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An Exploration of Nurses' Experience following a Face-to-Face or Web-Based Intervention on Patient Deterioration

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Abstract: A clinical simulation web-based program, known as FIRST²ACT (Feedback Incorporating Review and Simulation Techniques to Act on Clinical Trends) is designed to increase the efficacy of clinicians' actions in the recognition and immediate response to a patient's deterioration. This study, which was nested in a larger mixed method project, used ten focus groups (n = 65) of graduate, enrolled, registered nurses, Associate Nurse Unit Managers, and general managers/educators/coordinators from four different institutions to investigate whether nurses felt their practice was influenced by participating in either a face-to-face or web-based simulation educational programme about patient deterioration. Results indicate individuals who were less 'tech-savvy' appreciated the flexibility of web-based learning, which increased their confidence. Face-to-face students appreciated self-reflection through performance evaluation. While face-to-face simulations were unable to completely duplicate symptoms, they did show nurses' adaptability. Both interventions enhanced clinical practice by improving documentation and replies while also boosting confidence and competence. Web learners initially experienced tech-related anxiety, which gradually subsided, demonstrating healthcare professionals' resilience to new learning approaches. Overall, the study highlighted the advantages and challenges of web-based and face-to-face education in clinical practice, emphasising the importance of adaptability and reflective learning for healthcare professionals. Further exploration of specific topics is required to improve practice, encourage knowledge sharing among colleagues, and improve early detection of patient deterioration.

Keywords: clinical simulation; web-based intervention; face-to-face intervention; patient deterioration; patient safety; nurses; FIRST²ACT

1. Introduction

Early intervention by healthcare staff in the detection of a patient's changing health status reduces the risk of a medical emergency [1] It is clear many cues indicative of a person's deterioration is overlooked or missed altogether [2]. There can also be confusion about which clinical indicators should be recorded.

To support compliance with Standard 9 [1] requiring competency in managing the deteriorating patient, a clinical simulation web-based program described in a theory-based model by Buykx et al. [3] known as FIRST²ACT (Feedback Incorporating Review and Simulation Techniques to Act on Clinical Trends) was developed. FIRST²ACT is a clinical simulation program that is offered either face-to-face or as a web-based program. The program is designed to increase the efficacy of clinicians' actions in the recognition and immediate response to a patient's deterioration. Face-to-face and web-based versions have demonstrated impact on educational outcomes and clinical performance with regard to increasing participants' knowledge and prompt call to action [2]. Using the web-based or e-learning approaches ensured important information was delivered [4,5] reflecting desired

outcomes [6] and reducing the difficulties associated with time for continuing professional development.

In 2016 a mixed method study [1] was designed to demonstrate the impact of clinical simulation on improved early detection of patients' deteriorating health status. This larger research project was designed to compare the effectiveness of two forms of simulation education, face-to-face (F2F) versus web-based (WB), facilitating nurses' ability to detect and manage patient deterioration. During the FIRST²ACT face-to-face simulation, assessment tests were conducted, simulation occurred, and feedback techniques were delivered to individual participants by a team of facilitators over a one-and-a-half to two-hour period. The FIRST²ACT web-based program constituted an online learning package. All participants with different skill mixes completed three contrasting, eight-minute simulation exercises that included patient deterioration at the midpoint. Acute myocardial infarction, hypovolaemia and chronic obstructive pulmonary disease comprised the patient scenarios. In the face-to-face experience, video recordings of participants' actions occurred. This initiative referred to as 'photo elicitation' [7,8] provided an audio-visual record used as a reflective account of participants' decision-making. Individual feedback was given by an instructor.

The FIRST²ACT web-based educational package included a series of three professionally video-recorded scenarios using specialist actors as patients. A 'mouse over' function enabled participants to click on an action for example, lay the patient flat, give oxygen, or take an ECG. On completion, results were provided with automatised feedback on performance outcomes and, where the pass mark was reached, a certificate was issued. Participants could make as many attempts as required to achieve mastery.

