THE DEVELOPMENT OF A CONCEPTUAL FRAMEWORK AND AN ACCOMPANYING TECHNOLOGY ENHANCED LEARNING TOOL TO REDUCE THE INCIDENCE OF PRESSURE ULCERS: A NEW MODEL FOR PRACTICE.

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List of Abbreviations

ABBREVIATION	IN FULL
ACP's	Advanced Clinical Practitioners
aSSKINg	**A**ssess risk, **S**kin inspection, **S**urface, **K**eep moving, **I**ncontinence, **N**utrition, **G**iving information
BCU	Birmingham City University
CPD	Continuing Professional Development
CQC	Care Quality Commission
CQUIN	Commission for Quality and Innovation
DH	Department of Health
EPUAP	European Pressure Ulcer Advisory Panel
GP's	General Practitioners
HEE	Health Education England
HES	Hospital Episode Statistics
IT	Information Technology
MUST	Malnutrition Universal Screening Tool
NHS	National Health Service
NICE	National Institute for Health and Clinical Excellence
NIHR	National Institute for Health Research
NMC	Nursing and Midwifery Council
NPUAP	National Pressure Ulcer Advisory Panel
NRLS	National Reporting System
NWCSP	National Wound Care Strategy Programme
OSIME RDG	Online Simulation and Immersive Education Research and Development Group
PURSUN	Pressure Ulcer Research Service User Network
SUS	Secondary Uses Service
PPPIA	Pan Pacific Pressure Injury Alliance
TEL	Technology Enhanced Learning
TELT	Technology Enhanced Learning Tool
QUIPP	Quality, Innovation, Productivity and Prevention
VCC	Virtual Case Creator
WHPDU	Wound Healing Practice Development Unit

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Abstract

The Development of a Conceptual Framework and an accompanying Technology Enhanced Learning Tool to Reduce the incidence of Pressure Ulcers: A New Model for Practice

The incidence and prevalence of pressure ulcers has been an ongoing challenge for healthcare providers for decades, resulting in pain, suffering and a reduced quality of life for patients and an ever increasing financial burden for the NHS. The plethora of government initiatives, national and international guidelines all aimed at reducing their incidence has had little impact. Education and Training of healthcare professionals in pressure ulcer prevention, recognition and treatment has been shown to have a positive impact on incidence, and indeed there are some high quality free resources available, however, due to the lack of consistency in the quality and frequency of education and training the challenge remains. This study was commissioned by two NHS Trusts for the development of a new conceptual framework and model for practice to include a bespoke online learning tool with a specific focus on pressure ulcer risk assessment that could be accessed across a large geographic location.

A critical action research approach was chosen for this study as this enabled the researcher to build on each cycle, developing the conceptual framework and model for practice concurrently with the online learning tool. Thus developing and integrated approach to the prevention of pressure ulcers in all healthcare settings.

Building on the work of others, a conceptual framework has been developed that, for the first time combines all elements required to reduce the incidence of pressure ulcers, including the currency of competency testing, for healthcare staff involved in caring for patients at risk of developing pressure ulcers. It has been designed as a multimodal approach linking research, government strategies, education programmes such as "the TELT", care provision and practice, as it is only through integration that consistency in practice will be achieved, leading to a reduction in incidence and prevalence of pressure ulcers.

For the TELT, the results reveal that that the bespoke, patient focussed, simulation technology enhanced learning tool has the potential to be used effectively as an integral component of the commissioning Trusts CPD portfolio. The TELT was well received by healthcare staff who approved the interactivity and challenges it posed.

However, some technical issues did emerge, which for some impacted on the overall learning experience of the user. These have now all been addressed, and the programme can now be launched across the Trusts.

 Overall the study positively supports the UK Government's ambition, through the National Wound Care Strategy Programme, to reduce the incidence and prevalence of pressure ulcers, reducing the financial burden on the NHS and more importantly the pain and suffering of patients.

Chapter 1

1.1   Introduction

This study was developed following requests for help and support from two National Health Service (NHS) Trusts, to design an education and teaching tool to enable the Trusts to work towards the government requirements to reduce the incidence, prevalence, and impact of pressure ulcers. Pressure Ulcers are currently categorised using gradation labels 1, 11, 111, and 1V, which indicate their increasing complexity. The European Pressure Ulcer Advisory Panel (EPUAP, 2014 p12) gives a definition that is clear to both professionals and the lay public, suggesting that a pressure ulcer can be said to be a "A localised injury to the skin and/or the underlying tissue". They go on to point out that it is "…. usually over a bony prominence." (EPUAP, 2014 p12) and to cite possible causes. Today, pressure ulcer prevention is seen as a fundamental aspect of health care provision involving a range of health care professionals; however, the statistics reveal that in the UK, the majority of pressure ulcers are chronic, and found in patients cared for in community settings by nurses and General Practitioners (GPs) (Guest, 2020). Thus, it is essential that health care professionals, carers and the patients they serve, are aware of the risk factors associated with pressure ulcer development if they are to use timely interventions, firstly to avoid their development, and secondly when they have developed, to prevent them progressing through the increasing severity Categories.

Greenwood & McGinnis (2016) argued that the lack of staff education plays a significant role in the continued challenges of pressure ulcer prevention. They suggest that these wounds are frequently mismanaged, resulting in additional costs, delayed healing and other complications. Ousey (2014) suggests that health care professionals involved in caring for individuals at risk of developing pressure ulcers need to have the appropriate education and training. Schofield (2018) supports these views, arguing that there is no consistent approach to the length of time for, or the frequency of, pressure ulcer education. However, the UK is not alone in facing this problem, with pressure ulcers regarded as an international health care challenge (Briggs et al, 2013; Smith et al, 2016). Regardless of the immense amounts of money spent, and major advances in treatment modalities, the financial burden on global health services,

remains in the billions, and continues to rise exponentially (Larouche et al, 2018). However, cost is only one of the major issues associated with pressure ulcers, equally their impact on patient morbidity and psychosocial aspects of life, can in turn have long-term effects on quality of life, and should not be underestimated (Gorecki et al, 2009, 2012; Guest, 2020; Fletcher et al, 2021).

A major challenge to the provision of education and training in this field is that due to staffing constraints and service demands, NHS Trusts are constantly challenged in their ability to release staff to undertake continuing professional development (CPD)t; therefore, their emphasis has to be on mandatory training for example Moving and handling. However, as all health care providers are charged with reducing the incidence of what are largely but not wholly avoidable pressure ulcers (Department of Health (DH), 2010 b) that is Category's 11.111.1V, a national impetus for education in this field has developed. The Trusts, who contacted the university wanted the development of an online learning programme, with flexibility of delivery that would challenge and enhance the participant's knowledge and understanding of pressure ulcer risk assessment and through this improve patient care. They were clear that they wanted an education and training programme that they could subsequently evaluate in practice, seeing this as an essential element in the prevention and management of pressure ulcers.

1.2   Rationale for the Study

This study, as indicated above, was commissioned by an NHS Trust, on behalf of themselves and another Trust, and funded by their local Clinical Commissioning Group as part of their Commissioning for Quality Improvement (CQUIN) payment, in recognition of the significant cost that pressure ulceration has on patients, carers and NHS providers. In anticipation of a longer term solution, they chose to support the development of a flexible education and training resources to enable all staff to access the knowledge and acquire both understanding and skills in completing effective assessments of individuals at risk of developing pressure ulcers. Their aim was to develop an "expert" workforce, and for patients to receive high quality, evidence-based care, with the goal of reducing overall the incidence and prevalence of pressure ulcers. They therefore commissioned the researcher's university to develop a continuing

professional development education programme. Recognising the skill mix and diversity of their staff, they wanted a programme that could be accessed by qualified and unqualified nurses, midwives and AHP's engaged in the assessment of individuals to determine their risk of developing pressure ulcers, across their health economy, including the care home sector. As stated above, the education and training programme formed part of a "CQUIN" set by the NHS Trusts Clinical Commissioning Group it was linked to additional funding made available to the Trusts provided the "CQUIN" related to pressure ulcers was met. Commissioning for Quality Improvement (CQUIN) was an initiative that emerged from the Darzi Review (DH, 2008) that enables NHS providers to be given financial incentives if they can demonstrate their achievement in providing high quality and innovative patient care.

The timing of the study was good as the university was leading the UK in simulation and gaming in nurse education and had developed the Virtual Case Creator (VCC) for their undergraduate nurse education and training programmes. This had been very successful, and the originator and the technology experts had recently completed a Dutch version of the programme via a funded programme with Saxion University that had been very well received (Notter et al, 2014). There were already clinical scenarios for the students, but at that time there was none for post-registration nurses and none for specialist areas such as pressure ulcers. The move to include prevention, and risk assessment for a specialist area of practice was welcomed by the Faculty, and it seemed to the researcher, that the university and the commissioning NHS Trusts would both benefit from the study. The university now has an expanded suite of scenarios that can be used by a wider group of learners, and the commissioning NHS Trusts have an evidence based, fit for purpose, online learning package. The commissioning group had been very honest, in that they had secured some funding in support of a set CQUIN and with the study complete could access the financial incentives associated with achieving the CQUIN, as determined by the local Clinical Commissioning Group.

In the longer term, there is an opportunity to make the TELT more widely available to a wider national and international audience; particularly for those working in care homes, in emerging economies and lower income countries where there is an urgent need for accessible education and training in pressure ulcer prevention. By way of example, the researcher has been privileged to visit hospitals in Vietnam and has seen

at first hand, how, healthcare staff, strive to provide the best care they can to prevent and treat pressure ulcers. However, without the availability of accessible Continuing Professional Development, patients will continue to suffer, healthcare professionals will continue to be frustrated and hospitals and, in some countries, patients will have to manage the increasing financial burden for extended periods of time (Haesler & Rice, 2020, Fletcher, 2021).

The researcher is also the Director of a Wound Healing Practice Development Unit (WHPDU) which comprises four substantive, but very part time Professors coming from scientific, medical and nursing backgrounds with Visiting Professors from Podiatry and one currently in clinical practice out with England. Therefore, this study fitted well with the range of expertise in the university and for both the VCC and WHPDU the study was seen as an appropriate next step which could also help to raise the profile of both areas of expertise.

Given the researchers professional background and her passion for quality and evidence based care, it was decided, with the knowledge and support of the commissioning Trusts, that the study could be developed further, into an academic study that the researcher could then submit for the award of a PhD. It is important to report that the study was submitted to the Trusts for formal ethics approval, however, once documentation had been received and reviewed by the ethics committee, the decision was made by the Trusts, that as the study involved education and training it would fall under the oversight of the governance department. They therefore forwarded the documentation to this department, who after careful consideration, deemed the study to be a service evaluation, without patient involvement. Therefore, the approval letter for the study to start, was provided by the governance department as opposed to the ethics committee, see Appendix 1. Further, it is important to note, that when this study was approved by an NHS trust, there was no need for additional approval from the university. In consequence, once the Trust's response was received, the study was able to start.

This research was designed to be conducted across a whole, local health economy that includes an acute district general hospital, a community health and care trust, which included mental health services, and the care home sector.

The aims of the study were:

- To develop a conceptual framework and model for stakeholders to use to maintain and extend the expertise of their qualified and unqualified healthcare professionals, particularly nursing staff, in the assessment of individuals to determine their risk of developing pressure ulcers.
- To provide recommendations on future education and training policies for policy planners, healthcare providers and education institutions, and for post registration education and training in the field of pressure ulcer prevention and care.

To achieve these aims the following objective was devised:

To develop and evaluate an online Technology Enhanced Learning Tool (TELT) to:

- Explore the perceptions of qualified and unqualified staff who have completed the technology enhanced learning tool, to assess how it has impacted their knowledge and understanding of pressure ulcers and on their practice.

- Identify student engagement in the online learning package and the barriers/enhancers to its completion.

The study needed to develop a learning resource that was accessible to a large number of users, enabling care providers to demonstrate their commitment to the education of their staff, and aimed at reducing the risk of pressure ulcer development through the assessment of individuals to determine their specific risk level. Further, the Trusts wanted to be able to demonstrate the take up of the education programme across their teams but did not want to have to release large numbers of staff for extended time periods, therefore, their preference was for the learning and teaching approach to be based on 'online' learning. When they made this request, the Trusts were just beginning to consider using this approach for the (CPD) of their staff, consequently, they viewed this project as an innovative addition to the education and

training they needed to offer. Up to this point, their approach was mainly through power point presentations delivered online as opposed to face-to-face teaching.

The chosen approach, of Technology Enhanced Learning (TEL), which replaces the previous term e–learning is increasing globally (Guri-Rosenblit & Gros, 2011). The Higher Education Funding Council (HEFCE) (HEFC, 2009) in their e–Learning Strategy define TEL as "Enhancing learning and teaching through the use of technology" stating three associated advantages in using TEL namely:

- Efficiency: in that it is cost and time effective and increases sustainability and scalability
- Enhancement: related to improving outcomes
- Transformation: with significant changes in current practices and the development of new practices.

However, Kirkwood & Price (2014) in a critical review of the literature argued that it was rare to find explanations explicitly describing what TEL actually entails, hence organisations were likely to request learning opportunities based on TEL without a clear knowledge of what it comprises of, or its strengths and limitations. Although since then there have been major advances and multiple programmes in TEL, there remains limited focus on evaluating the learning experience in terms of interactivity and engagement, as well as output. There remained therefore a need for high quality research to demonstrate its applicability in a range of settings and as an innovative approach that can be tailored to individual needs, capable of engaging and motivating participants.

At identified above, at the time of implementing the study, Birmingham City University's then Faculty of Health had a unique resource, the VCC. VCC uses an online learning platform to present patient scenarios using 3D technology, aimed at facilitating clinical decision making within a safe environment. It works on the principles of gamification to engage and motivate the user to achieve staged recognition awards, through interactivity. The tool designed, comprised a number of cases that reflected the different locations in which care could be given. Initially it was suggested to follow a patient journey involving a 72-year-old lady who had a fall at home, was taken to hospital by ambulance and diagnosed with a fractured neck of femur. This scenario

enabled the case to be followed in each care setting, in different departments and onwards into a care home for assessment and rehabilitation, prior to discharge home. However, as this study formed part of a new approach to learning, it was agreed that only two patient care settings would be applied namely, a ward setting in an acute district general hospital and a patient's home. To ensure clinical validity, the online learning tool developed for this study was designed by academics and clinicians with expertise in the area of tissue viability, particularly with expertise in pressure ulcer assessment and prevention. However, all activities were led, directed and overseen by the researcher. The Trust welcomed the innovative approach proposed, seeing this as a way to empower their staff to take control of their learning a new and novel approach for the Trust. This would be their first venture into self-directed, interactive learning that they recognised could be adapted to address other areas. It would also provide the opportunity to engage staff in the use of technology to support their learning. Consequently, they were satisfied with all aspects of the study proposed and at no point did they express any concerns or ask to be more actively involved in the progress of the study.

At this stage, it is important to note that the VCC, originally developed for students, was an accepted element of an ongoing programme of learning. The target group in this study - NHS staff with diverse backgrounds in terms of their professional knowledge and skills. A significant difference between university-based students and the group for whom this particular education approach had been developed. In addition, those engaged in the study had differing levels of access to, and skills in the use of technology enhanced learning. Knowles (1990). Knowles et al (2015) assert that adult learners, are more likely to engage in learning if they understand why the learning is necessary; and they are more likely to be motivated to undertake the learning if it brought about a desired outcome. In essence, adults will come to a learning event with a wealth of both life experience and, as in the context of this study, relevant practice-based experience. Therefore, the VCC needed to be adapted to reflect the user's area of practice and status – qualified or unqualified - and enable them to explore the whole patient journey but from the position of their point in the care delivery process. The TELT had to offer information that increased and refreshed the participants current knowledge and understanding, whilst adding to their expertise.

The remit given by the NHS Trusts was for the study to focus on education and training for risk assessment to avoid the incidence of pressure ulcers, which was reflective of Hultin et al (2022 p232) assertion that "International guidelines agree that structured risk assessments are the cornerstone in pressure ulcer prevention" (EPUAP, NPIAP, PPPIA, 2019). The programme needed to include the assessment of individuals, anticipatory factors that could increase their risk of developing a pressure ulcer, and an understanding of presenting factors that could delay healing. However, it became apparent that the online learning needed to include sessions on the structure and function of the skin, maintaining healthy skin and the aetiology of pressure ulcers, subjects that were not part of the original commissioned brief, see reflections in Chapter 12. Further, change was needed to the conditions under which individuals participated in the programme, working to achieve specific aims was deemed more appropriate than recognition awards, as was the case with the pre-registration students accessing VCC cases. The programme also needed to develop an access mode for participants from the Trusts, who could then study in their own time or as designated by their particular managers, following the initial introduction to the VCC cases by the researcher. The above adaptations would enable the users to revisit each scenario on a number of occasions to achieve all the planned learning outcomes, and to reach the level required, thus maximising the learning opportunities available within the scenario.

A key aspect of this study was to determine how the use of TEL impacted on the participant's learning, which factors enhanced, and which were barriers to learning. From this, using the principles of adults learning, a framework to underpin ongoing education and training was developed, which was then piloted and refined, and resulted in a conceptual framework and a TELT that can be used as a stand-alone resource. This has the potential to have a significant impact on the way healthcare providers facilitate the ongoing education and training of their qualified and unqualified workforce, not only in the field of pressure ulcer prevention, but in many other areas of education and training, including mandatory training. Information from all the data sets was utilised to determine the factors that impeded or enhanced the use of the technology enhanced learning package and was applied to inform the recommendations emerging from the study, see Chapter 12.

There already exists a wealth of literature about pressure ulcers and their prevention but despite this existing practice has been ineffective. Equally, education and training linked to practice for healthcare staff is varied, both in terms of accessibility and content. As a result, preventing and managing pressure ulcers remains a significant challenge for the NHS (Webb, 2018; Wynn, 2020). Healthcare providers have no standard approach for maintaining, upskilling, and assessing their workforce, through the opportunity to attend accredited modules relating to the prevention and management of pressure ulcers. The usual format of part and full day workshops appear to have little effect (Wynn, 2020), so local NHS Trusts made the decision to commission their own online learning. The rationale for their decision was the changing emphasis now being placed on the psychosocial, care and economic issues resulting from an increasing incidence and prevalence of pressure ulcers in healthcare settings.

To develop an online learning tool that was relevant to resolving the challenges of pressure ulcer risk assessment, the researcher needed to explore how adults learn, cross referencing this with consideration of the variety of learning and teaching approaches available, to determine how or if online learning would prove to be 'fit-for-purpose' in this specific clinical field and the best way forward for the Trusts. In addition, a detailed review of the literature relating to the education of healthcare professionals in the context of pressure ulcer prevention was carried out, focusing particularly on TEL (See Chapter 5).

When considering the training needs of nurses, both registered and unregistered, recognising that the greatest demand for the online learning would arise from that group, it was essential that it reflected the requirements of their regulatory body's code of practice; this is the Nursing and Midwifery Council (NMC) Code - Professional standards of practice and behaviour for nurses, midwives and nursing associates (NMC, 2015; 2018), see Appendix 2. The Code, developed by nurses, midwives, patients and carers states that the practice of nurses and midwives is based on agreed standards that practitioners "live" by and can be used to hold the registered practitioner to account where their professional practice is brought into question. The standards are organised under four key headings entitled - Prioritising people, Practising effectively, Preserving safety and Promoting professionalism and trust. The Code is about ensuring that the NMC (NMC, 2015) as a regulator can ensure, as far as is

possible, their safeguarding role in protecting the public through the education and training of nurses and midwives and to ensure that they continue to be Fit for Practice following their entry onto the register through three yearly revalidations. The code developed in 2015 for nurses and midwives was updated in 2018 to include the new nursing associate role (NMC, 2018).

During this study, the NMC (2016) set out their requirements for revalidation, which came into operation in April 2016. Registered practitioners are required to complete a revalidation process every three years providing evidence to the Nursing and Midwifery Council, that they are safe to practice and that they adhere to the standards set out in the code. This in turns enables them to maintain their registration on the professional register. Within the context of this study, all four of the standards headings set out above are directly or indirectly relevant and in particular, the requirement to undertake 35 hours of CPD of which 25 hours must include participatory learning related to the individual's scope of practice. Therefore, the learning associated with this study would be ideal as evidence towards the achievement of the CPD element of the revalidation process.

There is an expectation that registered nurses and allied health care professionals are both responsible and accountable for the care they deliver and supervise. Consequently, participants undertaking what became known as the Technology Enhanced Learning Tool, (TELT), should have been motivated, as it provided them with the best evidence-based care for patients, whilst maintaining their own CPD, and assisting their employer to achieve associated funding to support the prevention of pressure ulcers and further enhance patient care. In addition, the importance of the study was further enhanced by the NMC, in the development of their new education standards in the "Future Nurse" curriculum (NMC, 2018), when they included required competencies specific to pressure ulcer prevention. This means that existing registered nurses need to ensure they are up to date with current evidence in the prevention and management of pressure ulcers in order to support student nurses entering the profession. It is only now that nurses who have completed courses based on the new standards (NMC, 2018) will be entering the workforce as qualified nurses. For all other nurses, training offered though the TEL, such as the one developed in this study, are likely to become mandatory, increasing the importance of this study.

The final group that needed to access the training were unregistered staff, whose specific needs differ to those of qualified staff. Whilst they deliver care within the scope of their abilities, they do not hold the same accountability as the qualified workforce, and work under direct and/or indirect supervision, they still play a key role in pressure ulcer prevention. This group were invited to participate in the study and their feedback used to identify their specific needs, leading to checks being introduced that ensured that available information was provided in a format that could be accessed, understood, and applied by all levels of staff. Also, it was appreciated that introductory sessions needed to be appropriate and that the materials provided recognised the distinct levels of expertise and practice. The latter influenced the content of some materials designed for inclusion in the programme, for example Chapter 3 is in fact a working document designed to offer fundamental information that would be appropriate to all those undertaking the TEL. With all the above acknowledged, the study began.

The progress of the study however was significantly influenced by the emerging pandemic Covid 19 and the impact on the development of the TELT and in particular staff attendance cannot be over-estimated. As the NHS strived to respond to the unprecedented demand resulting from the effects of the virus and the increasing number of cases in each wave, whilst also attempting to maintain emergency and essential services, workforce redeployment and availability was paramount. In consequence, less emphasis had to be placed on preventive practice; hence, whilst there may well have been an increase in the incidence and severity of pressure ulcers (Gannon et al, 2021), at present the full impact is unknown. It is likely that post COVID 19, lessons will be learned by healthcare providers, and their deliberations will include a review of the necessary changes to practice, its impact on the prevalence of pressure ulcers, what processes were put in place to manage increased risk, and how successful contingencies can be factored into future training. Further, Covid 19 introduced technological challenges, as services considered new ways of working e.g., how to enable clinical staff to care for patients remotely through, for example 'Virtual Wards'. The lockdown in early 2020 also affirmed existing problems in the NHS regarding technical equipment, recognising that there needed to be rapid advances in essential communication networking.

As a result of the pandemic, the decision was made by the Trust to temporarily pause the study activities until the demands of the pandemic were under control. The full

impact on this study will be discussed in future chapters however, the potential of online learning and a TELT to maintain CPD for staff was recognised. The TELT has the ability to facilitate CPD activity, whilst maintaining social distancing and protecting peers and potentially patients from risk (Gannon et al, 2021).

1.3   Positionality

The starting point for any study has to be recognition of the education background, knowledge and clinical experience of the researcher, and their impact on the design, planning, implementation of activities, and outcomes of the research. Increasingly referred to as positionality, the formalised recognition of the impact of the researcher on the research process and research outcomes supports transparency and auditability, as well as helping to address and minimise bias (Holmes, 2020). In positivist research an assumption is made that the researcher's stance is objective and outside the research process, but it is increasingly recognised that within all research there is an element of bias that needs to be identified and addressed (Bryman, 2016). In contrast to the positivist approach, interpretivist research has always accepted that because of their role, the researcher is actively involved in all phases of data collection and analysis. As Charmaz (2014) points out, the aim of qualitative research is an in-depth exploration of specific phenomena and includes reflection on how interactions between the researcher and participant(s) are established and developed, and how these impact on the study. Nevertheless, until relatively recently there was no formal process to acknowledge or describe the direct or indirect influence of the researcher (Moore, 2014). Assembling the different debates on subjectivity and objectivity does enable researchers to identify the positives and negatives that arise from their interactions during the research process (Hopkins, 2006; Bryman, 2012; Charmaz 2014). As a consequence, qualitative researchers, especially those working with marginalised groups, are required to acknowledge and reflect critically upon their position within research in which they are involved (Holmes, 2020). Therefore, a critical reflexive stance, with attention on the researchers own positionality was a crucial element throughout this study.

