within their online, professional development environment (Shuster & Pearl, 2011).

For RNs who were expert in their clinical skills, there appeared to be a reluctance to acknowledge a lack of competence in ICT aspects. Throughout the clinical environment there is, legitimately, a clinician competence imperative to ensure patient safety. This focus is enshrined in legislation, nursing regulatory authorities' documentation and facility procedural guidelines. As a consequence, admission of incompetence in an ICT capacity appeared to elicit troubling dissonance for nurses whose sole emphasis throughout their career is on competence.

Research participants highlighted the nefarious assumptions of colleagues with respect to sitting at a computer during a clinical shift. Organisations must facilitate a variety of ways in which staff can engage with online learning resources. This might involve the provision of sufficient numbers of computers away from the clinical space, or headsets to block out interruptions, through to offering resources accessible on multiple (including mobile) platforms. An organisational culture promoting learning and ongoing professional development will certainly influence staff engagement with the resources. Alerting colleagues to the action of online professional development might be as simple as having a sign 'velcroed' to the edge of the monitor such as, 'Learning in progress, please leave undisturbed'. The organisation could highlight the professional development that has occurred for specific staff members in facility newsletters or posters to profile the benefits and outcomes of online learning. Thus transformation of the organisational culture towards online professional development might be initiated.

Gould, Papadopoulos and Kelly (2014) highlight the importance of adjusting learning resources to take account of contextual and audience differences. With technological advancements and increased international access to professional development activities via social media, video conferencing and webinars, there is an opportunity to consider how these learning activities might be relevant to an international audience. Furthermore, this research project focused on the ongoing

professional development of RNs but future research is warranted into how online learning translates into improved patient care and safety.

Limitations

Due to time constraints this action research project did not allow for additional opportunities for the participants to engage with the online forums and learning activities that they were developing. The research began with 10 participants, however there was attrition of three participants prior to the completion of research which potentially limited the breadth of experience, insight and interrogation of the findings. There is potential for bias in the selection of a representative sample for this research however action research is primarily focused on engaging practitioners in order to improve practice and to generate living theories of knowledge. As such, a representative sample was essential for this co-creation of knowledge. In addition, the author's role as a learning designer, educator and researcher created potential for research bias. This was mitigated by the cyclical nature of action research in which the participants interrogated emergent data and themes verifying their validity and veracity.

CONCLUSIONS

This action research project has highlighted five aspects that are essential for effective implementation of online professional development. These strategies will support clinical staff to successfully transition to an online environment for professional development. The efficacy of the engagement of participants with the online learning activities will increase by taking into account their circumstances during the planning stages. How online professional development activities are prepared and offered can be modified by implementing these research findings. Moreover, these findings provide support for incorporating heutagogical learning principles, in online, professional development opportunities for registered nurses, as beneficial for achieving desired learning outcomes.