This study was undertaken in four different hospital contexts, three rural and one metropolitan, with nurses working primarily in acute care. Nurses participated in either web-based (two sites) or face-to-face (two sites) learning. The mixed methods study aimed to establish which educational approach best served to enhance practitioners' skill development in the early detection and management of patient deterioration and provide participants with opportunities to experience alternative pedagogies building on individual knowledge and experience [9]. As part of the overall mixed method study, clinical evidence gathered from patient records, pre-questionnaires, and post-intervention evaluation rating scales helped to demonstrate that the two educational interventions used did have an impact on practice [9].

What was omitted from this aspect of the mixed methods study, however, was the nurses' experience of either program. Thus, what is highlighting in this paper is the nested qualitative dimension of the larger mixed methods project. In this nested component, focus groups were conducted to capture participants' experiential insights in undertaking either the web-based program or the face-to-face version of the educational interventions. The findings gleaned from this qualitative aspect of the overall study will be used to inform future changes to the FIRST²ACT program. To better understand participants' experience of the two different educational interventions, focus groups were held in the institutions in which the interventions took place. The aim of this paper, therefore, is to explore the experience of those staff members who participated in the focus groups designed to gain information on what participants felt the impact of these educational interventions had on their practice.

2. Materials and Methods

Following ethical approval from all institutions involved, qualitative data were collected using focus groups aiming to uncover participants' experiences and the perceived influence the intervention had on their clinical practice. A purposive sample of participants who had completed either of the educational interventions was invited to participate in one of ten facilitated focus groups. The data were collected three months post-intervention (September-October 2016). Participants were provided with Participant Information and Consent Forms to complete and sign prior to the

[1] This study was registered as clinical trial: See

https://www.anzctr.org.au/Trial/Registration/TrialReview.aspx?id=370425)

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commencement of each focus group held at their institution. At the beginning of each group, participants were reminded they could terminate their involvement at any time during the interviews without penalty. Participants were also provided with the opportunity to stop and restart the audio recordings at any time. Six of the ten focus groups conducted involved participants who had undertaken the face-to-face intervention (31 participants), and the remaining four focus groups (34 participants) were held with those completing the web-based program. In total, 65 nurses volunteered to participate in the focus groups comprising a skill mix of graduate nurses (n = 7) (1st-year post-registration), enrolled nurses (n = 17), registered nurses (n = 31) Associate Nurse Unit Managers (ANUM) (n = 6) and general managers/educator/learning program coordinators (n = 4). In most focus groups, the skill mix varied with ANUMs present in approximately a third, which may have had some impact on the overall dialogue.

Focus groups lasted approximately 60 minutes and were audio recorded and transcribed verbatim. Using a semi-structured interview schedule designed by the research team from the literature, two of the researchers with experience in facilitating focus groups conducted them. The interview schedule included starter questions about the following:

1. Form of program completed (either face-to-face or web-based).
2. Fidelity of simulation.
3. Clinical applicability of the program they completed.
4. Educational outcomes in terms of changes to practice.
5. Possible improvements to the program; and
6. Reflections on their practice pre- and post-intervention.

Field notes (as part of the reflective practice) were also recorded in two researchers' personal journals and formed part of the data. To support rigour, transparency of documentation, audit trails, and authenticity of commentary including the researchers' reflections in asking participants the questions and then inviting commentary on colleagues' positions to ensure clarity in meaning, were included.

Focus group transcripts and field notes recorded in journals by the two researchers were independently analysed. Data were analysed using coding based on language and meaning and from which tacit and embodied understandings informed the subthemes and themes. Field notes provided additional information about participants' engagement, non-verbal details, tracking ideas and reflexive questions to pose when the data was analysed including questions about power relationships where mixed-skill focus groups were taken for granted. A coding format was initially used to locate and cluster verbal texts associated with the questions. Texts were then further examined and reclustered to expose underlying or alternative ideas. As additional clustering occurred, new understandings emerged in the language as it was exposed by peeling back or unfolding different meanings in which the participants' language served to implicate aspects of practice [10]. The interpretive lens facilitated the initial examination of textual experiences that were then reconstructed to enable the development of subjectivities revealing participants' tacit and embodied understandings of their practice interventions [11]. These understandings were then grouped into the sub, then common or core themes reflecting multiple dimensions of meaning whilst articulating tacit knowledge and taken-for-granted assumptions in practice [12]. This interpretative lenses helped to highlight the implicit and useful knowledge that practitioners have and use in their work. 10]. Meanings were also 'checked' with subsequent focus groups to increase the depth of understanding establishing credibility, resonance and authenticity [11].