As a nurse with a clinical background mainly in surgical nursing, with a particular interest in cancer and palliative care, pressure ulcers and their impact on general health, morbidity and ultimately quality of life, or palliative and end of life care have

been ever present. Having moved into education, but maintained clinical links, it was a natural move to work with tissue viability experts, nurse consultants and educators to develop and deliver pressure ulcer education for both under and postgraduate audiences. This meant that when the commissioning Trusts approached the university it was for me an ideal study to undertake.

1.4   The Structure of the Study

The study comprises twelve chapters:

Chapter 1: sets the scene for the study as a whole and introduces the issues that need to be considered by the reader to enable them to understand the concept of pressure ulcers and their assessment and prevention.

Chapter 2: builds on the introduction, identifying the key issues and challenges associated with the assessment, prevention and treatment of pressure ulcers.

Chapter 3: focuses on the structure and function of the skin, how to maintain healthy skin, factors influencing wound healing and the aetiology of pressure ulcers.

Chapter 4: reviews the research related to assessment tools and their use in the prevention of pressure ulcers. Using this evidence, it goes on to detail the requirements underpinning the assessment process, with specific consideration on the education and training needs of staff.

Chapter 5: considers learning and teaching theories, it discusses the debate between pedagogy and andragogy, and the rationale for the choice of andragogy for this study. It also includes the exploration of technology enhanced online learning and teaching, particularly for continuous professional education and training, where the outcome is to facilitate increasing competence.

Chapter 6: concentrates on the methods chosen for the study, the rationale for the choices made, the underpinning theoretical perspectives, and the design and conduct of the study. The rationale for the use of critical action research, and within this

approach, the methods selected for the collection and analysis of the data, and the structure and order of activities within each cycle.

Chapter 7: provides an overview of the VCC that was used to develop the TELT.

Chapter 8: focuses on the first Critical Action Research Cycle including the development Testing and Piloting of the Technology Enhanced Learning Tool.

Chapter 9: presents the baseline data that started the study, including the circumstances surrounding the collection of the data. This chapter also explains how the experts were selected and their input to the study's development and the implications of its findings.

Chapter 10: centres on the implementation of each critical action research cycle and the outcomes achieved, including the piloting of the technology enhanced online Learning tool. It summarises the research activities applied, illustrating how using critical action research facilitated the identification of advantages and limitations in the TEL model, leading to a revision of the TELT that was ultimately piloted.

Chapter 11: addresses the main aim, discussing how the findings from the critical action research cycles and pilot have been integrated with the theoretical concepts of learning and teaching, the requisite knowledge of pressure ulcer care, and the influencing NHS directives, and how this culminated in the development of a conceptual framework and model for practice education and training, as requested by the commissioning NHS Trust.

Chapter 12: provides reflection on the study, the challenges faced as the study developed, and the strategies used to address them. It also considers the positionality of the researcher and issues that had to be addressed as the study progressed. It completes the thesis, with the conclusions reached and recommendations made with implications for future education, training, research and practice.

Chapter 2

2.1   Contextual Information

This chapter provides an overview and description of essential information around the definitions, incidence, prevalence, service directives, and challenges pertaining to pressure ulcer prevention. It explores a range of initiatives relating to the current government's Pressure Ulcer Reduction strategy, the economic burden brought about by pressure ulcers and their treatment on the NHS, and the impact that pressure ulcers have on the patient's quality of life. As stated in Chapter 1 p. 1, pressure ulcer prevention is seen as a fundamental aspect of health care provision involving a range of health care professionals; however, the statistics reveal that in the UK, the majority of pressure ulcers are chronic, and found in patients cared for in community settings by nurses and G.P's (Guest et al, 2020).

The European Pressure Ulcer Advisory Panel (EPUAP) offers a definition to both professionals and lay public, suggesting that a pressure ulcer is:

"A localised injury to the skin and/or the underlying tissue, usually over a bony prominence, as a result of pressure or pressure in combination with shear"

(EPUAP, 2014 p.12)

they go on to point out however, that the definition alone is not sufficient, as there are:

"…number of contributing or confounding factors are also associated with pressure ulcers; the significance of these factors is yet to be elucidated".

(EPUAP, 2014 p.12)

The National Pressure Ulcer Advisory Panel (NPUAP) have accepted the definition given above, and together both organisations developed a Clinical Practice Guideline (EPUAP, NPUAP, 2009). Subsequently, an updated guideline that included the Pan Pacific Pressure Injury Alliance (PPPIA) was then developed and published in 2014, but this retained the same definition (NPUAP, EPUAP, PPPIA, 2014), as did their further update published in 2019, (EPUAP, NPUAP, PPPIA, 2019). However,

according to (Philips et al, 2016), whilst this generic definition is useful, pressure ulcers also need to be formally classified within the category of chronic wounds that are hard to heal, pointing out that they are a significant cause of morbidity and mortality. Greener (2019) supports this argument, suggesting that the annual cost to the NHS of hard to heal wounds, including pressure ulcers is now over £5 billion, and rising annually. In addition, Guest et al (2020) point out that the problem is exemplified by the NHS England Safety Thermometer (2016), which found that despite a range of pressure ulcer prevention strategies, in one year alone (April 2015 - March 2016) 24,674 patients were identified as having developed a new pressure ulcer. Their estimate of the costs associated with managing these ulcers was more than £3.8 million. Disappointingly, their repeat Safety Thermometer NHS Improvement (2018a) suggested there had been no improvement in incidence since the 2016 figures, and that by 2019 the overall figures had risen further (Guest et al, 2020).

As a result of the ongoing challenge of pressure ulcer prevention and associated care provision, together with the lack of progress on the reduction in incidence and severity, NHS Improvement (2018 a & b) introduced a revised, and extended definition, which whilst similar to that of the EPUAP (2009) NPUAP (2014) and EPUAP, NPUAP, PPPIA (2019) adds the inclusion of pressure damage from medical or other devices and introduces additional possible physical presentations. They state:

> "A pressure ulcer is localised damage to the skin and/or underlying tissue, usually over a bony prominence (or related to a medical or other device), resulting from sustained pressure (including pressure associated with shear). The damage can be present as intact skin or an open ulcer and may be painful".
>
> (NHS Improvement, 2018b)

Following on from the above, NHS Improvement (2019) produced guidance reiterating that NHS trusts and educators, need to ensure consistency in their approach to care, with all staff using the same language, and basing assessment and care on the NHS Improvement (2018b) definition. Their guidance contained 29 recommendations, all of which had to be implemented in full by all NHS Trusts. In addition, the Trusts were required to review and amend existing policies and procedures to accept and adopt

the new guidance. Their expectation was that by adopting this guidance, there would be an improvement to the coding and reporting of pressure ulcers, as is required by NHS Trusts.

Changes in the revised definition, recognising that pressure ulcers can cause severe pain and discomfort, (Gorecki et al, 2009, 2012) in some instances, resulting in increased morbidity and mortality (Borojeny et al, 2020) was considered significant.

Further, the recommendations removed two previously accepted grades or descriptions of pressure ulcers:

1. Avoidable pressure ulcers, given that many pressure ulcers are preventable.
2. Secondly, unavoidable pressure ulcers occurring in severely debilitated individuals, possibly at the end of life, previously known as Kennedy Ulcers.

The terms 'avoidable' and 'unavoidable' are considered subjective and potentially viewed as intimating an element of blame. Equally, as causes can vary from individual to individual, this could lead to inconsistent and/or inaccurate reporting and adversely impact on the recording of the actual extent of pressure ulcer incidence. To maximise accuracy and consistency, NHS Improvement (2019) determined that all pressure ulcers were to be categorised 1, 11, 111, 1V (see Chapter 3 for more information) with the previously used grading system discontinued.

Definitions that were more person-centred, moved the focus for pressure ulcer prevention towards careful holistic assessment of the individual (EPUAP, NPUAP, PPPIA, 2019). In the case, of severely debilitated patients, the same holistic assessment and management remains essential, with an added focus on facilitating wound healing and/or managing the ulcer to maximise patient comfort through the reduction of pain and suffering (Fletcher 2021). It is increasingly recognised internationally, that the development of a pressure ulcer can cause anxiety, discomfort, and pain that may impact significantly on an individual's quality of life, (Welsh, 2017; Guest et al, 2020). This supports Gorecki 's (2009) review of 31 studies on the impact of pressure ulcers and associated interventions on health-related quality of life (HRQoL); which revealed that pressure ulcers significantly affect the physical, social, psychological, and financial aspects of HRQoL. Pain was reported to be a significant

issue. It was of great concern however, that patients perceived that their pressure ulcers resulted from inadequate health care, linked to a lack of clinical knowledge in their health care provider. It was disappointing to note that the same findings are still evident in recent research (Guest et al, 2020; Fletcher, 2021).

The impact of pressure ulcers and their treatment on the individual and health economies was recognised and included in the recommendations of the Darzi Review (DH, 2008). The report introduced incentives whereby NHS providers could accrue additional funding linked to their Commissioning for Quality and Innovation (CQUIN) strategy, if the strategy set out a robust plan to deliver high-quality innovative care. This scheme remains in existence today but, it has had little impact on the UK Department of Health (DH) (1992) target to decrease pressure ulcer occurrence by 5 to 10% annually. A target that has remained largely unachieved for almost 30 years. During this period, the DH have continuously advocated for improvement (DH, 1998; Nice, 2005; DH, 2008; NHS Midlands and East 2012; NICE, 2014a; NICE, 2014b NHS Improvement, 2018 a & b 2019). All repeatedly refer to the impact of pressure ulcers on the individual's quality of life.

In addition, a wealth of guidelines has accompanied government recommendations to assist practitioners in the provision of evidence-based care. These include NICE guidelines (2005, 2014 a & b, 2015), the European Pressure Ulcer Advisory Panel guidelines (EPUAP, 2009), the National Pressure Ulcer Advisory Panel, the European Pressure Ulcer Advisory Panel and Pan Pacific Pressure Injury Alliance (2014), the European Pressure Ulcer Advisory Panel, National Pressure Ulcer Advisory Panel and the Pan Pacific Pressure Injury Alliance (2019), High Impact Actions (DH, 2010a) and the Quality, Innovation, Productivity and Prevention (QUIPP) agenda (DH, 2010b). The NHS Safety Thermometer, a development from the QUIPP programme, was also introduced and aimed at collecting accurate and nationally comparable data that would be easy for healthcare providers to produce.

The Stop the Pressure Campaign initially developed in support of the NHS Safety Thermometer (DH, 2012c) was aimed at enhancing the standard and quality of patient care. The programme was initiated in the East of England before crossing to the

Midlands and East Strategic Health Authority (NHS Midlands and East, 2012) with the ambition of eradicating all of, what they called, "avoidable" pressure ulcers, namely Category 11,111 and 1V ulcers by December 2012. However, as a result of another health service reorganisation, the Stop the Pressure Programme ceased operating in Spring 2012 when Strategic Health Authorities were disbanded. Despite the latter, Power et al (2016), argued that the Stop the Pressure Programme had had a positive impact on the prevalence of pressure ulcers, leading to a reduction in prevalence from 5.9% in July 2012 to 4.4% in 2015 and 2016. The Programme was then reintroduced in September 2016 under the auspices of NHS Improvement, with a combined NHS England & NHS Improvement initiative known as The National Stop the Pressure Programme. This time it included an intention to review the various definitions of Pressure Ulcers, to arrive at uniformity in definition and to facilitate more accurate reporting systems. This resulted in the publication of The Revised Framework for Definition and Measurement (NHS Improvement, 2018a).

The *NHS Long Term Plan* (NHS England and NHS Improvement, 2019) also had a focus on wound care, recognising the financial costs of wound care on the NHS (Guest et al 2015). This plan included the development of a *National Wound Care Strategy Programme* (NWCSP) (Webb, 2018) and a Commissioning for Quality and Innovation (CQUIN) for wound care. The NWCSP comprised three elements:

1. The assessment and prevention of pressure ulcers
2. The development of a National Data Set
3. The standardisation of education and training.

However, according to Adderley (2019) the impact of the strategy has yet to be fulfilled, particularly in respect of a national data set. This is despite the development and implementation of the pressure ulcer framework, which includes local reporting systems and onwards to the National Reporting System (NRLS) (NHS Improvement, 2019; Sandoz et al, 2021).

Fletcher et al (2021) in their editorial reviewing how pressure ulcer measurement has been undertaken over the past 20 years, clearly acknowledges the investment and resources that have been devoted to collecting accurate data in respect of the incidence and prevalence of pressure ulcers. However, they challenge the increased

pressure this has placed on the health care system, resulting in practitioners being removed from direct clinical care delivery. They conclude that it is now essential that "A new national PU data system is required to support quality improvement for people at risk of pressure damage." They suggest that the new data collection system should be supported by three fundamental standards in which current data resources are used to reduce the load for clinical staff. These three standards are:

> "1. Data capture should be secondary to operational practice.
> 2. There should be clarity about the purpose of the data capture. See Figure 1 below.
> 3. Data should be of a level of granularity (detail) relevant to the purpose for which it is required." See Figure 2 below.

The figures below make it clear that data collection should not be a burden to clinical staff and as a result it should be obtained from what is already available. Furthermore, they suggest that there must be a clear rationale for what data is being collected and for what purpose with the required level of detail to ensure it is fit for purpose for whoever requires it.

Figure 1: Identifies the purpose of the data
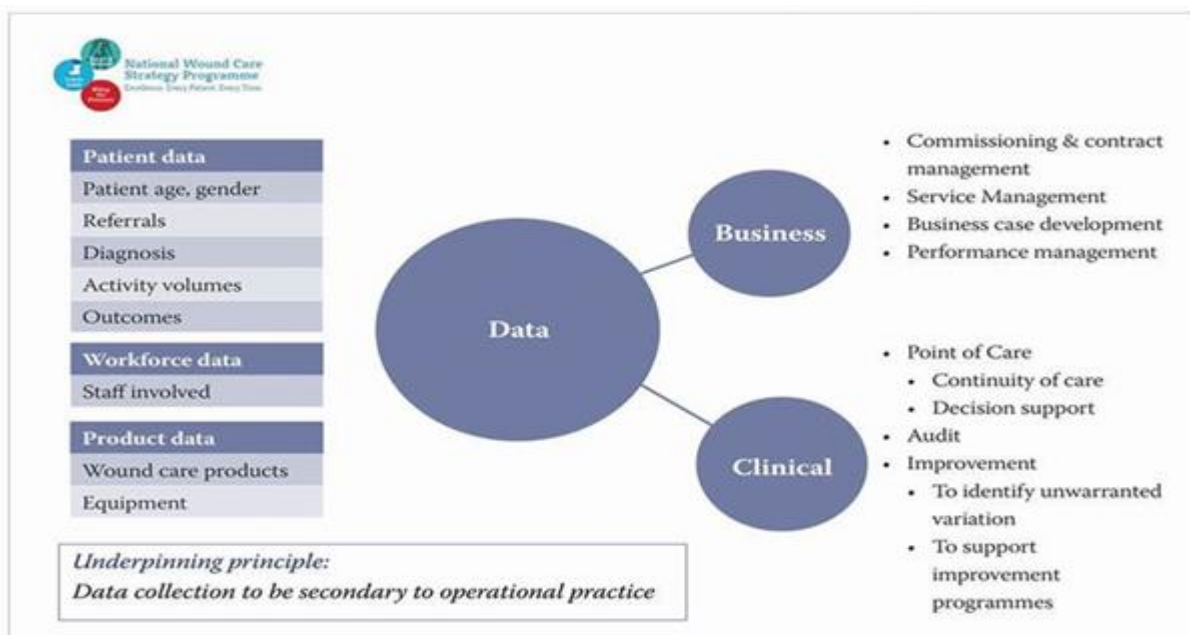
(Fletcher et al, 2021 p 17)

Figure 2: Identifies the use of data at different levels.

Use of data at different levels

Increasing granularity

National/Regional

Integrated Care System

Local provider

Clinican

National / Regional
- Highly aggregated patient / workforce / product

Integrated Care System
- More detailed across sectors/pathways
- Potential for patient linking
- Service commissioning
- Audit / Improvement

Local provider
- `Service management / improvement
- Contract management
- Audit / improvement

Clinician
- Continuity of care
- Clinical decision support
- Audit / Improvement

HES = Hospital Episode Statistics   CSDS = Community Services Data Set
LHCR = Local Health Care Record   EPR = Electronic Patient Record
ICS = Integrated Care System

(Fletcher et al, 2021 p 18)

Una Adderley, the Director of the National Wound Care Strategy Programme in a guest editorial for Wounds UK argues that *"Improving the surveillance of pressure ulceration continues to be a priority."* (Adderley, 2021 p.23). In support, Adderley acknowledges that since the NWCSP's inception in 2018, a great deal has been achieved but that there is much more required in the remaining four years if the project is to achieve its ambitions. Furthermore, it is highlighted that whilst the focus has been on the collection of data within secondary care, the programme is now looking at community services, a significant move, given the current burden of wounds, including pressure ulcers, on community services (Guest et al, 2020). Adderley, as a co-author, contributes to the view of Fletcher et al (2021), that using existing sources of data to avoid additional pressure for clinically focussed staff is an appropriate way forward. Adderley stresses the significance of enhancing data from both a digital and information perspective, describing it as essential if there is to be maintainable advances in the quality of patient care (Adderley, 2021).

Nyamajyah et al (2021 p.14) acknowledge that the NHS has collected data for some time via Hospital Episode Statistics (HES), which is obtained from a patient's individual clinical records. The information is "… extracted from Commissioning Data Sets (CDS) and submitted to Secondary Uses Service (SUS) data". This is significant inasmuch

as there are existing data sets that potentially can be adapted to meet the fundamental requirements of any new pressure ulcer surveillance system (Fletcher et al, 2021; Sandoz et al, 2021).

Sandoz et al (2021) suggest that one way of achieving the collection of data is via the Model Health System, developed from the Model Hospital approach (Carter, 2016), scheduled to come into operation during 2022. There will be three phases to this initiative, with the first and second phases focussing on Acute Care NHS Trusts using SUS data, which in phase 2 will incorporate the category of pressure ulcers. This work will then expand to include community care using the CSD data sets, with the aim of including existing data, thereby reducing the burden on clinical staff (Fletcher et al, 2021) and to "… eradicate unwarranted variations in the quality, safety and productivity of healthcare" Sandoz et al (2021 p. 15).

Considering retrospective approaches to reduce pressure ulcer incidence, designed over a decade ago, Whitlock et al (2011) reflected on the methodology adopted by the United States from 2004 onwards, whereby they aimed to facilitate the reduction of pressure ulcers using a structured approach based on the acronym 'SKIN'. It was internationally reviewed and became popular in the NHS, with NHS Wales (2010, 2013) the first UK country to introduce it. NHS Scotland (2011) then developed the concept further into 'SSKIN' and some eight years later, NHS England (2018) took it a stage further with their acronym 'aSSKINg' (**A**ssess risk, **S**kin inspection, **S**urface, **K**eep moving, **I**ncontinence, **N**utrition, **G**iving information) developed to support and guide care givers and providers in pressure ulcer prevention.

Arguably, the volume and range of available documentation, with in some instances, quite different information, has adversely impacted on shared understanding and the consistency of care delivered. Health professionals have received different training, information, and instructions, with the result that the patient may find themselves 'caught in the middle' with treatments changing as staff or the care setting changes. Such differences need to be replaced, with one standard set of information developed that can be easily accessed and recognises that the prevention of pressure ulcers involves two key elements:

1. Assessment: identifying those at risk of developing ulcers
2. Prevention and Treatment: implementing care plans and strategies to remove or reduce the risk and manage the individual's wound.

(Fletcher, 2017)

Recognising the important role that patients and carers have in the maintenance of good health and wellbeing, a national movement, supported by high profile personalities, aimed at reducing the number of pressure ulcers started in 2013 (Your Turn, 2013) producing patient/carer information leaflets to assist in this process. Yet again this initiative failed to deliver any significant reductions in the incidence of pressure ulcers. Nor have the changes to the NHS landscape, with an increased emphasis on patient choice, patient voice and harm free care (DH, 2013). The challenge here is likely to have been that the literature developed and distributed was not necessarily synchronous with that used within NHS Trusts and other care settings.

Choosing to address the challenges from an education and training perspective, the *Stop the Pressure* programme and associated campaign did develop a Pressure Ulcer Core Curriculum which was launched by NHS Improvement (2018a). Unfortunately, four years on, it is still not clear how or even if, this curriculum is used in part or in full by healthcare providers. Exacerbated by the demands of the pandemic deflecting attention, there is a danger that this information will sit on shelves rather than be implemented.

Identifying education and training as the way forward, the National Wound Care Strategy, Skills for Health and Health Education England were commissioned by the National Wound Care Strategy Programme to develop a National Core Capabilities Framework for England (Skills for Health, 2020). However, as this is still in its infancy, it is too early to identify what impact, these initiatives might have on the reduction in the incidence and prevalence of pressure ulcers. As this has been designated as a central component of the national response to address the challenges of pressure ulcers, it is discussed further in Chapter 4.

Patient Centred Care, with patient choice and the patient voice is now fundamental to the way in which todays NHS operates (Richards et al, 2015). Over the years, a range of initiatives have been put in place to facilitate this, including patient surveys, friends and family tests and a Patient Advocate and Liaison Service located within each NHS

Trust. Equally, each government has continually promoted public awareness as part of their campaigns. Included here is the, *"Stop the Pressure"* campaign (DH, 2011), which asserted that healthcare professionals, patients and, as appropriate, carers are an integral part of the decision-making process when planning care. Guy et al (2013) suggested that this approach would result in a more informed public, which in turn is highly likely to lead to an increase in patient expectations.

In terms of pressure ulcers, it appears that shared decisions have related mainly to preventative activities, as suggested by the media (Wighton 2012; Gregory 2013), however, the anticipated impact of a reduction in pressure ulcers was not achieved, instead a 43% increase in the costs associated with litigation was experienced in 2014 to 2018, as patients and their families sought redress for what they saw as unsatisfactory care (Stephenson, 2019). Leaving the aim of the *NHS Long Term Plan* (NHS England and NHS Improvement, 2019), to decrease the variabilities in clinical care and reduce the prevalence in pressure ulcers unfulfilled (Adderley et al, 2017; Adderley, 2019).

It must be noted that the current government policy changes pertaining to service commissioning and delivery will culminate in the end of Clinical Commissioning Groups to be replaced by Integrated Care Systems in 2022. This will bring about changes in funding streams, inevitably affecting care delivery and in the context of this study, education and training, at least until the new systems are fully implemented.

2.2   Summary

In summary, the impact on the quality of life for individuals and the associated financial burden on local health economies is well understood. Yet despite the wealth of research and government initiatives over many years, pressure ulcer prevention remains a significant challenge for healthcare providers. The new National Wound Care Strategy Programme and the associated National Core Capabilities Framework for England together with the now recognised and necessary need for greater consistency in education and training, could provide the impetus to make positive, achievable, long term change in pressure ulcer prevention. The value of this study is that it addresses the latter need and sets out a way forward for the delivery of an

educational approach that can be adapted to the differing needs of planners, practitioners, carers, and patients. Its recommendations will encompass, information (shared understanding of the challenges), communication (shared planning) and practice (shared, skilled delivery).

Chapter 3   Aetiology of Pressure Ulcers

3.1   Introduction

This chapter will enable the reader to develop a greater understanding of the impact that pressure ulcers have on patients, carers, health care providers and health care professionals. The focus will be on the structure and functions of the skin, the maintenance of healthy skin, wound healing, and the aetiology of pressure ulcers. The longer-term purpose of this chapter is to provide a resource for students undertaking the TELT whereby they can access information e.g., the anatomy of the skin and/or the aetiology of pressure ulcers that they could download as an aide memoire or access prior to or whilst working on the TELT.