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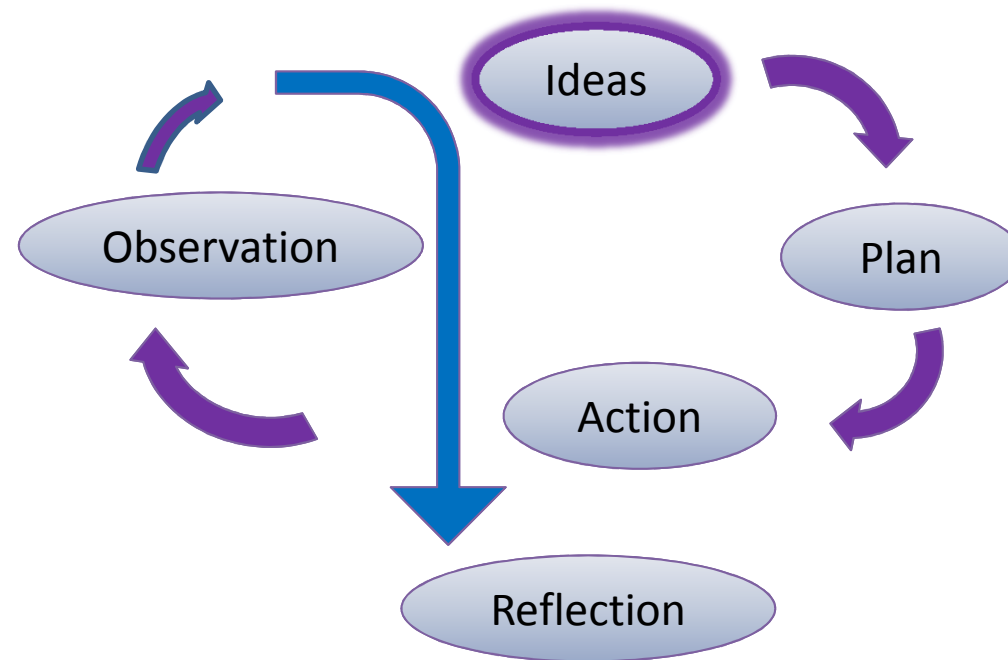
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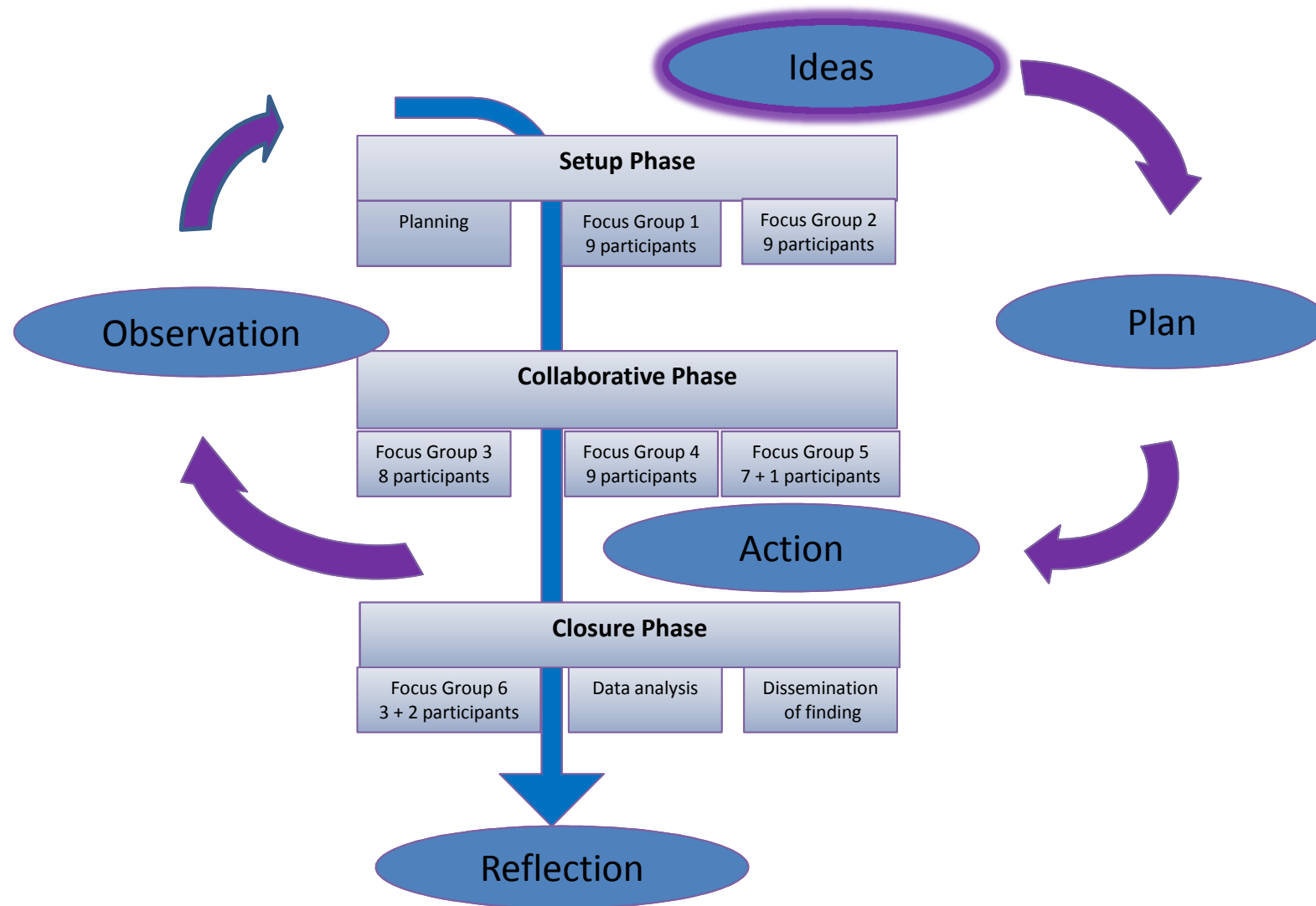
Participant Demographics Survey