For the purpose of clarity coded details at the end of each quote make clear the program involved, where *web* is used for participants who undertook the web-based program, while participants who engaged in the face-to-face version, the code *f2f* is used. In addition, to maintain confidentiality to do the ease of identifiability of participants by their role they were undertaking within the health service, these identifiable characteristics are not disclosed.

The paper has been through a lengthy peer review process since data collected that involved several rounds of input and revision because of the complexity of this research and the possible consequences of the findings.

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3. Results

Among the 65 participants, three core themes emerging from the data, which encapsulated 1) the structure of the program and its impact on practice, 2) surveillance and patient deterioration, and 3) the tacit knowledge informing clinical judgement. Each of these themes and sub-themes are discussed detail.

3.1. Structure of the program and impact on practice

One of the questions faced in the overall study was to try and gauge whether web-based education was more effective in learning about clinical practice than face-to-face interventions. As part of this quest, the focus groups participants were invited to explore what they felt about the structure of the program and whether it had benefitted their practice. Participants from both programs highlighted certain aspects of the experience including a) the benefits of ongoing learning; b) reflection on the process; c) mirroring the everyday world; d) how simulation affected the participant's clinical practice with subsequent impact on patient care; e) anxieties experienced undertaking the program.

3.1.1. Benefits of ongoing learning

Comments relating to the web-based program varied. There were participants who enjoyed the opportunities to engage with the program because *"a lot of us are a little bit older, less techno-savvy, and perhaps learn face-to-face better than – "(wb).* Given the dominant age range for registered and enrolled nurses were practising is 50-59 years (24.7% of the nursing workforce), [13] it is not surprising that many nurses feel they were not as computer literate as younger colleagues. Nevertheless, the online program was considered *"…good…I like that business. Because you can do it at your own pace" (wb).* Moreover, the opportunity to achieve mastery with self-pacing *"increases the confidence" (wb).*

Whilst participants in the face-to-face program, it was noted the generic nature of the training in terms of how it might be used in multiple healthcare environments, and there was a noticeable sense of discomfort in terms of the scenarios reflecting particular contexts of practice. The most common was the public/private hospital divide and how these two distinctly different organizations engage in caring practices that affect the deteriorating patient.

> *It's a few fundamentals that I think [are] quite different between private hospitals and public hospitals; so how we work wasn't really differentiated. Yes, the scenarios would all be the same, but the way we work within the hospital was very different… f2f.*
>
> *I think it's more perhaps suited for a public hospital than a private. Like I work public and private, and it was very - probably more like what would happen in a public hospital, having the doctor right there and [click] on standby. Whereas here [in private] you don't. f2f*

Not having a medical practitioner on-site twenty-four hours a day in private hospitals requires the registered nurse to use clinical understandings that are often derived from years of experience, expertise [14] and tacit knowledge [15–18]. This experience, expertise and knowledge is recognised and supported by programs such as this one. *"I've been nursing for a hell of a long time, so it was more reinforcing" (f2f).* Indeed, professional development in healthcare institutions could benefit by using either format.

> *I thought it might be good if we do 12 months of mandatory education with fire and safety and forms and all that sort of stuff…it was a good refresher…What you should do when you should see that deterioration, just a refresher that sometimes you might not notice something that you should. wb*

3.1.2. Reflections on the process

Looking back and reflecting on their experiences, participants in the face-to-face program saw its value for a number of reasons:

> *It was a positive experience. It was a powerful learning experience. So, to be able to self-reflect afterwards and yeah, talk about what we could have done and what we didn't do and what we did do. f2f*

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The filming of the participant's performance enabled the individual to stand back and view their engagement in the simulated situation. This performativity of the nurse, while not real, did approximate reality.