The information provided will play a vital role in establishing an early understanding of the key issues and is aimed at paving the way towards further study. To facilitate this aim, a decision was made to write the chapter in an accessible style, making it available to all levels of participants. The findings of the initial critical action research considered during the preparation phase of the chapter, revealed gaps in the knowledge and understanding of participants, who in turn were requesting information to be delivered in a format that they could keep and use. Consequently, further adaptations were made, so that this section of the study can be utilised as identified above. To facilitate its practical use, this section would be regularly updated, currently it is being refined for unqualified staff.

3.2   Pressure Ulcer Development

Although these definitions were included in earlier chapters, as this is a teaching resource in support of the TELT the definitions are repeated here.
A pressure ulcer is defined by the European Pressure Ulcer Advisory Panel (EPUAP) as:

> *"A localised injury to the skin and/or the underlying tissue, usually over a bony prominence, as a result of pressure or pressure in combination with shear".*
> (NPUAP, EPUAP, PPPIA 2014, p.12).

The updated EPUAP, NPUAP, PPPIA (2019) now defines a pressure ulcer as
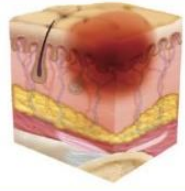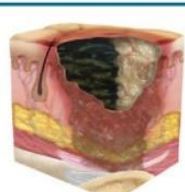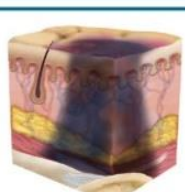
*"…localised damage to the skin and/or underlying tissues as a result of pressure or pressure in combination with shear. Pressure ulcers usually occur over a bony prominence but may also be related to a medical device or other object". (*EPUAP, NPUAP, PPPIA 2019, p.12).

3.3   Pressure Ulcer Classification

Pressure Ulcers are categorised as 1, 11, 111 and 1V, dependent on their severity with two additional categories entitled: Unstageable: Depth Unknown and Suspected Deep Tissue Injury: Depth Unknown.

Figure 3 below, is an internationally accepted classification system widely used across the world. The images make it very clear that it is essential for health care professionals, patients and carers to be aware of the risk factors associated with the development of pressure ulcers, if they are to ensure timely interventions and the avoidance of their development.

Figure 3: Categories of Pressure Ulcers

Category/Stage I: Non-blanchable Erythema

Intact skin with non-blanchable redness of a localised area usually over a bony prominence. Darkly pigmented skin may not have visible blanching; its colour may differ from the surrounding area.

The area may be painful, firm, soft, warmer or cooler as compared to adjacent tissue. Category/Stage I may be difficult to detect in individuals with dark skin tones. May indicate "at risk" individuals (a heralding sign of risk).

Category/Stage II: Partial Thickness Skin Loss

Partial thickness loss of dermis presenting as a shallow open ulcer with a red pink wound bed, without slough. May also present as an intact or open/ruptured serum-filled blister.

Presents as a shiny or dry shallow ulcer without slough or bruising.* This Category/Stage should not be used to describe skin tears, tape burns, perineal dermatitis, maceration or excoriation.

*Bruising indicates suspected deep tissue injury.

Category/Stage III: Full Thickness Skin Loss

Full thickness tissue loss. Subcutaneous fat may be visible but bone, tendon or muscle are not exposed. Slough may be present but does not obscure the depth of tissue loss. May include undermining and tunneling.

The depth of a Category/Stage III pressure ulcer varies by anatomical location. The bridge of the nose, ear, occiput and malleolus do not have subcutaneous tissue and Category/Stage III ulcers can be shallow. In contrast, areas of significant adiposity can develop extremely deep Category/Stage III pressure ulcers. Bone/tendon is not visible or directly palpable.

Category/Stage IV: Full Thickness Skin Loss

Full thickness tissue loss with exposed bone, tendon or muscle. Slough or eschar may be present on some parts of the wound bed. Often include undermining and tunneling

The depth of a Category/Stage IV pressure ulcer varies by anatomical location. The bridge of the nose, ear, occiput and malleolus do not have subcutaneous tissue and these ulcers can be shallow. Category/Stage IV ulcers can extend into muscle and/or supporting structures (e.g., fascia, tendon or joint capsule) making osteomyelitis possible. Exposed bone/tendon is visible or directly palpable.

Unstageable: Depth Unknown

Full thickness tissue loss in which the base of the ulcer is covered by slough (yellow, tan, gray, green or brown) and/or eschar (tan, brown or black) in the wound bed.

Until enough slough and/or eschar is removed to expose the base of the wound, the true depth, and therefore Category/Stage, cannot be determined. Stable (dry, adherent, intact without erythema or fluctuance) eschar on the heels serves as 'the body's natural (biological) cover' and should not be removed.

Suspected Deep Tissue Injury: Depth Unknown

Purple or maroon localized area of discolored intact skin or blood-filled blister due to damage of underlying soft tissue from pressure and/or shear. The area may be preceded by tissue that is painful, firm, mushy, boggy, warmer or cooler as compared to adjacent tissue.

Deep tissue injury may be difficult to detect in individuals with dark skin tones. Evolution may include a thin blister over a dark wound bed. The wound may further evolve and become covered by thin eschar. Evolution may be rapid exposing additional layers of tissue even with optimal treatment.

International NPUAP/EPUAP/PPPIA Pressure Ulcer Classification System

(NPUAP, EPUAP, PPPIA 2014 40-41)

3.4　Structure and Function of the Skin

3.4.1　Introduction

It is essential that healthcare professionals have knowledge of the anatomy and physiology of the skin, and how to maintain healthy skin to fully understand the aetiology of pressure ulcers. This section is prepared as a resource to support the participants' understanding. The content is readily available in a range of textbooks e.g. Ross and Wilson, Tortura.

The skin forms the boundary between the body and the outside environment. It is the largest organ of the body. In adults it covers approximately 2 square metres, weighs between 4.5 to 5 kilograms, and with a thickness that ranges from 0.5 to 4 millimetres depending on where on the body it is located e.g., the skin on the soles of the feet is thicker than the skin on the shin. In essence, the skin holds everything inside the body, acting like a coat that provides protection, and performs a number of important functions namely:

➢ Barrier to mechanical, chemical and physical insults
➢ Barrier to biological invasion
➢ Moisture retention
➢ Heat retention
➢ Sensory perception (pain, heat, pressure, vibration, itch)
➢ Communication
➢ Synthesis of vitamin D
➢ Immune surveillance

As can be seen in Figure 4, the skin comprises two main layers, the outer thinner epidermis and the inner thicker layer, the dermis. Beneath the dermis is the subcutaneous layer, often referred to as a third layer namely the hypodermis, which consists of areolar tissue that provides a support framework, allowing for the attachment to bones, and muscle, and adipose tissue that enables thermal insulation and a cushioning effect against traumatic forces and is a store of energy reserves.

Figure 4: Diagram of the Skin
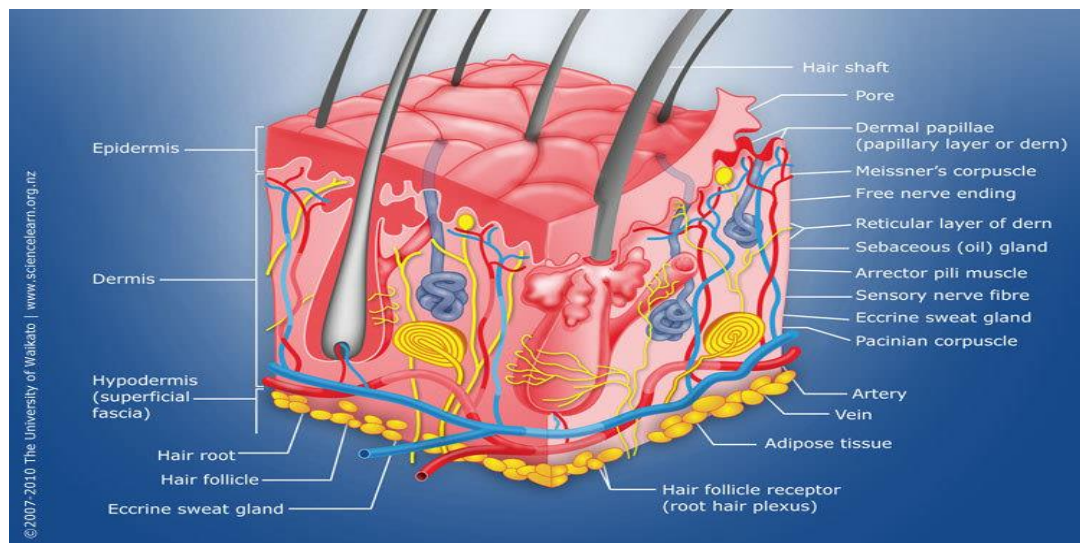
3.4.2 Epidermis

The epidermis comprises stratified squamous epithelial tissue that ranges from 0.05 to 0.1mm thick depending on gender and anatomic location. The blood supply in the dermis does not pass the dermal/epidermal boundary so the epidermis is avascular. Instead, proteins and other nutrients diffuse through the thin basement membrane of the epidermis from the capillary beds of the dermis. The epidermis is composed of five layers:

3.4.2.1 Stratum Basale

This is the layer at the dermal/epidermal boundary. It is a continuous layer, one cell thick but may be two to three cells thick in non-hairy (glabrous) skin. Here cells - keratinocytes are generated by mitosis dividing and beginning to differentiate moving upwards to form the other layers that comprise the epidermis. Epidermal ridges interlock with dermal ridges (rete pegs and dermal papillae) forming the dermal/epidermal junction.

3.4.2.2 Stratum Spinosum

This layer is where the ascending cells become irregular in shape developing protuberances or spiny projections - desmosomes, where the keratinocytes interlink

and start to form a structure that is strong and durable. Where desmosomes are not present or functioning, the adhesion between the cells is broken and the result is either skin loss or the presence of blistering depending on the extent of the damage to the desmosomes. Examples include genetic malformation of the desmosomes (epidermolysis bullosa), infectious damage (bullous impetigo) and autoimmune disruption (pemphigus). Langerhans' Cells are found mainly in this layer – these form part of the body's immune system that can interact with lymphocytes, are able to process and present antigens and are capable of phagocytosis. They can also release cytokines, to attract and activate lymphocytes. Studies in mice have also shown that Langerhans' cells regulate the balance between immunity and peripheral tolerance; mice without these cells have hypersensitive skin.

3.4.2.3 Stratum Granulosum

The cells that were still actively dividing in the previous layer continue to ascend but, in the process, flatten to producing Keratin a strong waterproofing protein substance. As they start to flatten, they lose their organelles as they progress through this layer. These cells contain granules of keratohyalin and lamellar bodies. The keratohyalin granules release filaggrin to form macro fibres. Lamellar bodies are organelles containing waxy (ceramides) and fatty (sterols and fatty acids) compounds. These organelles migrate to the edge of the cell, fuse with the plasma membrane and disperse their contents into the intercellular space. This plays an important role in barrier function and intercellular cohesion. The resulting extracellular lipids are known as the acid mantle. In atopic dermatitis, the lamellar bodies are blocked from releasing their contents, resulting in the poor barrier function of the skin.

3.4.2.4 Stratum Lucidum

This layer is found between the stratum granulosum and the stratum corneum in palmoplantar skin subject to lots of friction e.g., the soles of the feet where an extra layer of cells is present that produces a substance called Eleidin that provides a cushioning effect absorbing shearing forces created by e.g., walking.

3.4.2.5 Stratum Corneum

The outermost layer is composed of layers of non-nucleated, cornified keratinocytes. This layer is resistant to pH changes, temperature and dehydration. Around the early 1980's it was proposed that the outer layer of the skin had a bricks-and-mortar style arrangement. The bricks represent the keratinocytes; the now dead, flattened, and hardened with keratin cells. The mortar a lipid bilayer that started out as basic sterols and waxes secreted by the lamellar bodies into the extracellular space and now part of a structured environment that blocks the outflow of water into the environment and prevent the ingress of toxic substances, allergens, and microbial pathogens into the body. The lipid bilayer accounts for approximately 10% of the mass of the stratum corneum with the dead cells in this layer constantly shed and found in house dust and in bedding.

3.4.2.6 Adnexal Structures

Also known as epithelial appendages, these are important for re-epithelialisation where a wound has occurred. Epithelial stem cells are found in the basal layer, follicular epidermis, base of sebaceous glands and the bulge area.

3.4.2.7 Sweat Glands, Hair and Nails

There are two types of sweat glands: apocrine and eccrine. The eccrine gland is the primary gland responsible for thermoregulatory sweating. The structure of the eccrine sweat gland consists of a bulbous secretory coil leading to a duct. The secretory coil is located in the lower dermis, and the duct extends through the dermis and opens directly onto the skin surface. Sweating is regulated by the sympathetic nervous system and can be triggered thermally, through exercise, or mentally, through emotions or stress.

Apocrine glands attached to hair follicles are found mainly in the genital and axillary areas. These glands have a low secretory output and do not play a significant role in thermoregulation. The lipid rich secretions are emptied into the hair follicle. The exact role of the apocrine glands in humans is not understood. Hair is derived from the epidermis provides protection through insulation, heat loss, filtration and sensation. Nails are hard structures that protect the tips of the fingers and toes. Hair is derived

from the epidermis provides protection through insulation, heat loss, filtration and sensation. Nails are hard structures that protect the tips of the fingers and toes.

3.4.2.8 Sebaceous Glands

Sebaceous, or oil, glands produce lipid-rich sebum, which prevents trans-epidermal water loss and has antimicrobial properties, inhibiting growth of certain fungi and bacteria. Sebum production keeps the hair and skin supple, peaks in adolescence, providing an environment in which Propionibacterium acnes flourishes. Thereafter production decreases by 23% per decade in men and 32% per decade in women. Although sebaceous gland function diminishes with age, sebaceous gland size increases.

3.4.3 Dermis

The dermis comprises a layer of collagen and elastin that provides a support framework for nerve endings, blood vessels, lymphatic capillaries, sweat glands, sebaceous glands and hair follicles. It ranges from 0.5 to 5mm thick and is divided into the papillary layer (the undulating interface with the epidermis) and reticular layer (deeper dermis that is denser and houses the blood supply and adnexal structure). The superficial venous plexus and deep venous plexus form a network of capillary beds responsible for heat regulation. Lymphatics follow the blood vessels, becoming larger as they go deeper. Innervation of the skin is via the autonomic nervous system affecting things like sweating and flushing. Sensory fibres register painful stimuli and there are a number of nerve receptors (transducers) that register touch, pressure and vibration.

3.5   Other Cells

3.5.1 Langerhans' Cells

These dendritic cells capture antigens and present them to T-Cells and Macrophages. Langerhans' Cells found mainly in the stratum spinosum are a part of the body's immune system. These cells can interact with lymphocytes, are able to process and present antigens and are capable of phagocytosis. They can also release cytokines,

to attract and activate lymphocytes. Studies in mice have also shown that Langerhan cells regulate the balance between immunity and peripheral tolerance; mice without these cells had hypersensitive skin.

3.5.2 Melanocytes

Melanocytes are dendritic, pigment-producing cells located in the skin and hair. The pigment they produce is called melanin that the melanocyte transfers in packets to neighbouring keratinocytes in the epidermis and into the growing shaft in hair follicles. Melanin production also provides a certain degree of protection from harmful ultraviolet radiation. Melanocyte density decreases with age by 6% to 8% per decade from age 30, and the melanocytes do not produce melanin pigment as efficiently.

3.5.3 Merkel Cells

Merkel cells are mechanoreceptors that communicate with the afferent nerve conduction system in the basal layer in order to perceive the sensation of touch. Other transducer cell types are also mechanoreceptors that work alongside the Merkel cells to detect vibration, touch and pressure. These are Ruffini organs, Meissner's corpuscles, and Vater–Pacini corpuscles.

It is important to note that the skin is constantly remodelling itself based on external stimuli. Cells produced in the basal layer of the epidermis migrate to the outer layers and eventually flake off. This process takes about 28-30 days but accelerates in many instances e.g., diseases like psoriasis, ageing, illness, medications and the effects of sunlight on skin. By looking at the condition of a persons' hair, skin and nails clues may be evident in terms of the individual's overall health status.

Given that many pressure ulcers occur in the older people it is important to recognise the impact of the ageing process on the skin and the associated pathophysiological changes that can occur thus increasing an individuals' risk of developing pressure ulcers. (see Table 1 below).

Table 1: The Effect of the Ageing Process on Skin

Physiological change	Pathological change	Clinical significance
Thinning of epidermis and dermis	Increased vulnerability to mechanical trauma, especially shearing and friction	Increased incidence of skin tears
Flattening of dermal papillae	Increased risk of blister formation	Increased susceptibility to infection
Slowdown in turnover rate of epidermis; decrease in ratio of proliferative-to-differentiated keratinocytes	Delayed cellular migration and proliferation.	Increased time to re-epithelialisation.
	Decreased wound contraction	Longer healing times after injury or surgery
Decrease in elastin fibres	Loss of elasticity	Loose skin and wrinkling, with loss of self-esteem and/or depression
Decrease in vascularity and supporting structures in dermis	Fragile, easily broken blood vessels.	Skin easily bruised (senile purpura)
	Decreased wound capillary growth	Increased risk of wound dehiscence
Decrease in vascular plexus, blunted capillary loops	Loss of thermoregulatory ability	Hypothermia, heat stroke
Changes in and loss of collagen and elastin fibres	Decreased tensile strength, lower layers more susceptible to injury	Increased risk of pressure damage to elderly skin, decubitus ulcers
	Delayed collagen remodelling	Longer healing times after injury or surgery
Impaired immune response	Impaired inflammatory response	Impaired wound healing
	Impaired delayed hypersensitivity reaction	Increased risk of severe injury from irritants
	Decreased production of cytokines	Impaired immune function
	Decrease in number of Langerhans cells	Increased susceptibility to photo carcinogenesis, false-negative delayed hypersensitivity tests
Impaired neurologic responses	Reduced sensation	Increased risk of thermal or other accidental injury
Decreased skin thickness	Loss of cushioning and support	Increased risk of pressure damage, decubitus ulcers Increased susceptibility to skin tears, bruising
	Decreased vitamin D precursor production	Osteoporosis and bone fractures
Atrophy of sweat glands	Decreased sweating	Less ability to thermoregulation, hypothermia Dry skin, xerosis

Physiological change	Pathological change	Clinical significance
Reduced stratum corneum lipids	Decreased ability to retain water	Variable response to topical medications, altered sensitivity to irritants
Structural changes in stratum corneum	Altered barrier function	Variable response to topical medications, altered sensitivity to irritants
Reduced movement of water from dermis to epidermis	Reduced epidermal hydration	Dry skin, xerosis
Decrease in melanocytes	Loss of ability to tan, greater susceptibility to solar radiation	Cutaneous neoplasms
	Greying hair	Loss of self-esteem

3.6   Maintaining Healthy Skin

The maintenance of healthy skin is essential for both the physical and psycho-social health of individuals. Any break in the integrity of the skin will damage its barrier function and leave the body open to infection that could have serious consequences. Furthermore, where an individual has skin problems e.g., Acne, Rosacea, Burns this could affect the persons self-esteem and self-worth impacting on their mental health and potentially giving rise to social isolation.

There are many factors that can affect the health of a person's skin as identified by Page & Robinson (2008) and Andrews (2012). Table 2 is a further adaptation of Andrews (2012 p 286) table that identifies the internal and external factors that can have an adverse effect on an individual's skin and potentially their health and well-being overall. The table below identifies these factors, however, ill health and immobility cross both.

Table 2: HEALTHY SKIN - Internal and External Factors affecting a person's skin

Adapted from Page & Robinson (2008) and Andrews (2012 p 286)

HEALTHY SKIN - Internal and External Factors affecting a person's skin.	
INTERNAL FACTORS	**EXTERNAL FACTORS**
Ageing	Trauma
Nutrition/Fluid Intake	Pollution
Medication	Temperature
Stress	UV Radiation
Lifestyle	Chemicals, Allergens, Irritants
Hormonal Changes	Contact with Urine & Faeces
Infection	Infestation
Heredity	Central Heating
	Micro organisms
Ill Health	
Immobility	

It is essential for healthcare staff to understand the structure and functions of the skin if they are to take account of the possible impact any internal and/or external factors could have, complete a thorough assessment of the individual's risk of developing a pressure ulcer, and to enable an evidence-based plan of care to be developed.

According to the European Pressure Ulcer Advisory Panel and National Pressure Ulcer Advisory Panel (2009 p.68), "Maintaining skin integrity is essential in the prevention of pressure ulcers", -and further-, "Preventative care not only protects the skin and promotes comfort but also provides an opportunity to conduct a skin assessment and identify areas at risk ……"

Using the underpinning evidence base, recommendations regarding preventative skin care are provided as follows:

- Keep the skin clean and dry – use an appropriate cleanser that will maintain the Ph balance of the skin.
- Clean the skin following any instances of urinary or faecal incontinence. Utilise a barrier cream as required to protect the skin against moisture and a moisturiser where required to maintain skin hydration. When cleaning the skin

or applying creams/emollients, avoid briskly massaging or rubbing the skin to avoid damage to underlying structures.

- Maintain a healthy diet and ensure the individual ingests sufficient proteins, carbohydrates, fats, vitamins, minerals, and fluids, based on the assessment of the individual, to avoid or treat malnutrition and/or dehydration. If the person is unable to tolerate taking food and and/or fluids oral supplements can be given, and the advice of a dietician sought.

3.7 Physiology of Healing

When the integrity of the skin is breeched, the body immediately responds in an attempt to restore normal function. This response involves stopping the bleeding, cleaning the area to decrease the risk of infection and re-establishing a suitable blood supply to repair the damage. The result is not the regeneration of normal skin but a repair of the damaged skin that results in the formation of a scar. A series of events take place as described below.

3.7.1 Haemostasis

Immediately after an injury, the damaged blood and lymphatic vessels undergo vasoconstriction to slow or stop blood loss in the affected area. Under normal conditions platelets circulate freely, they do not interact with intact vasculature surface. However, in an injury, platelets are in contact with disturbed vasculature or extracellular matrix, this makes them adherent. Once they adhere, they break open (degranulation) and release clotting factors, essential growth factors and cytokines. These cytokines attract leukocytes, fibroblasts and keratinocytes. Haemostasis occurs by the formation of a platelet-fibrin plug and the wound space fills with a fibrin clot. The clot provides temporary cover for the wound and acts as a provisional matrix that supports cell migration during healing.

The growth factors and cytokines released by the platelets are important triggers for haemostasis and the later phases of healing. This coagulation cascade is essential to initiate wound healing.

3.7.2 Inflammation

Neutrophils quickly enter the wound site and begin removing foreign materials, bacteria, and damaged tissue. Other white blood cells and macrophages also begin to arrive at the wound site. This signals the initiation of the inflammatory phase. Neutrophil numbers peak after 1−2 days and, in the absence of infection or further damage, rapidly decline. Macrophages continue to increase until day 5, when their numbers decrease slowly as healing proceeds. A significant population of macrophages will still be present for the next stage in the healing process – the proliferation phase. The inflammatory phase should be temporary however, if there is an infection or other inflammatory processes, this will delay wound healing.

3.7.3 Proliferation

Once the inflammatory phase has produced a "cleaned wound" area proliferation begins. This is the 'repair' phase of wound healing as new types of cells move in to start the processes of granulation and epithelialisation. Granulation fills the base of the wound bed with a nutrient and oxygen rich environment for epithelialisation (the migration of epithelial cells over the wound surface).

3.7.4 Granulation

While a wound heals the matrix is continually decreased by proteolysis and re-synthesized as needed. For example, for blood vessels to grow into the area - angiogenesis capillary endothelial cells detach and, using proteases to dissect a pathway, migrate into the haphazard matrix. These capillary sprouts can grow up to a few millimetres per day and are what gives the granulating wound bed its red, 'granular' appearance. As the granulation phase progresses, myofibroblasts grow across the wound, anchoring to the edges and start to contract, pulling the edges in and decreasing the wound area.