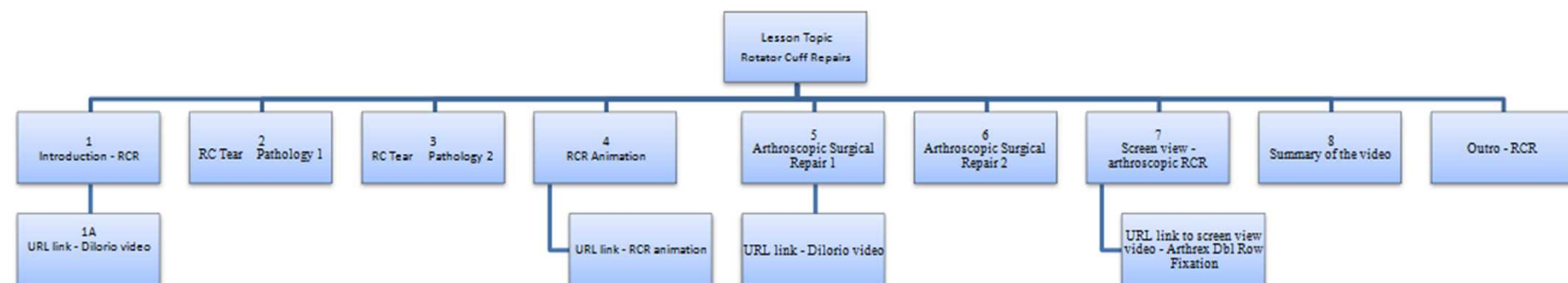
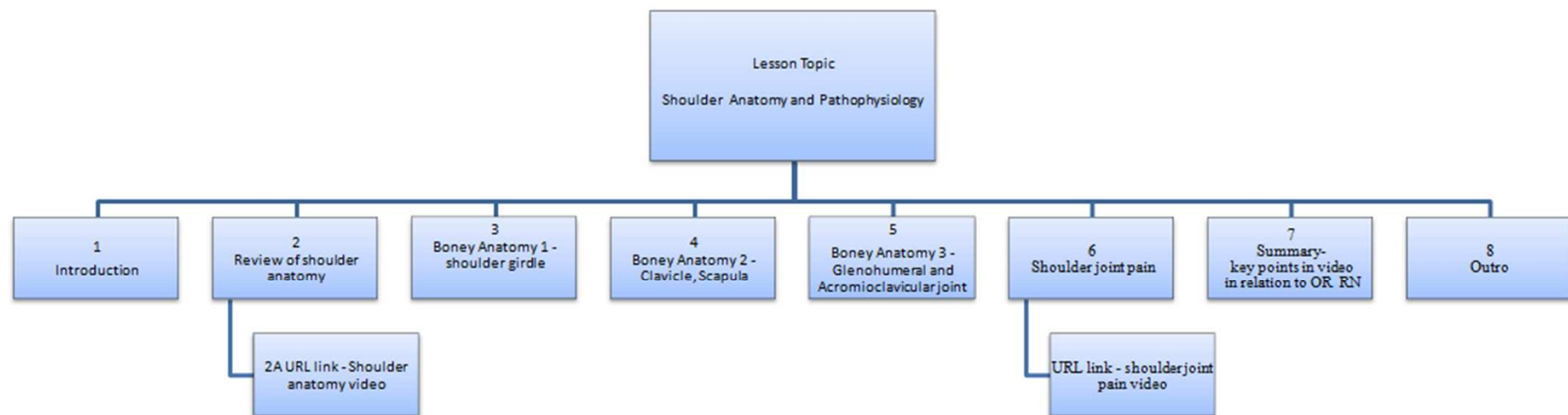
Work location	
Ward	3
Operating Room	4
PACU	3
Computer at home	
Yes	10
No	0
Do you use the internet?	
Yes	10
No	0
Time spent on the internet	
(<1 hr/wk)	0
(1 - 5 hrs/wk)	6
(6 - 10 hrs/wk)	1
(11 - 15 hrs/wk)	0
(16 - 20 hrs/wk)	0
(21 - 25 hrs/wk)	1
(26< hrs/wk)	1
Internet connection	
Dial up	1
Broadband	9

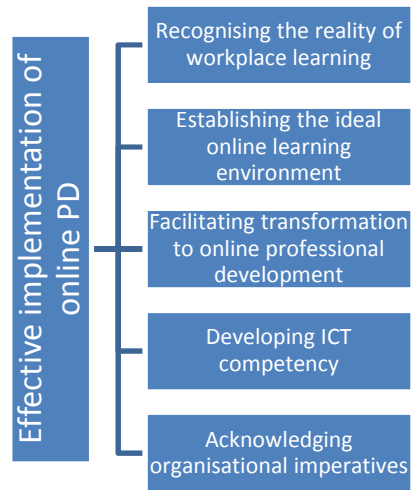
Continuum of computer familiarity	
Unfamiliar	1
	2
	4
	4
Very familiar	5
Nursing Qualification	
Diploma of Nursing	4
Bachelor's Degree	6
Nursing course inclusion of IT for research	
Yes	4
No	6
Gender	
Male	1
Female	9
Age group	
31 - 40 yrs	2
41 - 50 yrs	4
51 - 60 yrs	3
Over 61	1

Action Research Spiral









Online professional development for digitally differentiated nurses: An action research perspective

Green JK

2017-01