> *It's different when you're in the situation, you just go and do things. Whereas being outside and then looking at the film was another experience that you could pick up on things that in the moment - that you weren't necessarily properly concentrating on or thinking of. So, it gave you another perspective being outside, looking in and not part of the situation. f2f*

Furthermore, examining how one acted generated confidence and provided ways to think about how one acted in different situations using experiential understandings. *"It also builds your confidence to know that you actually have got that knowledge…you are doing the right thing when you get your feedback" (wb).* These acts of surveillance highlight the practitioner's self-criticism or perhaps more importantly the absence of critique from an instructor. *"I remember at the time feeling frustrated that there wasn't more feedback" (f2f).* In such cases, it is possible to suggest that nurses have become enculturated into understanding that external sources of approval carry greater weight than self-recognition of one's accomplishments. Unquestioned understandings appear as common sense, an acknowledgement of 'this is what is, and this is what needs to happen'. In these circumstances there is no external voice, rather, one is looking at the self and gauging one's performance on what one understands the protocol to be. This shift in thinking is significant in terms of self-engagement, reflection and has impact on one's practice standards. Nevertheless, the importance of commentary from an authority (the instructor), add weight to the disciplinary voice [19] of the self to ensure the right action occurs.

> *I think that would be the most valuable aspect of the whole training – the scenarios were excellent – and made us think quickly which is really important. It's ultimately having a little bit more feedback surrounding our actions and areas to improve. f2f*

Thinking in correctional terms, 'wrong/right', is not helpful. What it really overlooks is that practice is not a question of binary distinctions – good and bad. Rather it is a complex tentative process of making decisions based on the fluidity of data where the practitioner makes informed judgements relative to their experience and practice understandings.

3.1.3. Mirroring the everyday world

Participants raised concerns about the limitations of the simulation. In particular when face-to-face with an actor they had to ask the actor what they were feeling and other questions about the deteriorating experience. As the actors were unable to mirror changes in their vital signs some of the constraints of the learning were apparent. *"When [the patient] is an actor - you have to actually ask are they sweating, are they clammy. That makes it obviously not real to me anyway" (f2f).* In this regard, predictive or anticipatory knowledge helps to show the individual what they are expecting, and this too depicts the nature of the nurse's knowledge or indeed pattern recognition. The importance of mirroring everyday reality is problematic when the actor playing the doctor is unable to portray the material world.

> *Because you knew we were hands on and we were all straight in there and we just found it weird that this doctor said I don't know, I don't know, you know what the answer was, but can we tell you what it is…f2f*

While this was regarded as frustrating, it did emphasize the depth of the nurse's knowledge in the care provision of the deteriorating patient. Clear demarcation lines between the modus operandi may be apparent in some clinical contexts but will vary in others.

Knowledge of process in the everyday reality of practice was not well mirrored in the web-based experience. In part, this may have been due to what might well be understood as a one-dimensional experience that is predicated on 'right' choices and singular activity.

> *It was frustrating because if you're in a clinical situation you can do two things at once. While you're, say, taking an ECG you'd be asking the patient about their family history or anything like that. You couldn't do that. You had to specifically do one thing and then you're locked out for that*

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length of time, which seemed, when the clock's ticking, it seemed like a long time. So, I found it very frustrating. wb

Sequential events portrayed as singular moments that together provide a picture of the deteriorating patient help to reduce the complexity of the situation. Recognition of patterns has consequences in early detection as a logical flow of outcomes given the nurses' responses. At the same time slowing down these events assists health professionals to more closely watch these patterns and make sense of the meanings in terms of clinical importance and thus impact.