3.7.5 Epithelialisation

At the edges of the wound keratinocytes proliferate and produce daughter cells to migrate into the wound bed. Proteolytic action is required to dissect a pathway for keratinocyte migration, the same as for angiogenesis. If a scab is present the keratinocytes have to burrow underneath the scab and phagocytose and digest any debris they may encounter, not just the extra cellular matrix. However, in a moist environment, without a scab, the migration is easier, and healing is accelerated. This was an important consideration in the development of the concept of moist wound healing. While this new layer of cells is delicate, most modern wound dressings do not remove them when the dressing is changed. However, if a dressing dries out or adheres to the wound, traumatic removal of the dressing may harm the delicate new epithelial layer.

The process of re-epithelialisation is complete when keratinocytes migrating from the wound margins reach each other and contact inhibition induces the cessation of migration. Because keratinocytes are located around adnexal structures, if the wound is superficial and these structures are intact, the migration can occur from these sites. It is common to find 'islands of epithelium' in a large superficial wound. For full thickness wounds of the same size all of the migration must start at the wound edges, therefore re-epithelialization is slower.

3.7.6 Remodelling

Once the wound is closed over and the immediate repairs to the skin are complete, the body has time (it can take up to 2 years) to remodel the tissue. Proteolysis continues in this phase, degrading the existing extracellular matrix, re-synthesizing and cross-linking the new matrix to achieve greater wound strength. However, even after months of remodelling, the tensile strength of the repaired skin is unlikely to achieve more than 80% of the strength of non-wounded skin. The resultant scar tissue is brittle and less elastic than normal skin. Hair follicles and sweat glands do not grow back. Scar tissue is unattractive, but it achieves the need of the body to restore the skins barrier function and prevent the ingress of bacteria.

So far, this chapter has considered the structure and function of the skin, including the pathophysiological changes that occur to the skin due to the ageing process, how to maintain healthy skin, the sequence of events that take place when the integrity of the skin is lost and the initiation of the wound healing process. It is now necessary to consider the aetiology of pressure ulcers, to better understand individual risk factors, to recognise sites where an individual may develop a pressure ulcer, inform the interventions that can be put in place to reduce the incidence of pressure ulcers and to devise a plan of care to manage and treat the pressure ulcer.

3.8   Aetiology of Pressure Ulcers

Wohlleben (1777) appears to be the first person to consider the causes of skin trauma and introduced the term '*gangraena per decubitum',* which translates to "dead tissue due to lying down" (National Pressure Ulcer Advisory Panel and Pan Pacific Pressure Injury Alliance, 2014). Groth (1942) identified the term '*decubitus'* with seminal studies by Reichel (1958) using the term '*decubitus ulcer'* and Kosiak (1959) introducing the term '*ischaemic ulcer'.* However, in the relatively recent past, following an international conference held in Glasgow in 1975 that focussed on the aetiology of pressure ulcers, the term '*bedsore'* was coined, which in turn resulted in the publication of a book entitled *Bedsore Biomechanics* (Kenedi Ed, 1976). All of these terms describe the association between lying down, mainly on a bed, and the cause of pressure ulcer development. None of the terms recognise however, the impact of shearing forces on pressure ulcer development. The term bedsore became less popular in the 1980's, being replaced by '*pressure sores',* acknowledging the associated overall patient discomfort and not just due to lying down. In the 1990's, the term '*pressure ulcer'* became the more popular term to use, however, ulcer suggests that the skin integrity has been breached and an open sore or ulcer is present on the skin, yet in the previous grading classifications of pressure ulcers grade 1, the skin remains intact. Globally, the terms pressure ulcer or pressure injury are the accepted descriptions, however it is accepted that neither precisely describes the occurrence NPUAP, EPUAP, PPPIA (2014).

Historically, pressure was thought to be the key component in pressure ulcer formation. Early studies on animals, focussed on the intensity of the pressure and for

how long this intense pressure could be endured (Hussian, 1953; Kosiak, 1959; Daniel et al, 1976). In turn, Reswick & Rogers (1976) applied this work to humans; however, their study was not sufficiently robust as it relied on practice-based experience but lacked the essential control measures (Young, 2017). Subsequent studies began to recognise the existence of other causes of pressure ulcer formation, referred to as shearing forces (Bennett & Lee, 1985), the impact on capillaries (Larsen et al, 1979), skin distortion (Bell et al, 1974) and the protecting purpose of the skin (Reddy et al, 1975).

The Prevention and Treatment of Pressure Ulcers: Clinical Practice Guideline (NPUAP, EPUAP, PPPIA, 2014) updated (EPUAP, NPUAP, PPPIA, 2019) provides the current evidence base, which clearly identifies that for a pressure ulcer to form, the skin must be exposed to pressure from a 'Mechanical load'. A mechanical load refers to "all types of force applied to an individual's soft tissue as a result of contact between the skin and a solid surface" (p.18), including beds, chairs, medical devices. The guideline goes on to describe '**normal forces**', perpendicular to the skin, and '**shear forces**', parallel to the skin. It is important for staff to understand the implications of these forces, e.g., Baharestani and Ratliff (2007), identified that children and neonates in particular, are prone to pressure ulcers resulting from the use of medical devices, thus alerting practitioners to the risk.

It is now understood that the combination of short duration high pressure and/or pressure over a longer period can both result in pressure ulcer development. Recognising that it is highly likely that shearing forces will play a role particularly over a bony prominence.

Figure 5: Illustrates anatomical locations associated with the development of pressure ulcers

Fig 1. **Areas at greatest risk of pressure damage**
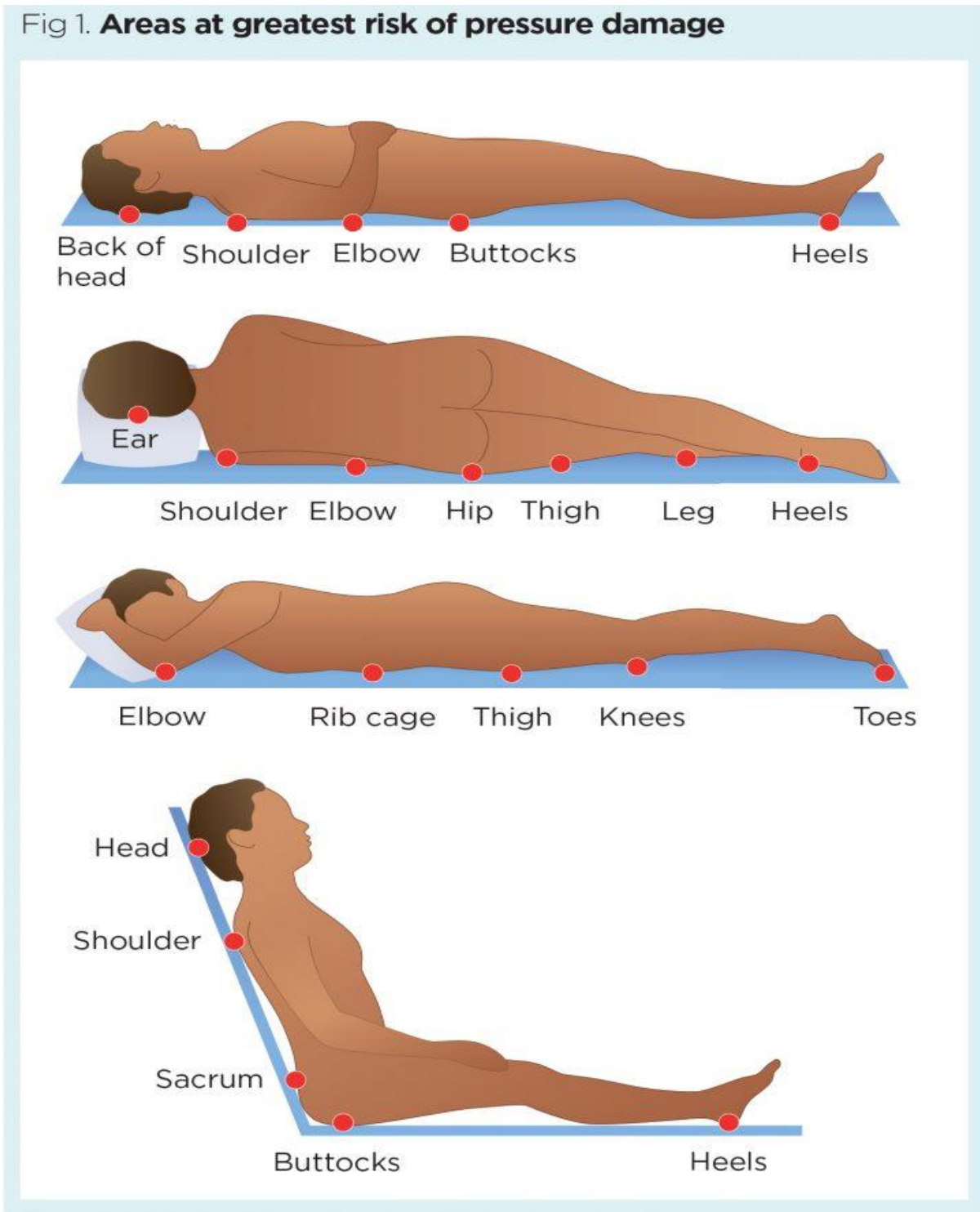
(Fletcher, 2020)

The ways in which an individual is positioned in bed or in a chair can cause the body weight to move forward with a resultant displacement of the underlying structures that are squeezed between the external surface and the bone. This causes a decrease in the flow of blood and lymph, depriving the area of oxygen and nutrients and enabling the build-up of metabolic waste. Ultimately this can lead to cellular death, which will trigger an inflammatory response and increase the mechanical load/pressure on the tissues because of an increase in interstitial pressures, (EUPAP, NUPAP, PPPIA, 2019). A further effect of a protracted period of occluded blood flow is reperfusion injury, which occurs when the occlusion is relieved and the blood starts to flow again, resulting in an inflammatory response and the release of oxygen-free radicals (Richardson et al, 2016). Hoogendoorn et al (2017) suggests that the reperfusion injury is reflective of the extent of the external pressure on the skin.

Figure 6: Demonstrates the impact of pressure between a bony prominence and a hard surface e.g., bed/chair.

Chamanga, E. (2016) - Talley's An Introduction to Pressure Ulcers: A Clinical Resource
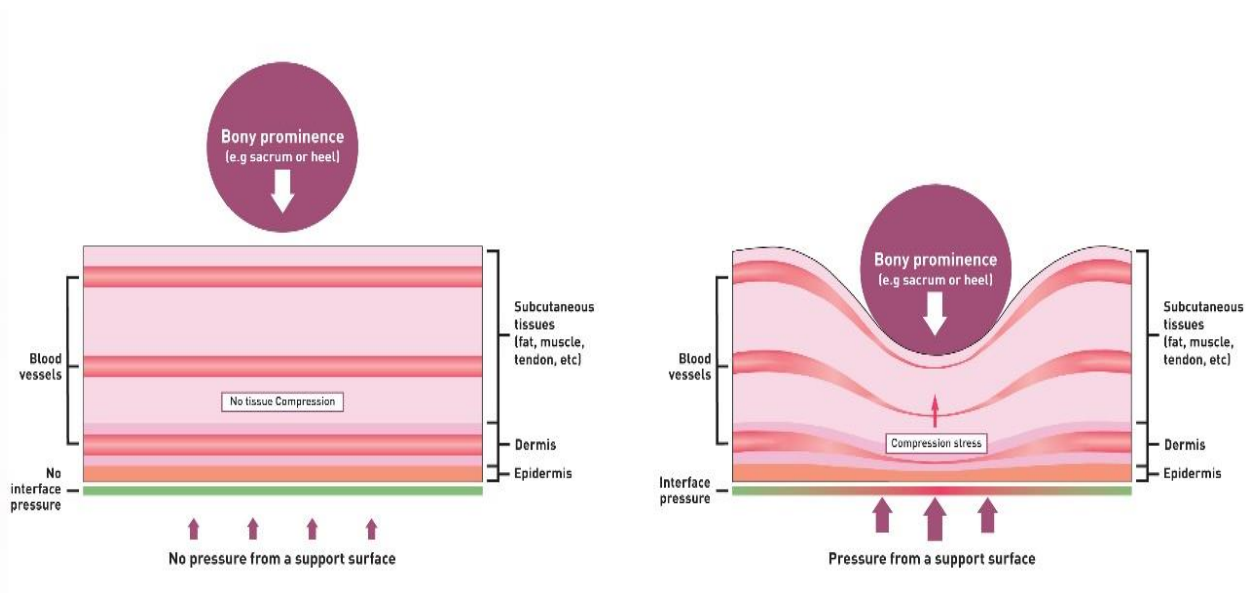
Currently, there remains no agreement on the relationship between pressure and shear, or their combined role in the formation of superficial and deep pressure ulcers. Kottner et al (2011) suggest that this is due to 'significant differences' in the aetiology of superficial and deep pressure ulcers, with superficial ulcers the result of pressure and shear at the surface of the skin, whilst deep ulcers are caused by high pressure and shear over bony prominences, (Agam & Gefen, 2007; Gefen, 2007; Gefen, 2008a; Gefen, 2008b; Gefen, 2009).

Although pressure and shear are thought to be the most significant factors in the development of a pressure ulcer, the notion of the skin's microclimate and its effects are gaining momentum. Moisture can occur as a result of an increased temperature or being in a hot and humid atmosphere, causing the moist skin to weaken (NPUAP, EPAUP, PPPIA, 2014). Dry skin is also thought to play a part in the development of heel ulcers in particular (Lecher et al, 2017).

The information provided above is summarised in Figures 7 and 6below which, provides diagrammatical representations to enable the reader to fully understand the aetiology associated with pressure ulcer formation.

Figure 7: Factors leading to Pressure Ulcer Development
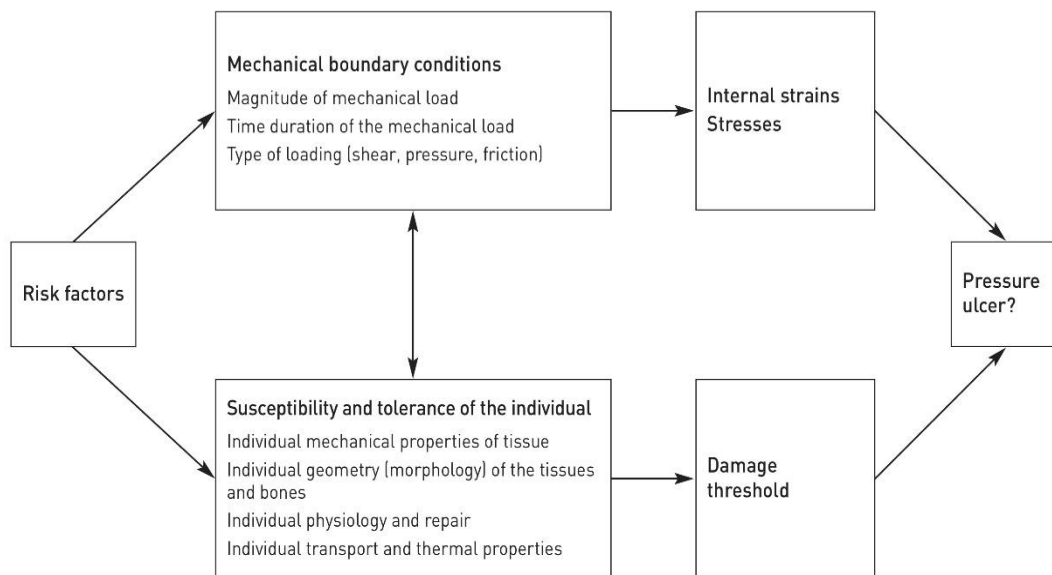
Enhancement of the conceptual framework developed by NPUAP/EPUAP (2009) by Coleman et al, (2014 p2229)

Figure 8: Coleman et al (2014 p 2229) went on to provide what they termed 'a theoretical schema of proposed causal pathway for pressure ulcer development'.
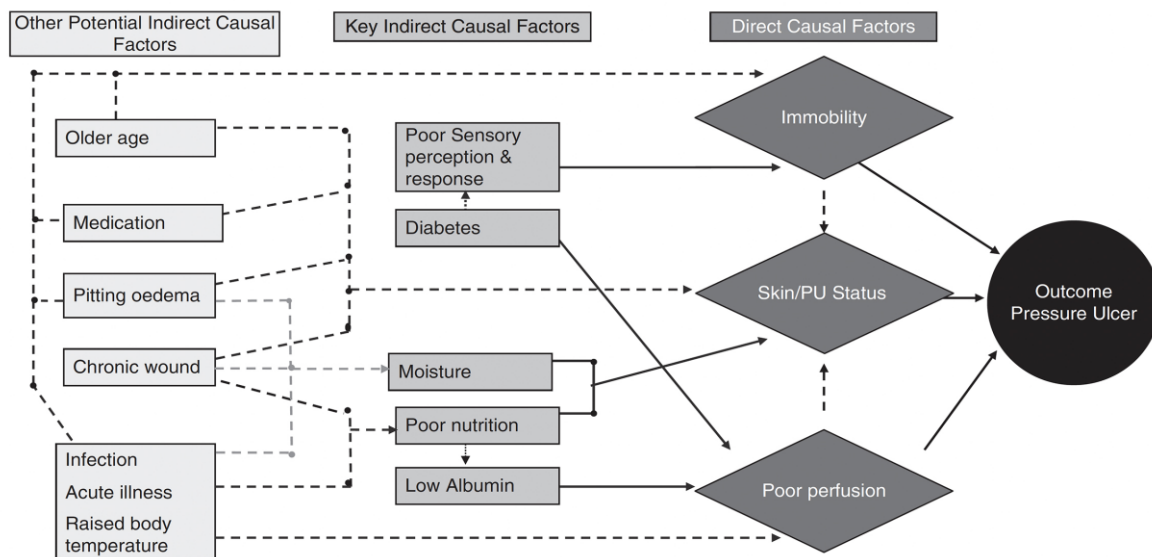
Figure 2 Theoretical schema of proposed causal pathway for pressure ulcer development. The solid arrows show the causal relationship between the key indirect causal factors and direct causal factors and the outcome. Interrupted arrows show the causal relationship between other potential indirect causal factors and key indirect causal factors and between direct causal factors. Interrupted arrows also demonstrate interrelationships between direct causal factors and indirect causal factors.

In essence, when considering patient assessment and subsequent care planning, there is a need to acknowledge that given the multiple factors that need to be considered, it is not possible to predict how long it might take for an individual to develop a pressure ulcer. An ulcer can develop in as little as one to two hours (Bansal et al, 2005; Gefen, 2008b).

3.9   Summary

This Chapter provides essential knowledge on the structure and function of the skin, how to maintain healthy skin and the process of wound healing. In addition, it considers causality and the impact of internal and external influencers. It will be used as supplementary reading for healthcare professionals undergoing CPD in the field of pressure ulcer prevention. This information will assist the reader to fully appreciate the multiple factors that have to be considered in assessing an individual's risk of developing a pressure ulcer as discussed in the next chapter.

Chapter 4   Assessing an Individuals' Risk of Developing Pressure Ulcers

4.1   Introduction

Having discussed the aetiology of pressure ulcers in the previous chapter, this chapter will focus specifically on risk assessment. Balzer et al (2014) suggests that assessing an individual's risk of developing pressure ulcers is fundamental in preventing their development.

The National Institute for Health and Care Excellence (NICE) produced the following general guidance on expected standards:

> *"NICE quality standards are a concise set of prioritised statements designed to drive measurable quality improvements in the 3 dimensions of quality – patient safety, patient experience and clinical effectiveness – for a particular area of health or care. They are derived from high-quality guidance, such as that from NICE or other sources accredited by NICE".*

(NICE, 2015)

NICE guidelines and associated quality standards are based on the best evidence in a particular area of care and are intended to assist healthcare providers to develop policies and procedures that in turn, will support healthcare professionals and inform their clinical decision making. These guidelines are not compulsory, but their aims should be facilitated by commissioners of services and reflected in service agreements with care providers.

NICE (2015) developed their Pressure Ulcers: prevention and management clinical guideline, which was reviewed in 2019 and updated to reflect current terminology (NICE, 2019). Within the guideline, provision was made for the presence of pressure ulcers to be identified as a safeguarding issue in respect of children and adults. This is reflected in the Department of Health & Social Care (2018) – Safeguarding Adults Protocol – Pressure Ulcers and the interface with a Safeguarding Enquiry.

Anecdotal and observed evidence would suggest that although the NICE guideline is recognised as a strong measure of good practice, the reference to safeguarding and its implications are not high on the awareness of healthcare professionals, particularly

those working in acute or community settings. The prevalence of pressure ulcers in the residential and care home sectors may attract closer scrutiny, where safeguarding appears to have a greater significance for regulators.

The guideline clearly identifies "key priorities for implementation" when assessing the care needs of adults, neonates, infants, children, and young people and, that the information obtained must be documented in a plan of care. The guideline also identifies the need for education and training.

NICE (2015) produced the following quality statements:

Statement 1. People admitted to hospital or a care home with nursing, will have a pressure ulcer risk assessment within 6 hours of admission.

Statement 2. People with a risk factor for developing pressure ulcers and who are referred to community nursing services, will have a pressure ulcer risk assessment at the first face-to-face visit.

Statement 3. People will have their risk of developing pressure ulcers reassessed after a surgical or interventional procedure, or after a change in their care environment following a transfer.

Statement 4. People will have a skin assessment if they are identified as high risk of developing pressure ulcers.

Statement 5. People at risk of developing pressure ulcers will receive advice on the benefits and frequency of repositioning.

Statement 6. People at risk of developing pressure ulcers, who are unable to reposition themselves, are helped to change their position.

Statement 7. People at high risk of developing pressure ulcers, and their carers, receive information on how to prevent them.

Statement 8. People at high risk of developing pressure ulcers are provided with pressure redistribution devices.

Statement 9. Prevention of medical device-related pressure ulcers.

These statements are supported by detailed information relating to each and aimed at improving the care of individuals at risk of developing a pressure ulcer. Consequently, there is a wide range of guidance and recommendations available to healthcare professionals and healthcare organisations, all of which is aimed at assisting in the recognition, prevention and/or treatment of pressure ulcers. Despite this however, the incidence of pressure ulcers remains high and presents an ongoing challenge for sufferers, their families, healthcare organisations and healthcare workers.

4.2   Risk Factors associated with Pressure Ulcer Development

It is recognised that the initial and ongoing holistic assessment of individuals to detect their risk of developing pressure ulcers, is a fundamental aspect of patient care. Assessment forms an essential stage in the planning process, to enable an appropriate plan of care to be put in place to assist in the prevention of pressure ulcer development (Fletcher, 2017; Johansen et al, 2014). In addition, an individual's family/significant other should be part of the assessment process, especially when the individual is cognitively impaired (NICE, 2015).

Coleman et al (2013) undertook a systematic review of the literature on risk factors and the development of pressure ulcers. 365 papers were considered with only 54 meeting the set eligibility criteria. Their findings identified a plethora of causes thought to increase an individual's risk of developing a pressure ulcer, with three most frequently cited as objective predictors namely, Mobility, Perfusion and Skin Condition. These findings are supported by research completed by Balzer et al (2014) and Guy (2013), who identified further risk factors, as shown in the table below.

Table 3: Risk Factors for Pressure Ulcer Development - Intrinsic & Extrinsic Informed by EPUAP, NPUAP, PPPIA (2019); Balzer et al (2014); Guy (2013)

Main Risk Factors for Pressure Ulcer Development	
Intrinsic (patient) Factors	**Extrinsic (external) factors**
Inadequate Food & Hydration	Pressure due to restricted movement, medical devices, casts or appliances
Reduced Mobility	Shear e.g., incorrect moving & handling techniques and friction
Over 65 years old	Moisture
Cognitive Impairment	Surgery or Trauma
Neurological Disorders e.g., Stroke, MS	Epidural/local anaesthetic
Sensory Impairment	Poor personal Hygiene
Diabetes Mellitus	
Neuropathy	
Circulatory Disorders e.g., anaemia	
Incontinence	
Infection	
Medications e.g., Steroids, Chemotherapy	

In addition to facilitating good quality care planning, it is important that initial and ongoing assessment is able to appropriately categorise a pressure ulcer to ensure it is treated in accordance with a recognised classification tool, (EPUAP, NPUAP, PPPIA, 2019).

4.3   Risk Assessment Tools

In assessing an individual's risk of developing pressure ulcers, assessment tools form a significant part in the process, as is clearly identified by a range of authorities, (NICE, 2014b; NICE, 2015; EPUAP, NPUAP, PPPIA, 2019; Fletcher, 2017; Samuwiro & Dowding, 2014). Fletcher (2017 p 44) argues that "In order to make best use of limited resources, risk assessment tools (RAT's) or pressure ulcer risk assessment scores (PURAS's) are widely used across all healthcare settings…" However, Moore and Cowan (2014) in a Cochrane review, found no evidence to support the notion that such

tools do indeed reduce the incidence of pressure ulcers. This is a view upheld by Samuwiro and Dowding (2014), who comment that the absence of supporting evidence may suggest that the time spent by nurses in using these tools may not be cost-effective. Equally, although the use of assessment tools is promoted nationally (NICE, 2014b) and internationally (NPUAP, EPUAP and PPPIA, 2019), they all caution on the need to use such tools to support, not replace clinical judgement.

Clinicians have a wide range of assessment tools at their disposal, some are very generic tools whilst others have been developed for a specific patient population. Furthermore, other tools have been developed that are specific to a part of an individual's body e.g., the heels (Delamore et al, 2015)

Table 4: Examples of Risk Assessment Tools for General and Specific Populations (Fletcher, 2017p 19)

Examples of Risk Assessment Tools for General and Specific Populations		
Population Type	**Tools Available**	**Reference**
Generic Tools	Waterlow	Waterlow, 2005
	Braden	Bergstrom & Braden 1992
	Norton	Norton et al, 1975
	Shape	Soppi et al, 2015
	PURPOSE T	Nixon et al, 2015
Paediatrics	Braden Q	Curley et al, 2003
	Glamorgan	Willock et al, 2007
	PPUPET	Sterken et al 2015
End of Life/Hospice	Hunter's Hill	Chaplin, 2000
Orthopaedics	PSPS	Lowthian, 1989
Community	Walsall	Chaloner & Franks, 2000
Intensive Care	Cubbin	Jackson, 1999
	COMHON	Fulbrook & Anderson, 2016
	Sunderland	Lowery,1995
Critical Care	CALCULATE	Richardson & Barrow, 2015
		Richardson & Straughan, 2015
Spinal Cord Injuries	SCIPUS	Delparte et al, 2015

Despite a myriad of studies, no one tool has shown sufficient evidence to support its role in the prevention of pressure ulcer development (Anthony et al, 2010; Coleman et al, 2013; Samuwiro & Dowding, 2014; Moore & Cowan, 2014). Fletcher (2017) argues that it is not the risk assessment tool that prevents pressure ulcer development, but the plan of care developed and carried out. A study by Vanderwee et al (2007) found that the risk assessment process was separate to the preventative measures put in place and Samuwiro & Dowding (2013) identified that the results of the risk assessments were not used to inform the decisions made in developing preventive measures. Fletcher (2017) suggests that there is a divide between risk assessment, care planning and delivery - and that this, in her view, is a "fundamental flaw".

Irrespective of an absence of a robust evidence base pertaining to 'prevention' it is agreed (NICE, 2015; EPUAP, NPUAP, PPPIA, 2019) and is indeed a requirement, for all patients to be assessed for their risk of developing pressure ulcers as part of the admission process to hospital, in the community or care home. In addition, it is suggested that the assessment should be completed within the first 6 hours of admission or at the first contact within a community setting. This is considered good practice and essential in enabling a plan of care to be put in place, where required, to prevent/reduce the risk of pressure ulcers developing.

Where a pressure ulcer is detected, several studies have identified that by using a "care bundle" the occurrence and severity of pressure ulcers is reduced (Downie et al, 2013; Fremmelevholm & Soegaard, 2019). Evidence would suggest therefore, that where a pressure ulcer is present, assessment is necessary to prevent further worsening of the ulcer (NICE, 2015; EPUAP, NPUAP, PPPIA, 2019), and that the assessment process must involve the use of a recognised, age specific risk assessment tool. It is also considered essential that the assessment should be conducted by an appropriately qualified and competent member of staff using a recognised assessment tool to aid in the clinical decision-making process (NICE, 2015; EPUAP, NPUAP, PPPIA, 2019).

In undertaking an assessment of an individual regarding their risk of developing pressure ulcers, the following should be part of the process:

- Consideration of any risk factors for example, the very young and very old age, those with limited mobility, individuals who are frail, who have poor nutrition, are diabetic, anaemic or at the end of life or with moist skin.

- Where a medical device is in use, this needs careful consideration especially in neonates and babies. (NICE, 2015; EPUAP, NPUAP, PPPIA, 2019).

- A thorough assessment of the individual's skin must be undertaken having obtained the appropriate consent. Particular attention should be given to areas over bony prominences and where medical devices are in use. A reddening of the skin is an indicator of pressure damage (NICE 2015; EPUAP, NPUAP, PPPIA, 2019). In addition, when the patient has dark skin it is important to pay particular attention to see any changes in the condition of the skin. Where, as a result of an individual's condition it is not possible to view certain areas of the skin, this must be clearly documented in the patient's records as would the results of the overall patient assessment (NICE, 2015). In addition to the assessment of the condition of the individual's skin, it is essential to ask the patient about their general health, urinary and bowel habits - incontinence will increase the moisture of the skin and can be a contributory factor in the development of pressure ulcers (NICE, 2015).

- Mobility assessment is essential as impaired mobility is a significant factor in the development of pressure ulcers – the person may be frail, have had a stroke, be post-surgery or another condition that may impair their mobility and/or their ability to sense the feeling of pressure or even if able to feel the pressure are unable to reposition themselves (NICE 2015; EPUAP, NPUAP, PPPIA, 2019). The individual's nutritional status. There are nutritional assessment tools to support this assessment. The Malnutrition Universal Screening Tool (MUST) (BAPEN, 2016) is a frequently used tool where consideration is given to a range of factors to assess the person's nutritional status.

Part of the process will also involve the use of a Pressure Ulcer Risk Assessment tool and whilst there is debate about such tools (Coleman et al, 2013) current guidance advocates their use as part of the practitioners overall holistic assessment. In the UK,

the Waterlow Risk Assessment tool (Figure 10) is one of the most frequently used (Stephenson et al, 2021).

Figure 9: The original Waterlow Pressure Ulcer Risk Assessment Tool

Many organisations have used this tool as the basis for developing their own versions of assessing risk, see Figure 11 below. These adapted tools often incorporate a great deal more than the original Waterlow Scale and are designed for completion by a registered healthcare professional, given the level of clinical decision making required. Furthermore, as the need to categorise a pressure ulcer is an essential element of risk assessment and forms part of the reporting framework, as set out in, 'Implementing the pressure ulcer framework in local reporting systems and reporting NRLS' (NHS Improvement, 2019), it is important that the information provided is accurate.

Figure 10: Adapted Waterlow Pressure Area Risk Assessment Chart

WRITE, IMPRINT OR ATTACH LABEL	
Surname …………………..	CHI No ……………….
Forenames ………………….	Sex……………………

Adapted Waterlow Pressure Area Risk Assessment Chart

More than one score/category can be used:

 10+= 'At Risk': 15+ = 'High Risk': 20+ = 'Very High Risk'

Undertake and document risk assessment within 6 hours of admission or on first home visit. Reassess if there is a change in individual's condition and repeat regularly according to local protocol.

Sex											
Male	1										
Female	2										
Age											
14 – 49	1										
50 – 64	2										
65 – 74	3										
75 – 80	4										
81+	5										
Build/Weight for Height (BMI=weight in Kg/height in m^2)											
Average – BMI 20-24.9	0										
Above average – BMI 25-29.9	1										
Obese – BMI > 30	2										
Below average – BMI < 20	3										
Continence											
Complete/catheterised	0										
Incontinent urine	1										
Incontinent faeces	2										
Doubly incontinent (urine & faeces)	3										
Skin Type – Visual Risks Area											
Healthy	0										
Tissue paper (thin/fragile)	1										
Dry (appears flaky)	1										
Oedematous (puffy)	1										

Clammy (moist to touch)/pyrexia	1									
Discoloured (bruising/mottled)	2									
Broken (established ulcer)	3									
Mobility										
Fully mobile	0									
Restless/fidgety	1									
Apathetic (sedated/depressed/reluctant to move)	2									
Restricted (restricted by severe pain or disease)	3									
Bedbound (unconscious/unable to change position/traction)	4									
Chair bound (unable to leave chair without assistance)	5									
Nutritional Element										
Unplanned weight loss in past 3-6 months										
< 5% Score **0**, 5-10% Score **1**, >10% Score **2**	0-2									
BMI >20 Score **0**, BMI 18.5-20 Score **1**, BMI < 18.5 Score **2**	0-2									
Patient/ client acutely ill or no nutritional intake > 5 days	2									
Special Risks – Tissue Malnutrition										
Multiple organ failure/terminal cachexia	8									
Single organ failure e.g. cardiac, renal, respiratory	5									
Peripheral vascular disease	5									
Anaemia = Hb < 8	2									
Smoking	1									
Special Risks – Neurological Deficit										
Diabetes/ MS/ CVA/ motor/ sensory/ paraplegia *Max 6*	4-6									
Special Risks – Surgery/Trauma										
On table > 6 hours	8									
Orthopaedic/ below waist/spinal (up to 48 hours post op)	5									
On table > 2 hours (up to 48 hours post op)	5									
Special Risks – Medication										
Cytotoxic, anti-inflammatory, long term/high dose steroid *Max 4*	4									
Total Score										
Date										
Initials										
Time										

(Healthcare Improvement Scotland, 2016).

More recently, the risk assessment tool: 'A New Pressure Ulcer Risk Primary or Secondary Evaluation Tool (PURPOSE T)', was developed as part of a National Institute for Health Research (NIHR) funded project. Here, the researchers reflected on the range of assessment tools that have been in existence for many years, Fletcher

(2021 p.6) in an editorial for Wounds UK asked the question "Has anything changed?" in pressure ulcer prevention suggesting that "we are still seeking the perfect risk assessment tool". She refers to the newest tool, PURPOSE T, and whilst acknowledging that it is based on the evidence, she questions if its application in clinical practice would be any different to the tools in current use.

Figure 11: PURPOSE T Risk Assessment Tool

(Coleman et al, 2013)

Arguably, the difference between PURPOSE T and other risk assessment tools in use, could be the way in which the tool has been developed, namely:

- The results of a systematic review of the current research on risk factors related to pressure ulcer development (Coleman et al, 2013)
- The results of a "consensus study to develop a draft "Minimum Data Set to inform a new Risk Assessment Framework followed by a meeting with a panel of international experts (Coleman et al, 2014)
- The development of a new pressure ulcer conceptual framework that drew on the finding of the first two steps above which suggested the need for a new framework (Coleman et al, 2014). Please see Chapter 8. for more detail and how this new framework has been used in the development of a new Conceptual Framework emerging from this study.
- The testing of the proposed Risk Assessment Framework with practitioners in practice (Coleman et al, 2018)
- The evaluation of the proposed Risk Assessment Framework with clinical staff to "assess reliability, validity, data completeness and clinical usability." (Coleman et al, 2014 p2341).

The findings from the research, outlined above, has led to the development of a new risk assessment framework which the researchers argue is fit for use with adults, both in a hospital or community setting (Coleman et al, 2018).

Hultin et al (2022) reporting on the results of utilising PURPOSE T by nurses working in Sweden concluded that it has the potential to replace other risk assessment tools currently used in practice. Coleman et al (2016) claim that PURPOSE T is different to other risk assessment tools in that it considers "patients at risk of developing pressure ulcers – what they term primary prevention, "patients that already have a pressure ulcer – what they term secondary prevention and "patients not at risk at the moment" Hultin et al (2022 p232). Another key difference is that clinical decision making is incorporated into this tool, a notion supporting Fletcher et al (2017).

PURPOSE T involves 3 steps to assessing an individual's risk of developing pressure ulcers; Firstly, a "screening assessment" based on mobility, skin status and clinical judgement to determine if the patient is at risk and if not, the patient is "screened out". Secondly, if the patient is assessed as at risk of developing a pressure ulcer or has an actual ulcer the process moves to step 2. This involves a comprehensive assessment encompassing "independent movement", "sensory perception", "detailed skin assessment", "previous PU History", "perfusion"," nutrition", "moisture". Thirdly, the result of this assessment is used in step 3 "to inform 1 of 3 assessment decisions as follows:

1. "… no PU, not currently at risk
2. … no PU but at risk
3. … PU category 1 or above or scarring from previous PU".

(Coleman et al, 2018 p. 410).

Hultin et al (2022) reports positive outcomes from their study, suggesting that the tool appears to improve the awareness, knowledge and understanding of nurses in pressure ulcer prevention. However, they promote the importance of team working, education and training, and the support of leadership at all levels of the organisation to facilitate the efficacy of the tool in practice.

In addition to pressure ulcer risk assessment tools, the application of specific 'nutritional' assessment tools is advocated, (EPUAP, NPUAP, PPPIA, 2019), however, it is important to acknowledge that nutritional assessment may be incorporated within an overall assessment tool. Roberts et al (2015 p25), states that, "Malnutrition is common in hospitals and is a risk factor for pressure ulcers". It is estimated that between 20-50% of patients in hospitals across the world are malnourished (Norman et al, 2008), but that hospitals fail to address this, and, as a result it is not recognised or treated (Barker et al, 2011).

In the UK, the MUST Nutritional Assessment Tool (BAPEN, 2016), is frequently used, see figure 13.

Figure 12: The Malnutrition Universal Screening Tool (MUST)

Fig 1. **Malnutrition universal screening tool**

Step 1 BMI score **+** **Step 2** Weight loss score **+** **Step 3** Acute disease effect score

BMI kg/m² — Score
>20 (>30 Obese) = 0
18.5-20 = 1
<18.5 = 2

Unplanned weight loss in past 3-6 months
% — Score
<5 = 0
5-10 = 1
>10 = 2

If patient is acutely ill **and** there has been or is likely to be no nutritional intake for >5 days
Score 2

If unable to obtain height and weight use alternative measurements and subjective criteria

Acute disease effect is unlikely to apply outside hospital

Step 4
Overall risk of malnutrition

Add scores together to calculate overall risk of malnutrition.
Score 0 = low risk   Score 1 = medium risk   Score 2 or more = high risk

Step 5
Management guidelines

0
Low risk
Routine clinical care
Repeat screening
• Hospital – weekly
• Care homes – monthly
• Community – annually for special groups eg those >75 years

1
Medium risk
Observe
• Document dietary intake for 3 days
• If adequate – little concern and repeat screening
  • Hospital – weekly
  • Care homes - at least monthly
  • Community - at least every 2-3 months
• If inadequate – clinical concern. Follow local policy, set goals, improve and increase overall nutrition intake, monitor and review care plan regularly

2 or more
High risk
Treat*
• Refer to dietitian, nutritional support team or implement local policy
• Set goals, improve and increase overall nutritional intake
• Monitor and review care plan
  • Hospital – weekly
  • Care homes – monthly
  • Community – monthly

*Unless detrimental or no benefit is expected from nutritional support, for example, imminent death

All risk categories
• Treat underlying condition and provide help and advice on food choices, eating and drinking when necessary
• Record malnutrition risk category
• Record need for special diets and follow local policy

Obesity
• Record presence of obesity. For those with underlying conditions, these are generally controlled before the treatment of obesity

Re-assess patients identified at risk as they move though care settings
See the MUST Explanatory booklet for further details Bit.ly/BAPENMust

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Malnourishment can give rise to a range of challenges for patients, with evidence of this dating back many years (Keys et al, 1950), these include, delayed healing, a compromised immune system, impaired mobility as a consequence of reduced muscle mass and a reduced quality of life for patients (Ferguson et al, 2010; Vivanti et al, 2011).

In turn, the above can lead to increased time spent in hospital with the associated costs both for the patient and organisation (Lim et al, 2012; Guest et al, 2020).

A study by Banks et al, (2010) argues that malnutrition is a contributory factor in the development of pressure ulcers, and further evidence from Roberts et al, (2013) confirms Bank's notion that inpatient nutrition is often insufficient to meet increased needs, or where individuals have existing malnutrition the situation is made worse. Bank's et al (2013 p.42-43) in a study conducted in Australia, asserts:

> "an intensive nutrition support intervention if implemented in Queensland public hospitals over 1 year, would have eliminated in the region of 2900 cases of PU and saved approximately AU$5.4 million".

Unfortunately, these findings did not result in nutritional interventions being implemented.

In the UK, nutritional assessment tools are included in pressure ulcer prevention strategies however, despite this and the accompanying wealth of knowledge that promotes the relationship between good nutrition and health, pressure ulcers remain a significant challenge for a patient's quality of life, their carers and healthcare providers, inevitably resulting in increased financial problems for provider organisations.

4.4 Patient Assessment

When an individual is assessed as at risk of developing pressure ulcers, it is essential that a plan of care is formulated to prevent their development. Using the acronym: **a**ssess, **S**kin (inspection), **S**urface, **K**eep (moving), **I**ncontinence, **N**utrition**, g**iving (information) **- 'aSSKINg'** (NHS England 2018), the individual's risk is **a**ssessed as follows:

Skin (inspected): According to Young & Fletcher (2019), examining the condition of an individuals' skin for signs of pressure, shear, and/or friction damage is essential. Furthermore, Lyman (2019) suggests that skin care is often ignored and as a result when an individual has a period of ill health or injury, they are less able to withstand the impact of pressure and/or shear on what is already compromised skin. Skin should be inspected at regular intervals dependent on where the person is and how often they will see a health care professional – so if in hospital more often than if in the community when there may be a daily visit (Guy et al, 2013). Where possible the patient and/or significant other can check the persons skin when washing or dressing. See below, an example of a skin assessment tool.

Figure 13: How to keep Skin Healthy

Source: Bit.ly/StPHealthySkin

Surface: As pressure and shear are the most common cause of pressure ulcers it is essential that the surface the individual is in contact with should be one that will reduce the risk of pressure damage. Consideration needs to be given to any medical devices or equipment that are in contact with the person's skin (Young, 2021). In respect of pressure relieving equipment there are two main types in use,

- a dynamic surface where an electric pump inflates and deflates cells alternating the pressure on the patient's body/skin.
- a static surface that redistributes the pressure on the person's skin, by supporting/moulding the persons' body – for example, a memory foam mattress or a gel cushion.

(Mahoney & Kembery 2020)

NICE (2015) advocates the use of a static surface as a minimum, it is however, up to the healthcare professional's clinical decision making to determine the type of mattress and/or cushion to be used, together with the availability of equipment. Nixon et al (2019) in a randomised controlled trial concluded that there was no significant difference between using a dynamic or static surface. They did suggest however, that where an individual is unable to move themselves, are critically ill, or with an existing pressure ulcer, a dynamic surface was shown to be the equipment of choice. Young (2021) identifies the need to consider what surfaces the person will be in contact with e.g., if they have medical devices in use, going to theatre or for other investigations where they may be on a trolley for lengthy periods. In some instances, the area at risk may require the use of wedges or a specialist boot for example.

Keep (moving): This is essential in addition to using pressure relieving equipment as discussed above. Where it is possible, the patient needs to be encouraged to reposition themselves, supporting this by providing them with encouraging information that promotes their independence. Where this is not possible, the patient needs to be assisted to relieve pressure as this is necessary to facilitate blood flow, bringing oxygen and nutrients to the area and removing waste (Verdon & Jeffrey, 2020). Equally important is the carers understanding of a situation whereby an individual moves around too much, for example if confused and restless, as this could cause shearing and friction, increasing the risk of pressure ulcers (Young, 2021). The

frequency of positional change has been the subject of ongoing debate (deWert et al, 2015; NICE, 2015; Fletcher, 2017; Sharp et al, 2019), with NICE (2015) advising the changing of the individual's position every 6 hours, and every 4 hours if at high risk. Alternatively, De Wert et al (2015) argues that tissue death can take place in two hours, so repositioning should be very frequent, possibly every half hour. The latter is recognised to be challenging, especially where an individual is being cared for at home. Fletcher (2017) is of the view that any decision as to the frequency of repositioning should be based on the assessment of each individual rather than routine practice.

Incontinence: Is a risk factor in the development of pressure ulcers. Francis (2019) suggests that moisture damage to the skin can be mistaken for a pressure ulcer, or a pressure ulcer mistaken for moisture damage. Either way, it is recognised that moisture does affect the integrity of the skin, causing the epithelial cells to enlarge and macerate, increasing the risk of pressure ulcer development. Where an individual is incontinent is it important to identify the cause and initiate treatment to resolve it. In the meantime, or where the situation cannot be resolved, skin care is essential to protect the skin from the effects of urine and/or faecal material on the skin. Woo et al (2017) advocates the use of barrier creams but for intact as opposed to broken skin. Lian (2016) promotes the use of barrier films, as these protect the skin for longer periods than barrier creams.

Nutrition: As previously stated, a well-balanced diet containing the necessary nutrients is essential to maintain healthy skin. It is also important to ensure an adequate fluid intake of one and a half litres per day to avoid the skin becoming inelastic and weak, increasing the incidence of pressure ulcers (Posthauer et al, 2015). Where a person is overweight, excess fatty tissue affects blood flow to the skin and its structures, increasing the impact of pressure, shear, and friction. Similarly, an underweight individual will have less fatty tissue, especially over bony prominences, and less able to withstand pressure. The use of a nutritional assessment tool as an integral component of risk assessment as discussed earlier in this chapter, and assessment will determine where there is a need for the input of a dietician to offer advice.

Giving (information): Young (2021) argues that there is little proof that providing individuals and/or their carers with information and guidance on how to prevent pressure ulcers is effective. NICE sets out an expectation that information will be provided for individuals (NICE, 2015; EPUAP, NPUPAP, PPPIA, 2019). Generally, it is thought that the provision of information will increase the likelihood of an individual's concordance with the advice and treatment given by the practitioner. Robineau et al (2019), in their study of individuals who have sustained a spinal injury, where able to show a considerable decrease in the frequency and seriousness of pressure ulcers when patients where provided with the required information.

4.5   Education and Training

Blackburn & Ousey (2018) suggest that pressure areas fall into the category of 'chronic wounds' i.e., wounds that do not follow the "normal" wound healing process (Frykberg & Banks, 2015). They go on to argue that it is essential that healthcare professionals receive the necessary, education and training to improve their knowledge and understanding, if they are to reduce the incidence of pressure ulcers. This notion is supported by Greenwood and McGinnis (2016), who claim that the education and training of healthcare professionals has a direct correlation with the prevention and development of pressure ulcers. As a result, in an attempt to provide a more robust, comprehensive, and consistent programme of education and training on the subject of pressure ulcers, a core curriculum was developed for healthcare professionals, by the National Stop the Pressure Programme (NHS Improvement 2018). The programme consists of 10 modules developed with two main areas of focus, one for use within Higher Education Institutions as part of pre-registration curricula and the other for use in clinical practice. According to Blackburn & Ousey (2018 p.5) this core curriculum was developed by:

> *"...creating transparency, developing recommendations for practice, and encouraging consistency for defining, measuring and accurately reporting the prevalence and incidence of pressure ulcers within NHS Trust in England".*

Newton (2010 p.40) argues that "Pressure Ulcer prevention is not complex, nor should it be made to be. Maintaining the integrity of patient's skin is a fundamental and essential element of care, for which all healthcare professionals are accountable".