3.1.4. How simulation affected their clinical practice

The extent to which the program made a difference to participants' practice was emphasised in all focus groups. Improved documentation that prompted recognition at strategic moments, would 'trigger' call for help. *"Just document, document everything" (f2f)*. Keeping the records up to date and ensuring the vital signs were being recorded enhanced clinical impact. In addition,

I think it also helped identify the gaps on the observations sheets and what we were and weren't doing correctly. I think I've even seen now back on the ward that people are utilising them…the obs charts now…and documenting it properly. f2f

The web-based program also enabled repetition, building one's repertoire of skills enhancing confidence.

3.1.5. Anxieties experienced undertaking the program

Many participants spoke about their anxiety in undertaking the web-based program, in large part because of their lack of familiarity with computer technologies. They commented on literacy, having to establish how the program worked; the absence of collegial support and thus, the risk of making a mistake. Those who undertook the web-based program found their anxiety levels were ameliorated with increasing knowledge of the format and opportunities to practice. This was particularly important to nurse who had limited computer skills or minimal exposure in using one. *"People who weren't computer literate were more anxious" (wb)* and because they undertook the program on their own, in the absence of colleagues, *"…you were doing everything on your own. You didn't have that support you felt" (wb).* Perhaps the presence of colleagues to facilitate the experience and affirm decisions in the 'real situation' works to build self-assurance reducing the levels of anxiety.

Nurses who undertook the web-based program found some anxious moments in completing it in a timely manner, or at least each of the various stages. Having to learn how the program worked did increase some nurses' anxiety because they were worried about providing the responses in the 'correct' way. Nevertheless, being able to address the issues as they arose "*helped the problem-solving process, yeah. I think it facilitated that and sort of helped guide you through what you'd sort of to-do mentally anyway" (f2f).*

3.2. Surveillance and Patient Deterioration

Organisations have their own systems of surveillance ensuring practitioners comply with standards that form aspects of the discipline's practice standards, as well as those that are institutionally driven frequently taken for granted by staff. Organising systems, therefore, include not only many reified practices but also overt protocols. The complexity of managing the deteriorating patient is best understood by participants in *"[clear expectations, clear guidelines and expectations from the medical team would absolutely go a long way I think if there's the clear direction it eliminates all of that uncertainty…(f2f).* The context of this comment was one in which the participant found themselves 'directing' the activities and providing advice to the medical officer. Many nurses in the study had a practice background in intensive care and/or had undertaken a critical care course (field notes). Well-informed insights gained during the past provided the ongoing development of practice wisdom.

The clarity in communicating the nature of the patient's status is vital. *"A good handover is key. So, it's making sure that that continuity in communicating is always open and that information is passed on*

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[about a patient]" (f2f). It could well be that the nuances in a patient's clinical status are not recognised by staff. As one accumulates these understandings one's intuitive knowledge develops over time. The less experienced would not perceptually recognise the small subtle aesthetic [20,21]), shifts in status.

> *There are quite a few altered conscious states that do or don't get called, it depends on different situations. People that are in palliative care situations for instance still have MET calls that…hasn't been altered yet. They're in that phase that we wouldn't call MET call. wb*

The documentary requirements noted by staff facilitate the initiation of a MET (Medical Emergency Team) call. There were instances when the patient appeared to be 'at risk' of having reached the MET criteria. In situations where the patient was receiving palliation, however, no MET call occurred despite the lack of clear documentation or shared information. *"Someone's deteriorating and there's been a decision that they won't take any further action, but it hasn't been clearly documented." (wb)* One wonders whether the nurses' local knowledge informed their practice decisions based on aesthetic understandings (for example, [22,23] and the various interpretive positions they may have taken. For nurses newer to the field, this intuitive and maybe relational understanding between colleagues could be constructed as a failure to communicate.