Whilst this may be true, the ongoing focus on pressure ulcers clearly identifies that they remain a significant challenge for the NHS and other care providers. In a 2018 debate on CQUIN's: 'Commissioning for Quality and Innovation target for wound assessment', simply asked, 'Is it working?' In addition, Sandoz et al (2021) argues that pressure ulcers continue to take up most of the time of Tissue Viability Specialists as opposed to Leg ulcers and overall wound assessment. As part of the debate, Maria Hughes highlights that pressure ulcers are included in wound assessment, equally supported by Blackburn & Ousey (2018). However, Hughes goes on to suggest that it is difficult to get staff to complete the required information. Louise Morris suggests that the focus given to pressure ulcers over the years may have been to the detriment of the assessment of wounds other than pressure ulcers.

Greenwood and McGinnis (2016), in an analysis of why patients develop pressure ulcers, argue that the lack of education for staff is a significant contributing factor. Some two years later, a curriculum standard for pressure ulcer education for nurses and other healthcare professionals was developed by NHS Improvement in June 2018 and published in October 2020. This coincided with the "Future Nurse" curriculum and the inclusion of competencies related to pressure ulcer prevention (NMC, 2018). Personal communication with Midwifery and Allied Health Care Professional colleagues, however, suggests that pre-qualifying course curricula does not necessarily address pressure ulcer prevention, its inclusion is either not a requirement by the regulator or left up to the discretion of the Course Team.

Schofield (2018), a Tissue Viability Specialist Nurse working in an NHS Trust, in as yet an unpublished survey, suggests there is inconsistency in the importance, frequency and length of time organisations spend on focused pressure ulcer prevention education. It appears that some embed this in mandatory training and others not.

4.6   Summary

Accurate, detailed, and comprehensive assessment of an individual forms an integral part of the care planning process, which in turn enables the delivery of high quality, evidence-based care.

When assessing a patient to determine their risk of pressure ulcers, and when detected, what measures require to be taken to treat and reduce that risk, depends on the depth of the assessment. Holistic patient assessment is fundamental, encompassing a range of information gathering relating to the individual's health, behaviour, environment, and support network.

Equally important, is that the staff completing the assessment, the care plan and the subsequent care delivered, have the knowledge and skills required to do so. It is also vital that employers provide a consistent approach to the education and training of these staff.

Evidence accrued during this study suggests that in the field of pressure ulcer prevention, treatment and wound management, there remains a significant need to ensure that practitioners and organisations fully understand the link between patient centred assessment and the delivery of high-quality care, and the importance of ensuring consistent education and support to staff teams engaged in these activities.

Indeed, it could be argued that current evidence suggests that the risks associated with pressure ulcers will continue to feature prominently in both acute and community care, resulting in ongoing suffering for individuals, financial strain on the health economy and potentially increased litigation against health care providers.

The challenge for policy makers, commissioners, regulators, care providers and educational institutions, is to design a consistently applied programme that recognises the problem, creates understanding of the issues, develops practitioners to deliver holistic assessment and care, and overall relocate resource investment towards prevention. In so doing, this will decrease the risk of mortality and morbidity as well as reducing the financial burden for healthcare providers.

Fletcher (2021) in her Wounds UK editorial expresses the following: "I would like to think that we are actually at quite a crucial turning point…. what we knew about the aetiology of PUs has changed significantly over the last 10 years … thanks to our bioengineering colleagues, to understand more about cellular deformation at a practice level…. the big difference…. is the national focus and drive. Perhaps

digitisation and improved communication and connectivity will be real drivers for change…".

Having discussed the assessment of individuals at risk of developing pressure ulcers, the next chapter will explore a variety of adult learning theories to determine the most appropriate approach in developing the commissioned education tool.

Chapter 5   Learning and Teaching Approaches

5.1   Introduction

The Trusts had commissioned a teaching programme based on online learning, therefore the starting point for this study had to be consideration of learning and teaching theories, to ascertain the most appropriate approach to use. Initial consideration was given to both 'pedagogical' and/or 'androgogical' principles and their influence on underpinning design and development. Any decision on choice had to recognise the specific strategies and styles of learning required to facilitate online learning.

There has been much debate and research conducted on, and into, what andragogy is and how it differs from pedagogy. Sato et al (2017), suggest that the answer lies in how the words were derived; Pedagogy comes from two words, the first meaning 'child' and the second '*agogus'* meaning 'leader of' (Ozuah, 2005), and is generally perceived to be a teacher-centred model, with all learning determined by the teacher. In contrast, 'Andragogy', which also comes from two words, has a different overall meaning, the first *'andro'* means 'man', recognising the adult, and the second '*agrourgous'* means 'to lead', a very different concept. This debate on the differences has continued for decades, with Knowles (1968; 197; 1988; 1989; 1990), one of the leading developers and proponents of andragogy, suggesting that it is a credible theory, whereas Brookfield (1986) argues that it is a set of beliefs, Pratt (1993) described it as a philosophy, and Merriam & Brockett (2007) referred to it as a set of guiding principles. Consequently, as Merriam et al (2007) assert, while authors were in fundamental agreement with the overall concept of andragogy, there is no general consensus of approach, instead, andragogy has developed into a number of frameworks and models, each contributing to the current understanding of andragogy.

Of importance for this study was the work by Knowles et al (2015), which raised two key points for consideration when planning learning activities. Firstly, children and adults use very different learning strategies and have different motivating factors, this leads to the use of different learning and teaching modalities. Secondly, they refer to pedagogy as a "content model", whilst andragogy is viewed as a "process model". This

implies that while children need the support and guidance present in a content model, adults with their different expectations, life experiences and education backgrounds, cope better with the process approach. This theory influenced the researcher's decision to follow the principles of andragogy when planning, implementing, and assessing an appropriate programme for this group of adult professional learners. It is reasonable however, to mention that using the andragogic model does not negate pedagogical beliefs and vice versa, as both share some essential elements, (Knowles et al, 2015), see below:

Table 5: Identifies the differences in the essential elements of learning.

Element	Pedagogical approach	Andragogical approach
Preparing Learners	Minimal preparation is provided	Information provided for learners in preparation and to develop realistic expectations
Climate	Formal, competitive, authority orientated	Mutual respect, trusting, relaxed, informal and warm, collaborative and supportive
Planning	Is undertaken by the teacher	Mutual process between the leaner and the teacher/facilitator
Diagnosis of needs	Is undertaken by the teacher	Mutual assessment
Setting of objectives	Is undertaken by the teacher	Mutual negotiation
Designing Learning Plans	Based on the logic associated with the subject matter	Sequenced by readiness
Learning activities	Transmission of information learners often passive recipients	Experiential, Enquiry based
Evaluation	Is undertaken by the teacher	Mutual re diagnosis of need and of the measurement of progress

(Adapted from Knowles et al, 2015 p22)

As this table suggests, to learn effectively, adults need to be actively engaged in the learning process (Jones 2019). They need to know the why, how, and what of the learning process and the opportunities offered. This recognises the presence and influence of self-awareness and personal motivation in individual learners, and how these impact on learning, and their need to remain independent during the learning process. Further, it is important for both teacher and learner to recognise how past learning experiences have affected them; how ready are they to learn, did they choose to learn, or were they pressured into attending. Here also, it is important to understand how the learning experiences are positioned in the totality of their lives, and what incentive or reward is anticipated from the learning (Knowles et al, 1998; Sato et al, 2017; Jones, 2019). All of these factors needed to be incorporated into the goals set and the desired learning outcomes derived for the programme.

Knowles et al (2015 p11), offer a definition of education that seemed most applicable to professional education and CPD, suggesting that that education should be: "*designed to effect change in the knowledge, skills and attitudes of individuals, groups or communities".* Understanding and applying the above definition encourages the educator to adopt a role as a 'change agent' to facilitate successful learning in adult learners. A view supported by Mukhalalati and Taylor (2015 p1) who argue," *Educational philosophy and learning theory underpin all educational practices, because they provider the "conceptual framework ….to achieve changes in behaviour performance or potential".*

Although there is a wealth of research into the theories of learning, accompanied by a range of definitions, in historical terms, there has been a paucity of research into how adults actually learn (Knowles et al 2015). Some of the better-known theorists include Erikson (1959, 1964), Jung (1969), Maslow (1969) and Rogers (1951; 1969). Rogers (1951) seminal, 'Student centred approach to Adult Learning', suggests that the learning process remains under the control of the learner, who needs to be fully engaged in the process of learning and comfortable in the environment in which the learning is taking place: with learning seen as a necessary life process. Since the latter part of the last century, interest in this field has grown exponentially, with the additions from educational, developmental, and social psychologists, philosophers, and adult

educators, all focusing on the differences between how children and adults learn (Schunk et al, 2018; Knowles et al, 2015). Although recognised as an international leader in this field, Knowles's (1968, 1970,1980, 1988, 1990) work was not without its critics, who argued that there was too much concern with the individual, and little recognition of the role of society in adult learning (Grace, 1996; Pratt,1993). Nevertheless, it has to be recognised that this work steered the growth of learning and teaching focused on adults (Mukhalalati, 2016; Taylor & Hamdy, 2013).

For this study, while other approaches were reviewed, Knowles et al (1998) original 'Andragogy in Practice Model' was considered the most appropriate match, for the context in which this study took place.

5.2   Theories of Teaching/Facilitation of Learning

The next step was a review of the theories of adult learning, to provide an evidence base for the teaching strategies to be applied (Johnson & Davies, 2000; Aliakbari et al, 2015; Takahiro, 2017). Benner et al (2009) argued that this review was often omitted from the development of healthcare education. Sato et al (2017) identifies ways to inspire learners to learn, illustrating how the learning theory adopted influences the facilitation of learning. An argument accepted and taken further by Mukhalalati & Taylor's (2019) whose review of the literature classified adult learning theories into distinct groups – see table 5 below.

Table 6: Classification of Learning Theories

Groups	Concepts
Instrumental learning theories	Incorporates behaviourist theories, experiential learning, and cognitivism.
Humanistic Theories	Focus on facilitative learning theories, self-directed learning.
Transformative learning theories	Focus on reflective learning
Social theories of learning	Focus on zone of proximal development, situated cognition, communities of practice
Motivational models	Incorporates self-determination theory, expectancy valence theory, chain of response model.
Reflective Models	Focus in reflection on action and reflection in action.
Constructivism	Incorporates cognitive constructivists and socio-cultural constructivism.

(Mukhalalati & Taylor, 2019 p1)

It is of interest to note, that despite the reviews of adult educators, much of the education of 'healthcare professionals' has been based on research resulting from studies mainly on children and animals (Skinner 1968, Thorndike 1928), and not on adult learning theories (Knowles et al, 2015). They assert that the use of instrumental learning theories provides the basis for the development of 'Clinical Competency' approaches (Wright & Morgan 2012). Yet this would appear to negate the complex nature of competence, with its mix of knowledge, skills, and attitude, and gives no recognition as to how these are integrated into professional practice.

Knowles et al (2015) building on Kolb's (1984), theory argue that in adult learning, it is key to facilitate change through 'experiential learning. Kolb (1984 p38) defined learning "*as …. the process whereby knowledge is created through transformation of experience*". He describes the role of the educator as a provider of new information and concepts to learners. Simultaneously, an emphasis has to be placed on enabling learners to change or adjust their ideas to embrace new concepts, however, it has to be acknowledged that prior learning, may impact on the learners' ability to encompass and process new learning.

To describe this in its totality, Kolb (1984), developed a 4-stage process that over thirty years later, remains one of the most popular theories. Here, it is suggested that the learner moves from, 'concrete experience', to 'reflective observation', 'abstract conceptualisation' and 'active experimentation', commenting that the stages do not necessarily follow that order. In turn, these processes have been combined into 4 distinct learning styles as identified in Figure 15 below, suggesting that individuals have preferred ways of learning. In essence, if they are to achieve maximum benefit from their education experience, the learner needs to be enabled to understand and use their own choice of learning style.

Figure 14: Kolb's 4-stage Learning Cycle

KOLB'S LEARNING CYCLE
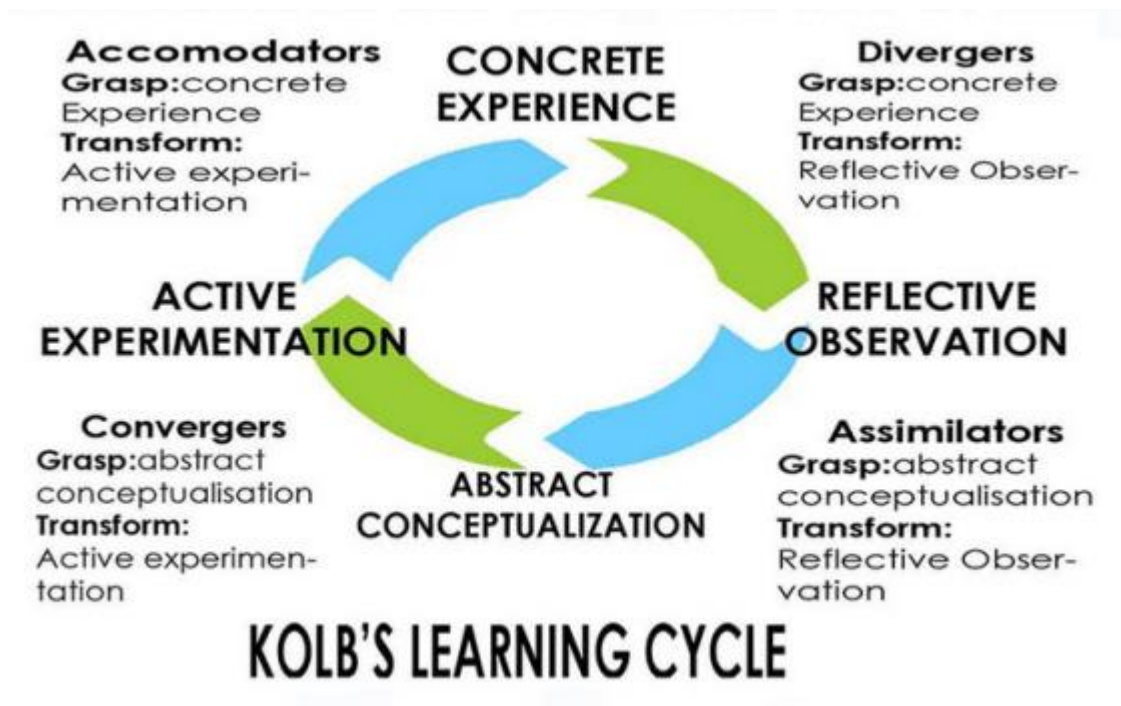
As with all theories of learning, Kolb's (1984) theory, *"…one of the older and better documented theories*" (Knowles et al, 2015 p. 196), has been subject to criticism and debate with regards of its simplicity, and in respect of its learning styles inventory. Cornwell & Manfredo (1994), suggest that there is a problem in how the learning style inventory is calculated, albeit they support the validity of Kolb's (1984) theory. Whereas Coffield, et al (2004) and Bergsteiner & Avery (2014) argue that the inventory itself, has poor validity and reliability. Despite such criticism, Kolb's model remains one of the best understood and accepted approaches, and can be applied to a range of settings, including simulation, demonstrations, discussions, and real-life experiences. Indeed, Knowles et al (2015), highlight that this approach has been widely used in the education of 'healthcare workers', consequently, it could have been adapted for use in this study.

Humanist approaches Rogers (1969 p 101) were also considered, as these view the teacher as a facilitator of learning. Tough (1979) developed this notion further, suggesting that the teacher should actually be seen as a 'helper'. The facilitator must be cognisant of the varying situations within which learning will take place, while considering the individual differences of learners (Knowles et al, 1998; Sato &

Haegele, 2017). Interestingly, when considering the guidelines developed by Rogers (1969), Watson (1960), and Tough (1979), the notion of reward and reinforcement were seen to play a role in the process of facilitating learning.

Learning strategies using this approach, within the context of healthcare education are simulations, role play, and problem solving, each with a focus on self-direction (Torre et al 2007), a useful consideration for this study. Knowles et al (2015 p129) comment that these approaches facilitate the gaining of insight through what they call, "*An operational set of principles*" for the andragogic teacher, helping them to consider the "*Conditions of Learning*" and the associated "*Principles of Teaching*", thereby reflecting the facilitative role of the teacher (Watson, 1960; Rogers, 1969; Tough, 1979). For this study, the concept of teacher as facilitator was also considered appropriate, as it was essential that the educational tool could be designed to meet individual learner needs, whilst taking into account the overall goals and purpose of the learning.

Before making a final decision, the researcher reviewed the literature on 'transformative' learning theories. These are theories concerned with the individuals' previous learning, and how to best encourage them to consider new perspectives on what may be long held views/beliefs, described by Mezirow (1991) as 'perspective transformation'. Brookfield (1986) suggests that to achieve this transformation, the learner requires to be skilled in critical reflectivity, arguing that, "*Significant personal learning entails fundamental change in learners, leading them to redefine and reinterpret their personal, social and occupational world*" (Brookfield, 1986 p 213-214). Lonie & Desai (2015) built upon the above, suggesting that in healthcare professional education this could encompass the analysis of critical incidents, and strategies for embracing change in professional practice. This approach to learning was considered to have applicability to this study but would not have fully addressed the study aims.

Initially, 'Social' theories of learning seemed possible for this study. Developed originally from Dewey's (1938) four key concepts model: 'experience', 'democracy', 'continuity' and 'interaction'. Here, experience is deemed the most important concept from which other concepts are based. Hoang (2012) supports this view, advocating that one of the areas of commonality amongst writers on adult learning, is that

'experience' is the starting point of the learning process. It is suggested that increasing levels of cognitive growth takes place as a result of the individual learner accommodating (altering existing ideas and patterns) to events/occurrences that happen around them, assimilating (arranging) encounters into currently held ideas and beliefs for future use (Yardley et al, 2012). Vygotsky (1978), a constructivist, supports the view that learning from experience is important, but argues that social interaction and imitation are also key in what he refers to as the 'Zone of Proximal' development, which enhances the learning potential as a result of communication and interaction with others (Yardley et al, 2012). Gage (1972 p 47) argued however, that "*learning through imitation seems to be especially appropriate for tasks that have little cognitive structure",* which negated this as an approach for this study.

The researcher considered two additional adult learning theories, 'motivational' and 'reflective' models. Mukhalalati & Taylor (2019) argue that the former have not been used widely in the development of curricula but could contribute to student motivation and the provision of positive feedback. On the other hand, reflective models focus on thinking, contemplation, meditation, and forms of attentive consideration, which aim to increase understanding, and lead to contextually appropriate changes when required. The above draws on earlier work by Mezirow (1981); Boud et al (1985); Street (1991) and Schon (1987). The latter promotes the recognition of two types of reflection: 'reflection in action' and 'reflection on action'. Reflection in action occurs whilst actually undertaking activity, during which the individual reacts to the situation, and modifies their responses according to the needs of the situation. Reflection on action occurs after the event, allowing the individual to contemplate on the situation, and complete an in-depth analysis of events, the successes and areas that potentially could have been managed differently. As the online learning was for healthcare professionals, with an emphasis on self-learning and reflective practice, the researcher was confident that 'Reflective' theory was the appropriate learning theory to underpin this study.

What also influenced this choice, was the researcher's understanding that the majority of participants on the study would be qualified nurses, with a requirement to revalidate their registration every 3 years, with an integral part of the process requiring them to produce reflective accounts discussed with another registrant (NMC 2016), it was

thought that 'Reflection' as a concept would already be embedded in a significant number of participants.

Overall, as those participating in the programme would come from a variety of personal and clinical backgrounds, with a range of past experiences to draw upon to inform their learning, the researcher elected to apply both reflection styles into the process. In action would occur during participation in the online learning event, where their interactions with the learning materials could be assessed and adapted in accordance with the individual's previous experience and knowledge. Reflection on action, would take place following completion of the online learning, back in the areas of practice, when each participant could assess the efficacy of the programme and its assumption that learning would promote best practice in the prevention of pressure ulcers, and enable participants to facilitate learning of others through role modelling, mentorship, and supervision. Mann, Gordon et al's (2009) systematic review comments that reflection helps students develop their knowledge and skills, and Mamede et al (2012) add, that the use of structured reflection improves students' competence and learning, particularly in clinical practice settings.

The researcher's overall consideration of the learning theories above, arrived at the conclusion that although each theory contributed to the study, Schon's (1987) 'Reflective Model' and Mezirow's (1978, 1991, 1997) 'Transformative Learning Theories Model' were the theories that most closely aligned with the study aims and objective.

5.3   Technology Enhanced Learning

This section will consider the key issues relating to online learning, such as e-learning, computer assisted learning, and technology enhanced learning and teaching. Knowles et al, (2015 p278) assert that Computer-based Instruction has many advantages for educators working in the health field as it:

- "provides consistency of content delivery,
- more readily provides training to remote locations,
- eliminates costs associated with employees' travel,
- provides a means of tracking learners' progress,
- provides standardised testing,

- offers learner flexibility in controlling and pacing learning,

- provides for diverse learning leads,

- provides opportunities for practice through simulation,

- provides greater retention and reduces the instructional time".

There is also a view that online learning may appear to be an easy option for employers as individuals are often asked to undertake such learning in their own time (Fletcher, 2017). Perhaps, in part, because of this, Knowles et al, (2015 p278) questions why computer-based learning has not been used more widely. Whilst its advantages are clear, the associated research as to the efficacy of such an approach to learning, appears to have been poorly researched (Lowe & Holton, 2005).

The use of Technology Enhanced Learning (TEL), a term that replaces the previous term e-learning, is increasingly globally recognised, (Guri-Rosenblit & Gros, 2011; Dunn & Kennedy, 2019). Over a decade ago, The Higher Education Funding Council (HEFCE) (2009 p 2), defined TEL as *"Enhancing learning and teaching through the use of technology",* and identified three key advantages:

1.   Efficiency as it is cost and time effective, and increases sustainability and scalability, both important issues for those planning long term education and training.

2.   Enhances the learning experience, which in turn improves outcomes.

3.   Transforms, as well-designed TEL can help learners recognise the issues in practice leading to significant changes in current practices and the development of new practices.

Kirkwood and Price's (2014) review of the literature states that "*it is rare to find explicit statements about what TEL actually means".* This remains true today, with the focus being on the development of TEL, rather than addressing the important issue of how technology enhances learning and adds value to the student experience.

According to the Higher Education Academy (HEA), e-learning/technology enhanced learning is achieved using computers to facilitate learning (HEA, 2019), whether that learning is in the classroom or at a distance. Reeves, Fletcher, McLoughlin et al (2017) argue that the current definitions need to be reviewed and they offer an alternative, suggesting that TEL refers to learning that uses technology, undertaken online and

outside a normal classroom situation. Saye & Brush (2007) suggest that using TEL gives the student control over their own learning, and Becker et al (2017) assert that using TEL can enable students to achieve their full potential. However, the literature does not appear to clarify whether or not the use of TEL gives students any practical or academic benefits (Dunn & Kennedy, 2019). Previous research has focussed on the behavioural aspect of engaging with TEL that is; the amount of time a student spends on the TEL, what content they are accessing, how often is it accessed and the number of times they click on extra resources to further enhance the content available (Kahu, 2013; Fikes et al, 2018), but it is argued that whilst this demonstrates that the student has engaged with the materials, it does not provide any detail regarding the other elements of engagement, i.e., an assessment of emotional and cognitive engagement, when added to the behaviour elements, would provide a fuller picture of the students learning (Fredricks et al, 2004). Cognitive engagement is concerned with how stimulating the content is for the student, making them want to know more; emotional engagement relates to how the student feels about the subject and how motivated they are to devote the time to engage more with the content (Fredricks, 2004).

TEL is an accepted, often expected component of university courses. It remains however, an adjunct to face to face teaching, providing references to the literature, lecture notes, sometimes with a chat facility, and is dependent on the teacher responsible for its development (Kennedy & Dunn, 2018). UCISA (2016) identified that in the UK the Virtual Learning Environment e.g., Moodle, is additional to traditional classroom learning, here students may choose to engage or not (Dunn & Kennedy, 2019).

TEL has different meanings and approaches, and while useful, it is not clear how its use impacts on the student's achievement of the set learning outcomes. Arguably, controversy surrounding TEL in professional education will continue (Dunn & Kennedy, 2019). Consequently, there remains an urgent need for high quality research to demonstrate its application as an innovative approach that can transform the student experience (Dunn & Kennedy, 2019).

5.4 Unexpected and Unprecedented Change.

This study began with a premise that the TEL developed would be for use within the healthcare setting, enabling staff to undertake continuing professional development, a mandatory element of registration, through the revalidation process (NMC, 2016). The added value of 'off the job' learning is that it facilitates training by overcoming the need to release staff from the clinical areas; an important consideration, which recognises the workforce issues faced by NHS Trusts. Also, with particular reference to this study, without additional education and training it was hard to appreciate how the Government's ambition for a reduction in the incidence and prevalence of pressure ulcers could be met (Adderley, 2019; Fletcher et al, 2021).

The strategy to reduce pressure ulcer incidence and prevalence supported by the development of this technology enhanced learning tool, with its anticipated ease of access for a large number of participants was to be welcomed. The added value of its suitability for employers and their staff in regard to time of access, was also considered important. Equally, acceptance of the strategy would enable care providers to demonstrate their commitment to the education of staff and that they were following the Government guidelines on the reduction of pressure ulcers. The latter would secure a financial reward if they met the terms of their CQUIN (See Chapter 1 p. 2).

The TELT designed for the commissioning Trusts, utilises the VCC, (see Chapter 7), as this was considered to fulfil their education and training requirements. The VCC comprises of patient scenarios that relate to clinical practice, consequently, it should stimulate and motivate participants to fully engage with the learning and be recognised as an aid their continuing professional development. The TELT was designed to facilitate evidence-based care, with the anticipated outcome of positively impacting on the incidence of pressure ulcers and hence the quality of life for patients, the primary objective of the commissioning Trusts. From a participant perspective, the TELT was designed to enhance their clinical decision-making. However, from the start of the study, challenges were encountered in relation the availability of the required technology within the Trusts resulting in the need to resolve these issues if the tool was to be accessible across a large geographic location.

The onset of the Covid-19 pandemic brought about the most unexpected obstacle to the conduct of the study. As NHS Trusts had to urgently identify and create virtual contact and communication systems this led in turn, to an unprecedented increase in technological developments in the NHS, which for the longer term have transformed the way in which services work. Although the need to increase options for clinical practice was the priority, the ensuing developments have offered educators new possibilities. Technological change has radically increased the potential for online learning, which can be remotely accessed, enabling learning to take place regardless of restrictions in face-to-face contact, and making it possible for employers to meet the education and training needs of staff. A practical example of this has been the role of TEL in preparing healthcare professionals and the lay public to administer vaccines. It is recognised that these technological changes, and their longer-term impact, were prompted by the challenges linked to the pandemic, and undertaken at the behest of the Government who were able to support the advances in technology that otherwise would have taken years to realise (NAO, 2020).

This TELT with its unique format, can now be more easily incorporated into the Trusts education plans. Newport & Roberts (2021), demonstrate how, as a result of the pandemic, their organisation changed their approach to education and training relating to wound care and pressure ulcer prevention by introducing online learning; this was positively received by staff and has enabled the Trusts to facilitate the ongoing professional development of their staff in line with the CQC (2018) "Harm free care agenda".

5.5   Summary

This chapter has explored various theories and models of learning and teaching and how each helped to inform the approach adopted by the researcher for this study. The decision to design a TELT developed using the VCC, would follow the principles inherent in Schon's model, (Schon, 1987) and was aimed at enabling participants to reflect on the overall learning experience, both 'in' and 'on' action.

The VCC will be described further in chapters 7 and 8 following an exploration of the research methods related to this study.

Chapter 6   Methodology

6.1   Introduction

This chapter discusses the choice of the theoretical perspective that underpins the study and the research processes applied. It includes the sampling strategy, data collection and analysis processes adopted, together with the ethical issues identified. The focus of the study was to explore the perceptions of qualified and unqualified nurses and other allied healthcare professionals, on the efficacy and impact of an online technology enhanced learning and teaching package, designed to increase their knowledge and understanding regarding future best practice in the prevention of pressure ulcers.

6.2   Aims and Objective of the Study

6.2.1 Aims

- To develop a conceptual framework and model for stakeholders to use to maintain and extend the expertise of their qualified and unqualified healthcare professionals, particularly nursing staff, in the assessment and determination of an individual's risk of developing pressure ulcers.

- To make recommendations for education and training policies for policy planners, health and social care providers and education institutions for post registration education and training in the field of pressure ulcer prevention and care

6.2.2 Objective

To achieve these aims the following objective was devised:

To develop and evaluate an online Technology Enhanced Learning package to:

- ➢ Explore the perceptions of qualified and unqualified staff who have completed the technology enhanced learning package, to assess how it has impacted their knowledge and understanding of pressure ulcers and on their practice.

- ➢ Identify student engagement in the online learning package and the barriers/enhancers to its completion.

When planning the study, consideration was given as to whether the aims and objectives needed to be used to develop a specific question to address. However, the approach in this study had been to develop a new conceptual framework and model which included teaching tools and, therefore in discussion with the NHS Trusts involved the aims and objective were formulated. The study contains elements of exploration, and explanation, clearly identified in the aims and objective, which also recognised the need for more in-depth information regarding perceptions and attitudes. In this study as Newman and Covrig (2013) argue the - what and why components of the study were all important. To try to encompass these differing elements into a set question could have been prescriptive, limiting the exploratory elements of the study. Therefore, the decision was made to remain with, and utilise the aims and objective.

The research was conducted across two NHS Trusts, comprising of a large Acute District General Hospital Trust, and a Health and Care Trust with Community and Mental Health Services. The latter also provides a tissue viability service to the care home sector. All are within the same geographic location.

6.3   Philosophical Context

The research aims and objective delineate the paradigm in which the study takes place. For this study, the different philosophical dimensions of the possible paradigms needed to be carefully considered. Bryman (2016) describes a paradigm as a conceptual framework wherein research is undertaken. Paradigms vary in their approach, with the most commonly applied being positivist, interpretivist and critical inquiry.

The positivist paradigm focuses on objective epistemology, knowledge known and its acquisition, focusing on the study and development of knowledge. Thus, epistemology is concerned with what is (or could be) regarded as acceptable and accepted knowledge within a discipline (theory of knowledge) (Bryman, 2016). The fundamental assumption is that there is one reality that can be studied and understood, it is seen as objective, existing independently of human observation and creations of the mind. So, in this paradigm, the world is driven by natural causes, their ensuing effects, and the aim of research is to seek for knowledge to increase understanding of the underlying causes of phenomena, using quantifiable and repeatable measures of assessment (Bryman, 2016; Cresswell & Cresswell, 2020). Personal beliefs and biases are excluded to avoid what is described as contamination of the phenomena under study, with objectivity being central to research, with hypothesis testing of cause and effect seen as crucial for recognition and addition to the knowledge base. Thus, there is an emphasis in both data collection and analysis on data reduction, with quantification and statistical analysis being key. Research is deductive with the research design fixed and pre-specified, and sample sizes adequate for replication and generalisation (Polit & Beck, 2012, Bryman 2016). The positivist paradigm is cost effective in research where there is a large study population, enabling results to be obtained within a short time frame, through for example, survey research with self-completion questionnaires (Bryman, 2016). It is often the chosen approach when the outcome is the production of evidence to inform, for example clinical practice (Nieswiadomy 2012) or the introduction of new drugs/treatments utilising Randomised Controlled Trials.

To be acceptable, positivist research, needs to be designed with reliability and validity as core components. However, it has to be acknowledged that these issues can be compromised if care isn't taken with the study design. For example, in surveys with questionnaire design, it is essential to make sure that instructions for completion are clear and that the questions are not ambiguous or likely to lead to differing interpretation (Bryman, 2016). It is argued that this deductive approach to research fails to recognise the individual, their perceptions and realities, together with the significance of the context in which the research is undertaken (Holloway and Wheeler, 2013), consequently the data collection can lack the wealth of potential information available.

On consideration, it was decided that, while this approach could partially address the aims and objective of the study, in isolation it would not be adequate given that the purpose of the research related to human behaviour, (Green & Thorogood, 2004; Holloway & Wheeler, 2013).

The interpretivist paradigm aims to gain insights into the subjective meaning of social actions and interactions, describing major differences between the lived experience and the objective nature of the natural sciences. The focus is more on ontology, relating to how an individual perceives and feels their reality, In contrast, questions of social ontology are concerned with the nature of being and the meaning of social actions and interactions (Wahyuni, 2012 p69). Reality is context, time, and place specific, and the emphasis is on increasing understanding of human actions and interactions (Bryman, 2012 p28). Data collection seeks insights from the participants themselves, aiming to uncover insider perspectives and or what participants see as reality of meaning in the social phenomena in which they are involved. The researcher is an integral part of the phenomena being observed and needs to accept that their own subjectivity and values can influence the research undertaken. Reality is seen as multifaceted and subjective, constructed by the individuals who live it. Social phenomena are continually being created and revised, as participants create their own reality (Bryman, 2012 p33).

On reviewing possible interpretive research strategies, individual approaches such as phenomenology, grounded theory, narrative studies, ethnographic approaches, and individual case studies were all considered. Phenomenology focuses on gaining knowledge and insights through interactions between researchers and participants. It studies the lived and conscious experiences of specific phenomena (concepts, idea). There are two possible approaches descriptive phenomenology and hermeneutics. The critical issue for descriptive phenomenologists is to gain insight into the lived experience. This is then used to identify the essence(s) of their experiences, not to explain or justify, and with this approach, no one element takes priority over the others. Experiences of perception, thought, memory, and emotion are explored, with all interpretation within praxis (van Mannen, 2014). Originally, to try to minimise bias, the belief was that the researcher's preconceived opinions should be set aside or bracketed. Today, it is accepted that this is not entirely possible, instead, the

researcher's knowledge, attitudes and perceptions should be assessed pre-study, and the researcher's positionality carefully considered. Reviews should be made throughout the study, to minimise any bias that could arise. Therefore, a process that resembles bracketing is still used to identify the researcher's pre-conceived beliefs and attitudes, and the way in which they may impact (positively or negatively) on the research (Holloway & Wheeler, 2013). However, on review it was felt that while this would help identify the essence of the lived experience, it would not fully address the project aims and objective.

Another possibility was grounded theory, Charmaz (2014) asserts, that data collection methods are determined by the study aims and objective being asked, how data is collected affects not only the actual data collected but the insights it offers. This approach implies that the researcher cannot be neutral or objective towards the subject under study, as both the researcher and participant make assumptions about what is real and pursue purposes that influences their respective views and actions as they interact. Researchers must be prepared to consider and accept what they bring to the process and understand how this can influence perception.

Consideration was given to the different approaches to grounded theory, which have emerged since the seminal work of Glaser and Strauss (1967), and the subsequent approach taken by Strauss and Corbin (2009), however, the constructivist approach described by Charmaz (2014) and further developed by Thornberg & Charmaz (2014), seemed the most appropriate for this study. It is built on the belief that people, (individually and collectively), are constantly changing, and therefore research should not be static (Charmaz 2014). This is used to try to explore the basic social process (or problems) which individuals encounter and experience, and to which they must respond (Silverman 2020). It is often used where little pre-existing theory exists, discovering, uncovering and generating new insights. Data collection and analysis occur simultaneously comparing data within and between individuals and groups supporting the conceptualisation of categories to describe and explain the data (Charmaz & Thornberg, 2021). This is a process of induction, in which analytic categories emerge from the data and are elaborated as the work progresses (Silverman 2020), with the researcher collecting and analysing data without using a pre-existing theory as an organising framework. The application of a constructivist approach to grounded theory, the data collected can reveal participants' perspectives,

feelings, intentions, and action. The information sought was from participants undertaking an education programme, and therefore while grounded theory could have been used, the aim was not to generate theory from the data sets, but to gather and analyse their responses in terms of pressure ulcer risk assessment. In consequence a different approach was sought.

A narrative study focusses on the experiences expressed within the lived and told stories of individuals, and ethnography has emphasis on describing a shared culture group (Holloway & Wheeler, 2013). These, although very different, are both relatively long-term approaches, and can include a study of the behaviours, reported beliefs, language, and interactions among members of the culture-sharing group. They can also include description of the journey of the researcher, but after careful consideration, neither would address the research aims and objective. Case study research looks specifically into a specific case, or multiple cases to develop an in-depth description and analysis, so increasing understanding of how the case(s) is constructed (Yin, 2013) and initially it seemed that this approach could be useful. A defined social setting can also be treated as a case study with all elements and interactions being studied to increase awareness and insights into how it and its members function and could be used to address study aims (Creswell and Poth, 2017).

Case Study design was initially considered, and according to Yin (2013 p10) ".. the Case Study is a distinctive form of empirical enquiry that has a specific role in evaluative research". Yin (2013 p.xi) further reaffirms the case study describing it as an "essential form of social science inquiry" highlighting its increasing use within the area of evaluative research, in particular process evaluations. While Stake (1995) defines the case study as a small piece of human activity embedded in the real world, which can only be studied and understood within its context. It exists in the present, so research is relevant to the here and now, precise boundaries are difficult to establish, and it is not designed for generalisability. This approach could have been relevant to this study, given the significant and almost constant state of change within the National Health Service in the United Kingdom however, whilst much of the basis of Case Study Design related to this study, on further consideration it was rejected. A strong influence on this decision was Yin's (2013) emphasis on the more quantitative

aspects of the research design and the reference to generalisation from the results as opposed to the transferability of the findings, which was the intention with this study.

Having considered both the quantitative (positivist) and qualitative (interpretivist) paradigms in relation to the study's aims and objective, it was evident that both could contribute to achieving the goals of the study but not individually. Cresswell and Poth (2017) argue that both qualitative and quantitative methods may be used appropriately within any research paradigm; and that questions of method are secondary to questions of paradigm. They assert that mixed methods can enhance research if carefully used. Creswell & Cresswell (2020) supports this view, pointing out that the application of mixed methods facilitates a more precise understanding of the data, overcoming any shortcomings of each method, suggesting that triangulation can be used to reconcile the differences of two or more data sources and/or methodological approaches, suggesting that the application of different designs, theoretical perspectives, investigators and data analysis can compensate for the weaknesses of any single approach. In addition, Bryman (2012) contends that triangulation facilitates double-checking or validating the results obtained from both quantitative and qualitative approaches. As this study has a strong ontological dimension, more than one method had to be found. An approach was needed that enabled roles and interactions in different setting to be considered. Critical Inquiry was therefore considered.

The critical inquiry paradigm: referred to as a "transformative paradigm" (Riyami, 2015), in which the ontological approach is based on relativism. From this, it is inferred that reality is socially constructed through all aspects of social life, so includes the media, institutions, communities, and society. For each paradigm, the methodology focuses on the processes used to explore the phenomena under study (Bryman, 2012). In this paradigm research is carried out in the light of the social, economic, political, and cultural context of the research (Pham, 2018). Creswell and Cresswell (2020) argue, any research should be designed with an agenda for reform and action that may, during or after the study, change the lives of participants. This paradigm has the expectation that research can be used to develop connections between the economic, political, social, and cultural standard of contemporary societies. It is described as helping to define the wider or global ideas of contemporary societies, to

develop innovative themes for social theories (Pham, 2018), and establishing a foundation from which research can seek to solve contemporary issues found within today's social contexts.

In relation to education, research helps to increase insights and the understanding of how learning and teaching issues change through their interaction with other social factors, including technology, economy, politics, culture, equality, and justice. Research can raise the conscious awareness of teachers and enhance their understanding of how core values and beliefs are developed and influence their natural roles. Here the research methods applied will include critical action research, discourse analysis and ideology critiques (Riyami, 2015). This study was designed to develop a new and innovative approach to learning and teaching about pressure ulcers, it was concluded that the processes of critical inquiry provided the most suitable approach to enable the researcher to ascertain how practitioners learned, what factors impacted on their choices and how their work and management impacted on their participation and the achievement of agreed outcomes, (Pham, 2018). Critical inquiry offered a design that considered how all aspects of the study linked together and how each part impacted on the other.

In designing a research study, it is important to acknowledge the philosophical assumptions underpinning the design, described by Cresswell and Cresswell (2020) as, the researcher's "worldview", the beliefs or assumptions that guide and underpin enquiries. This is of particular importance when using a mixed method approach. Cresswell and Cresswell (2020) identify 4 worldviews:

Table 7: Four worldviews used in Research (from Cresswell and Cresswell 2020)

Postpositivism	Constructivism	Advocacy & Participatory	Pragmatism
Determination	Understanding	Political	Consequences of
Reductionism	Multiple participant	Empowerment and issue	actions
Empirical	meanings	orientated	Problem centred
observation and	Social and historical	Collaborative	Pluralistic
measurement	construction	Change orientated	Real world practice
Theory verification	Theory generation		orientated

A Pragmatic worldview is the one most frequently associated with mixed methods and fits with critical inquiry. Although advocacy and participatory approaches were considered, pragmatism fitted more closely with the project aims. Cresswell and Cresswell (2020), identify a further two stances the researcher can adopt in determining the theoretical assumptions underpinning their research. Researchers can either adopt multiple worldviews - as long the differences in the ontological, epistemological, axiological, methodological, and rhetorical elements that comprise the 'differing' worldviews are understood and acknowledged – or researchers can adopt 'different' worldviews given the different mixed methods designs they utilise.

Given that this study is a stakeholder evaluation set in a real-life situation and where the consequences of the actions of all stakeholders is paramount to the research, pragmatism was considered the most appropriate. The philosophical assumption is that the actions people take cannot be detached from past events and experiences or from the views derived from those events and experiences (Kaushik & Walsh, 2019). This is significant for this particular study given the participants past experiences of pressure ulcer prevention and technology enhanced learning.

Morgan (2014) discusses three widely shared ideas on pragmatism, namely:
1.   Actions are integral parts of the context and situation in which they occur,
2.   They have consequences that can change with time and as settings change,
3.   All actions are affected by socially shared beliefs that constitute the individual's world view.

In developing his approach to pragmatism Morgan (2014) drew on Dewey's, 'Year Theory of Inquiry', and a preference for pragmatism over epistemology. The premise is, that the focus on understanding relationships between actions and consequences, helps individuals gain control over their actions (Kaushik & Walsh, 2019), suggesting that pragmatists weigh the pros and cons of different actions and their consequences before taking action. Morgan (2014) goes on to argue, that pragmatism in research requires a socially situated problem and adequate actions to address the problem, an approach not without critics, who comment that this theory disregards challenges associated with socially situated research problems (Feilzer, 2010). However, Kaushik

& Walsh (2019) suggest that there is a general consensus that supports a pragmatic approach in mixed methods studies.

Given the socially situated problem that is fundamental to this study, it is considered that pragmatism was the appropriate worldview to be adopted. The study needs to identify and supply a range of evidence for effective interventions (Kaushik & Walsh, 2019). A pragmatist approach will allow the research to gather rich data from a range of sources and critically evaluate them in terms of their strengths, limitations and applicability to the practice setting (Plath, 2013). Further study of possible approaches then led to consideration of critical action research (Pham, 2018).

6.4   Study Design

Having identified the theoretical underpinning for the study, the next step was to review and identify research methods that fitted within pragmatism and the critical paradigm that could in combination fully address the research aims and objective.

6.4.1   Critical Action Research

Action research, attributed to Kurt Lewin (1890-1947) was designed to facilitate change, where research needed to be seen as relevant and important to those affected by the change (Lewin, 1946 p35). He developed a participatory series of activities which were cyclical and led to change, with those involved playing a role in how the change developed (Townsend, 2013). Williamson et al (2012 p 7) defines action research as a process designed to achieve change whereby *".... new knowledge about a situation is generated,"* arguing that those who wish to change a situation first need to make every effort to understand it. In addition, the very process or working towards understanding can in turn reveal the possibilities for change. As this particular research had a strong focus on intended change, ranging from the direct educating of healthcare professionals about pressure ulcers prevention, to the development of best practice, and arriving at a reduction in the incidence of pressure ulcers across a local health economy, the use of action research was both appropriate and justifiable. In addition, the setting for this research was within a healthcare

environment with a strong focus on learning and teaching, further supporting the choice.

It is noted however, that researchers of the same era as Lewin, such as Collier (1945) and Moreno (1953), differed from his perspective. Nielson et al (2009), highlights that these researchers, applied an approach to action research that was aimed at reducing 'inequality' and "*ameliorate"* or improve conditions for individuals described as being 'oppressed'. Whereas Lewin (1946) wanted change to improve 'productivity' and advance 'science', with the result that whilst the action research cycles involved the wider workforce, it was in effect a 'top down' process, with the researcher operating as a facilitator. Moreno (1953) focused on studying ways in which individuals cooperated with each other, while at the same time acknowledging the presence of the researcher and how this could impact on the study.

Consideration of the varying types of action research, led to the decision that while participatory action research did have some advantages, for this study, as the researcher is an active participant in the research (Greenbank, 2013). However, this description did not fit with the aims and objective of the study. Although it is recognised that regardless of approach used, all terminology within action research, has purposeful processes, actions and a focus on social and behavioural change in respect of individual, groups and/or organisations (Manfra, 2019). It was important to also consider the relationship of education with action research. Pham (2018) argues that critical action research aligns well with education as the role of the teacher/facilitator can guide activities from initial creative planning, through curriculum design and assessment towards a student centric approach. The focus is on shared inquiry, recognising the importance of cultural sensitivity and the community in which the learning is taking place. This suggests that the difference between traditional action research and critical action research is that the latter, while retaining some of the original core concepts, focuses more on the social context and engendering change from the participants perspective, rather than on a 'top down' process. The cyclical processes in action research are dynamic and involve 4 stages Planning, Action, Observation and Reflection (Lewin, 1946; Hegney & Francis, 2015; Manfra, 2019). These steps together in combination with, where appropriate, iterative analysis

of the data collected, enables the plan to be reviewed, refined or revised, and thereby informing the next cycle.

Figure 15: Illustrating the Cycles in Action Research
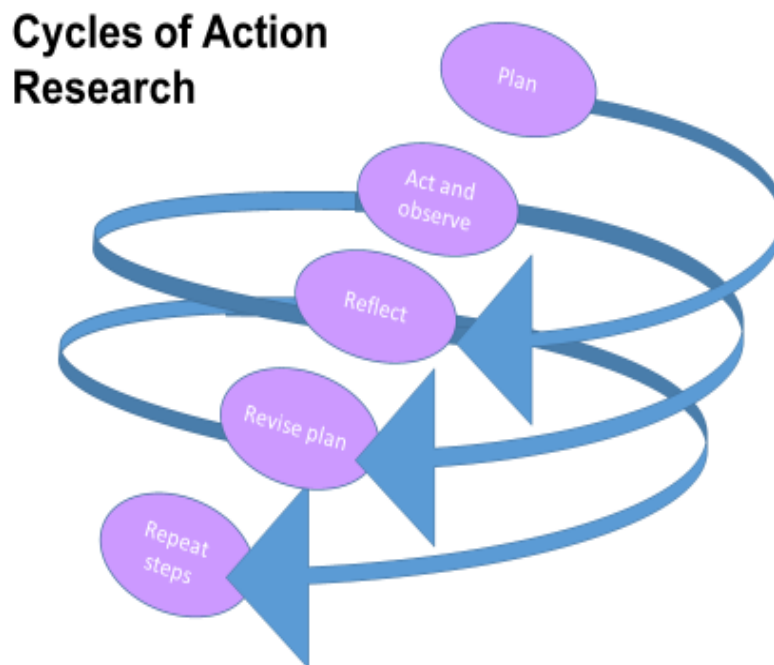
Adapted from Lewin (1946) and Carr & Kemmis (2003)

6.4.1.1   Application of Action Research in the study

Having decided that critical action research was the most appropriate method, further exploration of the process led to a decision that research workshops, would be used as the means of introducing and implementing the study. The study research workshops needed to be designed in a format that fitted with both action research and the principles governing research workshops. According to Yurdakul et al (2012) and Baran et al (2014), there are three different approaches to research workshops ; the first workshop format uses guidelines generated by specific clinical settings; the second format uses a planned workshop that describes and shares the plans, processes and implementation phases previously developed by the organisation; the third format uses an open approach that enables the participants and facilitator to work together to negotiate, influence, plan and develop the process. Irrespective of format,

the overall advantage of research workshops is that participants are not required to undertake time-consuming preparations before joining the workshop (Oberg & Hernwal, 2016).