Participants in one focus group spoke about some of the difficulties they faced in noticing that the MET criteria required the initiation of action. In these instances, nurses tended to seek advice from their supervisory team not relying on their own clinical judgement. Nurses' actions varied in response to vital signs chart criteria for triggering assistance. *"If you run it past your supervisor or whoever's in charge and they say no – [there is] nothing you can do about it" (wb).* On occasion, however, *"[you might get the [Critical Care Unit] (CCU) liaison to come around and then you've got your buddy helper and you might manage it before it gets to be a MET call" (f2f).* Surveillance appeared to be multifaceted with clear discriminatory guidelines informing nurses when to act, thus reducing risk. In some respects, however, it deskilled nurses by not fully calling on their scope of practice. There are, therefore, tensions in managing risk that potentially erodes the nurses' knowledge and practice understandings. As this nurse who had engaged in the face-to-face program commented – *"we were doing everything that needed to be done and we transferred the patient out. We didn't need to do all the bells and whistles" (f2f).* This example highlights the knowledge that more experienced nurses use to support the safety of the patient prior to generating a MET call.

3.3. Tacit Knowledge in Clinical Judgement

The 'Between the Flags' system, introduced in 2010 to improve the identification and response to deteriorating patients, is widely acknowledged in New South Wales, Australia, [24]. This system involves strict adherence to vital signs charting protocols, triggering a MET call when specific criteria are met. However, healthcare professionals recognise that such strict adherence may have the unintended consequence of limiting critical thinking and diminishing the flexibility in making clinical decisions [25]. Over time, this approach could potentially lead to deskilling, where healthcare providers rely solely on chart data, resulting in the decision-making process becoming automated and taken for granted. As one healthcare worker aptly expressed, *"I reckon the nurse's clinical call often is the right call. Rather than just relying on the raw numbers" (wb).*

The result is that practice knowledge diminishes, and the responsibility for the patient gets allocated to someone in a more senior position or a nurse who has undertaken additional education. *"It's about the management which - that reiterating that we're managing and what we need to do and what's right rather than we've called the MET, it's [now] someone else's responsibility" (wb).* Nonetheless, the charts create an opportunity to learn the patterns of deterioration and providing nurses with a valuable resource.

> *We're not always thinking of why it is going down; we're thinking oh, it's hit the yellow. I just need to call. We're not thinking well, it's going down…I think they might be a bit dry. We need to think of what interventions we need to do at that stage… wb.*

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Learning these patterns develops one's intuition. This is a form of tacit knowledge derived from experiential meaning [26] that when called upon, shifts one's thinking from a task-based observation of noting changes on the chart, to making meaning of the temporal situation.

> *If you're concerned about a patient. I mean regardless, I would say, for me, it would be gut instinct. If I'm concerned and the obs look okay - sometimes the observations aren't really going to be your prompt to call. f2f.*

Well-constructed feedback from the authorial voice of the institution or taken-for-granted assumptions directing self-surveillance, impact one's confidence. Taking a different position could result in retribution. *"Sometimes we might be discouraged from making that right decision when we should because we've been bitten a couple of times where we've rung [or called] them [doctors]" (wb).* According to several participants who work in the private sector, the ongoing experience of antagonistic relationships between nurses and doctors continues.

4. Discussion

Connecting the purposes with the perspectives from which the study originated and the cultural environments in which this took place, add to the veracity of the research by reportedly making a difference in participants' practice [27]. Together resonances of information, meanings generated by participants, researchers and the reader, help to establish trustworthiness. Collected successive dialogue of a similar nature highlights the impact of the two different approaches to learning and patient outcomes. Comments such as *"I'm definitely thinking more about the MET call situation now. If there isn't something done already that I can do, I do it rather than just standing there and waiting…" (f2f); and "Maybe we could do both though because I thought it was good to do it individually because it made you think" (wb)* were common. Statements such as this imply the importance of providing different approaches to learning to take into account the social, relational and individual perspectives in meaning-making which is crucial.

As highlighted, three core themes emerged from the data. The structure of the program and its impact on practice was found to be important in ongoing personal-professional development. In particular, how one generates new meanings from engaging the self differently was enlightening if not confronting for participants. Most participants had previous learning experiences that stood at odds with the simulation processes they encountered. One example was in the opportunities to see the self-perform and then evaluate their knowledge. Visualising the moment-to-moment decision-making in the web-based program provided a forum for developing self-paced knowledge. For example, a significant implication of the program is an increased awareness of the importance of documentation particularly when dealing with emergency situations. Yet, while the documentation was regarded as a critical component to reviewing a patient's status, it did not necessarily inform changes to practice where experiential knowledge called for alternatives such as 'wait and see', or where the context was part of the patient's normal pattern. These situations require further exploration.

Reflecting on the process of simulation and gauging action helped to reframe problem-solving and the decisions taken by individual nurses in the web-based scenarios. Initially, anxious moments were in the timing of decisions and making sure one acted appropriately in completing the program. Here, self-surveillance highlighted taken-for-granted assumptions that were hitherto unobserved. Tacit knowledge is developed from enhanced skill performance and augmented clinical knowledge [28]. Moreover, the web-based program enabled participants to have an opportunity to repeat the simulation, increasing self-confidence but it had less impact in terms of team knowledge and working together when a MET call was initiated. The focus of each session was on individual attainment rather than developing shared knowledge. While this approach assists the practitioner to increase their knowledge, there remain questions about ownership of that information when it is privatised.

The notion of tacit knowledge informing clinical decision-making remains problematic. Tacit knowledge for instance, reflects the personal understandings nurses use to inform their practice. Traditional meanings stem from, for example, Carper's [22] work on fundamental patterns of knowing in nursing. Carper argued (as have others subsequently such as Benner [15]; Benner and

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Wrubel [17] that tacit knowledge is a component of aesthetic understanding and expertise [14]so that meaning making derives from the merging of sequences into a picture to make sense of what is happening. The struggle to acquire this knowledge takes time. Yang and Thompson [29], however, oppose this view and point out the nurses' judgement might not improve with increasing years in practice. In another study, Cioffi [30] reports that nurses considered their ability to recognise patients' health status to be heavily grounded in past experiences. One wonders if the notions of performativity are contained in nursing knowledge or just in skilled action. Notions of performativity should be foundational in intuitive understandings embedded in nursing knowledge as a precondition for the right action. Linder and Pulsipher [31] claim that simulation 'training' assists the development of critical thinking, and clinical reasoning not only clinical judgement. Their findings do not completely parallel this study because nurses' perception of maximising clinical judgement which some participants saw as being systematically reduced when the usage of the standardised observation charts dictates what nurses need to do and when.

This study focussed primarily on tacit procedural knowledge development [32]. Taking Held's [33] interpretation of Habermas' [34] thesis on knowledge and human interests, educators need to enhance strategies that support grappling with the deeper meanings associated with forms of rational action, those aspects of performance that are dialectically related to language, culture and social relations [33]. In this way, there is an avoidance of a structural-functionalist position in which cause-effect relationships are exemplified rendering invisible opportunities for understanding [35] as well as accessing that knowledge that extend beyond singular scientific claims to truth or, technical rationality [36]. Schatzki [37] for example, argues that practice occurs in a context in which things or entities are situated within a set of special relationships. These arrangements of elements convey meaning. For nurses, as for other health practitioners, particular relationships between things depict patterns suggestive of an interpretive identity. Meanings are, therefore, reflective of what the individual understands this identity to be within a set of social arrangements or relationships. Moreover, it is the ability of the individual to work out what makes sense in particular circumstances that gives their performance intelligible [37]. Especially pertinent if nurses are being encouraged to change their practice, the notion of action and sense-making is the consideration of the socio-relational, cultural, material and historic elements in which arrangements of action occur [10]. Deeper meanings contained within these practice sites provide a platform for skill acquisition situated in complex practices of purposeful action. If a change is required, however, and individual practice transformed, then the social world in which one's engagement occurs also needs attention as the action takes place within social circumstances [38,39] a material world in which one is shaped by, and shapes, the pervasiveness of pre-existing discourses. Therefore, embodied engagement involves learning across a material world involving cultural and relational ways of being. While there could be a tendency to focus on skill attainment alone, there is a risk of omitting taken-for-granted discourses where deeper meanings associated with rational action or sense-making might be realised.

Participants found observation charts discouraged their ability to think critically, a situation they felt stemmed from the assumption that health professionals with more clinical experience and knowledge have better clinical judgement. Examples such as informing the doctor about a patient's condition were deemed the most appropriate course of action for those in the face-to-face program. The charts requiring nurses to take action at particular points in the patient's trajectory, serve to reduce institutional risk. This study found that a combination of approaches to facilitate the opportunities to further develop practice understandings that on one hand address questions about performance, and on the other, engage participants in sharing knowledge and meaning making, is one of the ways forward.

This study endorses the findings of Chung et al., [7] which suggest opportunities for blended learning will facilitate ongoing education in clinical practice. However, as Kim and Lee [40] describe, cognate, affective and psychomotor areas plus the value of simulation to the learner and the learner's developing competency are critical to educational strategies designed to increase clinical competence. A focus on the technical only, however, will distort potential patterns of action because it fails to take into account a fuller picture of the patient's health status. Central importance needs to be given to the

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cultural and relational elements in which nurses' performativity (not just the notion of competence) can significantly affect a patient's deterioration. Nurses' theories in use are shaped by, and give rise to, identities in which patterns are formed, and where understandings reflect the fluidity of unstable environments in which nurses work and make sense of their realities. This would suggest that by unpacking the practice worlds of nurses to reveal assumptions, clinical judgements, cultural knowledge and relational positions, a better understanding of situations in which nurses find themselves making decisions about which courses of action to take when a patient deteriorates, will reduce anxiety, and diminish self-surveillance. Further analysis of participants' commentary, their skill level, gender and age may also provide much-needed detail on differences in educational approaches to program development. In addition, processes of achieving consent with a staff of mixed status within the institutional hierarchy may add to closer scrutiny of the ways in which discursive patterns in the dialogue reflect power relationships in terms of the nature and substance of contributions. Put another way, power relationships underpinning the dialogue in this study may have had more influence than can be documented here. It would be interesting to separate the focus groups into staff categories such as RN or administrator to see if there was a variance in the dialogue.

Translational work to other fields would add to a growing understanding of alternative pedagogies that take into account tacit and embodied knowledge and their implications for practitioners. In addition, this knowledge may add new light to the meaning of competency. The nurses in this study felt that both the face-to-face and the web-based programs were valuable, a situation that parallel's Chung et al. [7] findings. As an ongoing educational program, both the face-to-face and web-based activities had their beneficial dimensions, value adding to nurses' knowledge and intuitive grasp of what is happening when a patient deteriorates. It built confidence and affirmed participants' understanding. Limitations of the study include the fact that the reality was distorted by role-play; participants who were technologically challenged had to learn how the program ran before they could operate the package. Further information on the experiential knowledge of participants is also warranted to evaluate the success of the health team who have different skill sets.

5. Conclusions

Nested in the larger mixed method project, this study used ten focus groups located in four separate institutions to explore whether nurse participants felt their practice was influenced by participating in either a face-to-face simulation educational program on patient deterioration or a web-based intervention. Using different pedagogical strategies draws attention to the learner's literacy in the design of the program a situation that requires careful consideration when working with people who have diverse skills and knowledge. Further research needs to explore how best to garner participants' experiences to maximize meaning-making in learning where nuanced changes in a patient's condition foreshadow deterioration. Revisiting Benner, Tanner and Chesla's [36] approach to sharing experience via storytelling (narrative) may hold additional promise in coming to grips with the complexity of patients' situatedness.

Attention to mirroring reality in both the web-based and face-to-face programs is vital because educational interventions will then have the capacity to bring together those arrangements and identities that comprise situational contexts, relational, political and economic aspects of reality that have a bearing on the performativity of the practitioner, enabling them to make sense of the contexts in which they find themselves and then to act intelligibly. Further unpacking of these various texts will add to ways in which practice can be improved, greater appreciation of embodied knowledge and tacit understandings in this context can then be shared with colleagues, promoting early recognition of patient deterioration.

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