For the purposes of this study, the workshop followed an open approach as per the third format above. Each workshop was three hours in duration and facilitated by the researcher, with a collegiate approach adopted. Cresswell (2013) argues that conflicts of interest and some ethical issues can arise from duality of role, in this instance facilitator/researcher, and with this in mind, by using a participatory approach, the participants themselves led all activities and discussions. The facilitator was therefore able to adopt a dual role as a clinician and investigator, asking questions, but not suggesting results or outcomes.

Oberg & Hernwal, (2016) suggest that both primary and secondary data can be produced from research workshops. Primary data is collected during the workshop, while secondary data emerges retrospectively, based on the activities and discussions that occurred during the workshop. All primary data collected during research workshops should be documented immediately, then treated as raw data sets. In this study, notes were taken throughout the workshops, recording all aspects of the activities and any issues and discussions that arose at any point. Following the workshop all data sets were collated and considered in their 'raw state' (unchanged), to maintain transparency and prevent misinterpretation.

The purpose of the research workshops was to enable participants and the researcher to work together to trial the education package, and to consider, assess and discuss adaptations to the programme as a whole. In addition to discussion on the programme's content, the groups also considered its applicability to their practice and its ease of use. All feedback was used to make refinements or adaptations to the training programme. A secondary result of the approach was that participants took the opportunity to share with each other and the researcher, their thoughts and ideas on the move to technology enhanced learning for continuing professional development (CPD).

Various activities were applied in the workshop, including the completion of a survey covering the key aspects of the programme and a series of open discussions. Using a workshops approach as a research method enabled the researcher to access a wider audience and offered a shared opportunity to focus on the aims and objective of the study, and add where appropriate, to add information to existing data sets. Yurdakul et al (2012) and Baran, et al (2014) assert that workshops can be used to support and enhance the research.

6.5   Sampling Strategy

Bryman (2016) suggests that in qualitative research, in order to provide a wealth of detailed data, the sample applied must be given serious consideration, and that simple random sampling was not seen as appropriate but instead, the choice of sample has to be based on specific criteria, often referred to as 'criterion-based' sampling. Holloway & Wheeler (2013) prefer the term 'purposive' sampling as the sample is selected for a specific purpose. Silverman (2020) supports this view, asserting that purposive sampling should be the norm for all qualitative research studies. It was noted however, that purposive sampling is non-probability sampling, where the aim is to select participants who are considered typical of the population under study, therefore the sampling strategy can be susceptible to conscious bias and every effort had to be made to avoid this (Bryman, 2016).

The study was commissioned by an NHS Trust, acting on behalf of themselves and another NHS Trust in the area. There were specific aims identified with the focus on a specific target population therefore, it was not the intention to generalise from the findings of the research however, it was anticipated that the results of the study could be transferable to other similar populations. Consequently, purposive sampling was chosen as the preferred approach, and it was decided to target a wide a sample of appropriate practitioner participants to the study. The prevalence and problems relating to pressure ulcers transcends all areas of practice, so the practitioners identified by the NHS Trusts came from a range of clinical settings and included qualified and unqualified health care providers and managers, in addition to tissue viability specialists. As the approach used was participatory, the term 'key stakeholders' was used to describe participants.

Applying a total sample approach (Bryman 2016), all key stakeholders were invited to take part in the research. Written correspondence was initially sent to NHS Trusts Managers, and once they had had time to consider and clarify issues relating to the proposed project, they were asked to nominate appropriate staff to attend the research workshops. Their attendance was coordinated by local Education Leads who arranged venues and liaised with participants. Each prospective participant was written to by their manager, information on the study was provided clarifying who and what met the inclusion criteria, and individuals were asked to state their interest and provide their consent to participate. Participants were informed that data would be collected via focus groups and a survey, and that no individual would be identifiable in the study's findings and that they could withdraw at any time without prejudice. The sample participant population was facilitated through Ward Managers and Professional Service Managers, and, in a few instances, self-referrals were received. Participants were identified because of their involvement in providing care for individuals at risk of developing pressure ulcers. Selection for attendance at each session was made through consultation between the NHS Trusts and the participant. At no stage was the contact list of potential participants released to the researcher.

Logistically, provision was made at each local site where the sessions were to take place, to enable the required computer equipment to be made available, in order to deliver the technology enhanced learning and teaching element of the workshop sessions. See Appendix 2 and 3 for copies of Draft Information (2) and Consent Form (3).

6.6   Ethical Considerations

Ethical consideration in all research studies is essential. Leavy (2017, p27) asserts that ethics can be said to "*underscore each aspect of social research: the philosophical and praxis levels, what we believe and what we do.*" This requires the researcher to ensure at all times, that the research is within the law of the land; accurate in terms of data reporting; given with informed consent from participants; does not affect the well-being of the participants, is respectful of cultural beliefs, equitable and acknowledges and guards against the subjectivities of the researcher themselves. In addition, as the research was to be conducted within the United Kingdom National Health Service, the

researcher was required to comply with ethics and research governance requirements and policies of the NHS Trusts, with the Heath and Care Trust allocated as the lead role in overseeing compliance.

As stated in the introduction, when ethics approval was sought to conduct the study on reviewing the application submitted, the Trusts decided the study was a service evaluation. Therefore, ethical guidance was devolved from the ethics committee to the Research and Governance team and did not require separate ethics approval. Consequently, the delegated responsibilities required the governance team to log and check all aspects of the study, including the maintenance of records for each applicant, registering planned processes and anticipated outcomes. The team were also required to check that the national research and ethics guidelines were followed throughout the duration of the study. To successfully gain approval within the Trust, the study had had to demonstrate that the research met, the ethical principles of autonomy, beneficence, non-maleficence and justice, as detailed by Beauchamp & Childress (2019), and that these would be upheld at all stages.

It was also vital to ensure that participants could gave informed consent, their having been offered an assurance of anonymity, confidentiality, data protection and overall safety in advance. Equally, participants needed to be advised on how the results would be disseminated. To address this, a consent form was developed from the templates available through NHS ethics, and circulated with information about the study, with each participant asked to sign consent prior to the commencement of data collection. It was also made clear that participation was voluntary and that that they could withdraw from the study at any time without prejudice.

All data collected from the focus groups was securely stored in a locked cabinet, accessible only by the researcher. The latter is a registered health care professional and is bound by a Code of Professional Conduct (NMC, 2018) in any activity undertaken. In addition, to ensure anonymity, no personal information e.g., name, address were included on the questionnaire or interview schedules. Equally, the survey had no means of identifying the origin of returned questionnaires and all electronic data was stored in encrypted files, again only accessed by the researcher. Data presented is in a format that ensures no individual can be identified and it is only

used for the purposes of this study. Finally, on receipt of formal approval of the study from the Trust, indemnity assurance was given by the university.

6.7   Positionality: in the context of the chosen method

From the beginning of the study, recognition of the positionality of the researcher was seen as essential. As a University professor, I had to recognise that my role could impact on how the participants perceived me, making it harder for staff to freely share their perspectives and where appropriate limitations or criticisms of the programme. However, it was hoped that the participatory approach chosen would reduce the possibility of this. To minimise bias, it was essential to carefully consider the professional and academic strengths I brought to the project and the possible constraints and/or weaknesses of research being undertaken by a nurse researcher closely attached to the area of study. It was necessary to review and reflect on my personal experiences and consider how these could impact on and affect any challenges or dilemmas that arose as the study progressed. This reflexive process enabled strategies to be identified that would help not only to overcome the expected challenges, but also to increase the trustworthiness and authenticity of the study.

The research approach involved the application of several methods, each with its own specific need for assessment as to the reliability and validity of the processes adopted. It was also crucial to consider carefully the time required to collect, analyse and interpret the data. Equally, it was important to examine holistically how the interactions, reactions and activities of the participants could impact on the study, accepting that in terms of time planning there needed to be a contingency period in case more time was needed than had been expected. In the event, as often happens, the time needed to collect, collate, analyse and interpret the data, was greater than had been anticipated. This was in part because the study data was examined to check for any reactive effects this relationship might have on interactions, and partly because of the impact of the Covid-19 pandemic on my role as a researcher.

To reduce and/or minimise identified and unconscious bias, iterative, reflective processes were used at all stages, and these included reflecting on how previous personal education and training experiences, and current concerns were affecting the

study. Charmaz (2014) and Palaganas et al (2017) argue that reflexivity serves as a method for the researcher to understand the views, beliefs, and values that impact on the study and adds credibility to qualitative research processes. Therefore, before starting the research, a key first step was to review personal thoughts and perceptions. This needed to include personal biases (both positive and negative) in order to bring to consciousness, explicit descriptions of what I believed about the topic. However, over time, it was increasingly difficult to limit my role to that of an outsider researcher, the nursing and educator roles repeatedly surfaced, and had to be considered and accepted each time.

What became clear was that the decision to engage in a participatory role, as mentioned in the opening paragraph of this section, presented advantages. As a nurse and researcher, I shared a similar cultural background to the participants, and her experience and strong commitment to pressure ulcer care, was appreciated by all. This dual nurse-researcher role or insider/outsider perspective has been recognised for well over a decade, (Thomson, 2011). There was a danger however, that participants could make assumptions regarding my knowledge and expertise, and in consequence not fully articulate their thoughts, concerns, or meanings. The assumption of 'peer understanding' was acknowledged and considered throughout the study.

It has to be accepted that as Aburn et al (2021) points out, even with careful checking insider research can still bias the interpretation of data. In consequence, in addition to the questions used, on completion of all research actions and interactions, the reflective process was used to review all steps of data collection, analysis and interpretation, searching for indications that my personal experiences had not negatively (or positively) affected the research results. However, the insider role is crucial for effective nursing research and the specialised professional role can only be studied by appropriately qualified researchers (Cresswell & Piano Clark, 2008). Using this argument, knowledge of the field gives better understanding of the nursing context and related clinical practice. In the context of this study, it was essential to remember that I was knowledgeable and had experience in pressure ulcer prevention (insider); the research role meant there needed to be some distance between myself and the

participants to succeed in collecting, analysing and interpreting data as objectively as possible (as an outsider)

When considering the education role alongside the researcher role in this study, the adoption of a positionality stance at the beginning of the study assisted in reducing the risk of bias but could not guarantee fully bracketing one's own experience. In this study, I adopted a memo writing strategy to record and discover intuitions, ideas and thoughts, to assist in developing interpretations, reflections, ideas and codes Charmaz (2014). Although developed for use in grounded theory, this approach was adopted as it brings increased transparency and enhances the audit trail.

A key consideration in the research methods adopted, related to my role in the research workshops. Using the action research cycles, I assumed the role of facilitator for all activities, whereas, in the focus groups the researcher took on a more active facilitator role, as discussed in previous sections. For all other activities, the difference in this study to traditional facilitator roles is that the TELT programme was being trialled, modified, and refined. Therefore, for the trial of the programme, to some extent, I could be described as outside the main activities. The role was that of observing the activities and questioning where appropriate, while the participants completed the programme. The research observer role sits in a continuum from complete observer to participant observation and can be either overt or covert (Bryman 2016).

Figure 16: Observer roles

Overt/Covert	Overt	Overt	Covert
non-participant	observer as	participant as	participant
Observation	participant	observer	observation

Quantitative → Qualitative
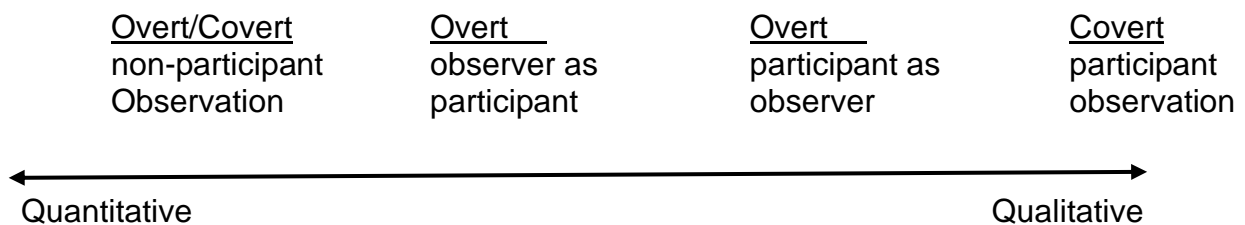
For this study, it was not seen as appropriate to consider a covert researcher role where the nurses would have no idea that they were being observed as part of the study. An overt researcher hopes to gain understanding into the phenomenon being studied (the TEL programme) and the internal and external factors that may affect the

participants' interaction and/or ability to use the programme. The non-participant observer role was also rejected, as this would not facilitate clarification of any issue or actions raised by participants. Without being able to identify and address concerns regarding the ease of use, understanding and content of the programme would not have been possible. Thus, essential information may have been missed.

This left observer as participant and participant as observer/researcher, however, for this latter role, the researcher needs to be part of the group (Bryman, 2016) and although having a background in pressure ulcer care, this was not the case. This left the role of observer as participant, which involves the researcher joining situations where behaviour, interactions, organisational practices can be observed first-hand. The advantage of this approach is that the researcher can study a situation in its natural setting without officially altering the conditions (Bryman 2016). It is argued that in some situations, initially the presence of the researcher can affect actions but for this study this was not considered to be an issue. I explained the chosen approach to the group, highlighting the importance of being able to observe but with the freedom to intervene and clarify issues as appropriate. The participants accepted my chosen role, understanding the need for 'outside' observation. The self-reflection and insider/outsider perspectives of this approach are discussed further in the positionality and study reflection in Chapter 12.

6.8   Data Collection

To carry out the critical action research cycles, different data sets needed to be collected. As these were both quantitative and qualitative, for clarity these are presented sequentially this includes collection methods, data analysis and reliability and validity/alternatives for qualitative research.

6.8.1 Quantitative data sets

6.8.1.1   Survey by Questionnaire

Surveys have the advantage of providing a wealth of information in a time and cost-effective manner, however, it has to be acknowledged that the information obtained

can be somewhat superficial in nature (Fowler, 2013), as there is no opportunity to query or check meanings of questions. Also, the use of a survey design to collect data suggests a focus on numerical analysis, and while this can show frequencies, trends, and significant differences, it limits the depth and quality of the data collected.

Data collection by means of a survey was not considered a problem in this study, as the researcher was seeking baseline data, not causation, via the process.

6.8.1.2 Questionnaire Design

As the main aim of the survey was to ascertain biographical information and individual perceptions, data analysis was descriptive, with a focus on patterns, trends, correlations, and significant differences. Initially, consideration was given to the use of an existing questionnaire, however, having searched the literature for such a tool, nothing suitable in addressing the study's aims and objective could be found. Consequently, a questionnaire was designed that was 'user friendly' to complete, accompanied by instructions and guidance for completion. The questionnaire was designed to seek answers to 'closed questions', using a Likert scale, but with space provided for qualitative comments, to enable participants to expand on areas where they felt this was appropriate.

Clear and focused questions were asked, with each set of questions given its own instructions for completion (Bryman 2016). The questions included general demographic information including age, gender, job title workplace. Respondents were then asked to identify their professional role – nurse, physiotherapist and their professional status i.e., were they a qualified or unqualified healthcare professional, followed by a series of questions relating to their experience of assessing patients to determine their risk of developing a pressure ulcer, including the use of Risk Assessment Tools. Additional questions focussed on the respondents experience of online learning and if they had, or had not, enjoyed the experience. Short dialogue boxes were added to enable respondents to clarify their responses, adding a qualitative element to the survey. The latter were designed with a coding in mind which would support quantification (Fowler, 2013). It was intended that individual comments could be used to illustrate the main findings.

The questionnaire was piloted by a small group of 5 nurses from the Trusts, who were informed of the purpose of the study, but who were not part of the research. No problems were reported, and the layout and questions were finalised.

6.8.2 Quantitative data analysis

Quantitative data analysis necessitates different approaches to be taken subject to the aims of any given study. This particular part of the study did not seek causation, as the main aim of the survey was to ascertain biographical information and individual perceptions. The data analysis was descriptive, focusing on patterns, trends, correlations, and significant differences. Different types of data require different statistical measures to both describe data and to support analysis (Leavy, 2017). Quantitative research examines and quantifies variables, with the 'dependent' variable concerned with the phenomenon being studied and what the researcher is trying to determine - the 'effects of an intervention'. Whilst the 'independent' variable considers what might be 'causing an effect' on the things the researcher is trying to understand, whilst the intervening variables can mediate the effects of the Independent variable on the dependent variable (Gravetta & Wallnau, 2013).

The statistical analysis applied is dependent on the level of data collected. There are four scales measuring four types of data namely:
1. Nominal data categorises the sample group for example occupation and gender, but each category is distinct.
2. Ordinal data as the term suggests uses rank order but does not differentiate or describe the distance between the ranks.
3. Interval data also places the data in order, but the difference is that it uses equidistant units to measure the difference between scores.
4. Ratio the highest level of data, like Interval data has standard distances between scores, but incudes an absolute zero.

In addition, there are different levels of statistical tests that can be applied, again subject to the purpose and type of data collected. These are referred to as; 'Parametric' and 'Non-Parametric' Tests. Parametric tests can only be used for interval and ratio data, where there is a normal distribution curve, and include T Tests. Non-

Parametric Tests are distribution free, and used for nominal and ordinal data, e.g., Chi-square, Mann Whitney. Much of the data collected in this study was nominal or ordinal, (Gomm 2008), so it was not possible to use the more sensitive parametric tests associated with interval data. Non-parametric tests were applied, including Chi Square (Bryman 2016), with data analysed using STATAv16. It is important to note that inferential statistics were not considered to be appropriate to this study as it was concerned with the knowledge and perceptions of individual participants. The accepted tradition probability (P) of <0.05 was applied (Fallon, 2016).

6.8.3 Validity and Reliability

For all quantitative studies, it is important to consider tests of reliability and validity (Bryman 2016).

6.8.3.1   Reliability

Reliability can be defined as whether a particular tool or instrument (or technique) would yield the same results if it is repeatedly used by one researcher, or used by different researchers, once. Looking at this definition it is clear that all that reliability assesses is the repeatability or 'consistency in use' of any data collection instrument, not the data gathered (Bryman, 2016). There is no mention of the accuracy or precision of any measurements taken, or of the findings/results. Provided similar results are obtained each time it is used, regardless of whether the results are right or wrong, the instrument, and hence the study would be seen as having reliability (Holloway & Wheeler, 2013). Thus, reliability implies consistency but not accuracy and replicability over time. Further, reliability is seen as the degree to which a test is free from measurement errors since the more measurement errors occur the less reliable the test. In this study, every effort was made to check for consistency, questions were checked with a peer group, and when administered every effort was made the make sure that the processes and procedures used with each group did not vary (Bryman 2016). Then too, although the study used a non-validated questionnaire, the findings from repeating the survey with the different groups of participants were compared to give an indication of repeatability.

6.8.3.2   Validity

Validity simply measures the extent to which a researcher has measured what they set out to measure There needs to be a clear relationship between the way a concept is defined, and the way it is operationalised. This measure aims to assess whether the relationship is well established, or whether there is a gap between the information that was sought, and the data collected (Silverman, 2020). Validity can therefore be defined as whether the research has measured what it set out to measure (Bryman 2016). Similar to reliability, it has nothing to do with accuracy or whether the results are right. Again, as with reliability this is a difficult concept to measure, and in an effort to resolve this several different approaches have been developed which address different aspects of validity. In this study content validity was of key importance as a new education tool was being developed, and it was important that preparation would lead to the recording measures in the tool adequately representing the domain(s) being studied, in this case pressure ulcers. Literature searches were completed and revised throughout the study, with their findings used as a basis from which to build and to repeatedly check that the tool being developed was appropriately designed, with concepts emerging from the evidence base. The baseline survey results were compared with government directives and research into pressure ulcers to assess the extent to which the data obtained reflected key findings and policy statements. Face validity was considered through the involvement of experts both in developing content and in the design of the TEL programme.

Criterion validity was difficult to assess as this whole aim of the study was to develop a conceptual framework, hence while some data was collected during the action research cycles and piloting, this was initial data, and this concept will be assessed when use of the TELT is evaluated after completion.

6.9   Qualitative data sets

6.9.1 Introduction

Qualitative data collection formed a key component of this study. The researcher wished to gather in depth data that could be analysed to gain rich and detailed insights into the knowledge and perspectives of participants.

Researchers can use varying approaches to collect the data needed, and in this study, it was obtained through two approaches namely: Research Workshops, which focused on learning and teaching; Focus Groups (Creswell and Creswell, 2020).

The aim was to gather rich, detailed, focused data. This approach implies that the researcher cannot be neutral or objective towards the subject under study, as both the researcher and participant make assumptions about what is real and pursue purposes that influences their respective views and actions as they interact. Researchers must be prepared to consider and accept what they bring to the process and understand how this can influence perception. As indicated previously, the main theories for qualitative data collection and analysis were considered and rejected. Therefore an approach had to be found that would work with the rich and detailed data collected from using a semi-structured approach to questioning. Framework analysis, unlike grounded theory, is less concerned with the development of theory from the raw data but aims to analyse qualitative data designed to address specific questions (Arifin et al 2019). It does have some similarities to thematic analysis but is seen as offering a more transparent process of description, initial thoughts and categorisation with associations as themes emerge (Ward et al, 2013; Arifin et al, 2019). As with other methods it fits with open and semi structured data collection, and uses clear steps to categorise, code and refine data, providing, with this structured approach, a format that facilitates structured analysis. Originally developed in the UK for use in social policy analysis it is seen as a pragmatic approach for real-world investigations and is being increasingly used in health care research in nursing, midwifery and health psychology (Ward et al 2013, Parkinson et al 2015). Unlike other approaches, framework analysis is not bound by a particular epistemological position, which allows for more flexibility in the process of analysis which enables researchers to categorise and code the data in line with the study aims (Parkinson et al 2015).

Of importance for this study, is that with framework analysis, data collection and analysis can occur simultaneously comparing data within and between individuals and groups supporting the conceptualisation of categories to describe and explain the data (Arifin et al, 2019). This is a process of induction, in which analytic categories emerge from the data and are elaborated as the work progresses (Silverman, 2020), with the researcher collecting and analysing data without using a pre-existing theory as an organising framework. This approach was seen as offering an appropriate system to analyse data collected through semi-structured focus groups (see below).

6.9.2 Focus Groups

Focus Groups can be highly structured, semi-structured or unstructured (Bryman, 2016). The ideal size of a focus group is 6 to 8 participants however, 3 to 14 may be acceptable dependent on the topic of the research and the participants. Within this study, semi-structured focus groups were held with the qualified and unqualified staff, who had studied the online pressure ulcer technology enhanced learning and teaching resource. In addition to providing feedback on the resource to the researcher, participants were encouraged to discuss their personal experience of the efficacy and impact of the resource with each other, enabling both collective and individual views to be gathered, and increasing the richness and depth of the data collected. This approach enabled individuals to recall what for them, had been the most important issues and to describe their experiences in their own words. It also facilitated input from all participants, minimising the risk of dominance by one or two individuals (Silverman, 2020).

Focus groups can be labour intensive with regard to their organisation, management, and the subsequent collation, transcribing and analysing of the data collected however, there are strengths in using this method. Given the topic and focus of the study, individual interviews with the numbers of qualified and unqualified staff taking part would have been challenging and time consuming. In addition, team working is fundamental to the planning and the delivery of high quality clinical practice and the bringing together of key stakeholders in groups facilitated familiarity, relationship

building and future networking between them. This interaction through the focus group activities was a significant outcome in the overall evaluation.

Focus groups were held at the end of each of the Research Workshops. An additional focus group was convened with the Tissue Viability Link Nurses who had been made aware of the Study by the Researcher at a Link Nurse meeting. At that time all of the nurses were given access to the TELT and asked to complete prior to a future Link Nurse Meeting during which time a focus group was held to determine their views on the TELT, it's accessibility, useability and content and any other comments they might have. Some of the group had participated in the testing of the Technology Enhanced Learning Tool (TELT) developed as part of the study. The decision was taken to not to tape the focus group but to record notes to pick out the main themes that were then checked for accuracy with the participants.

6.9.3 The Role of the Researcher: observer as participant

The questions used were designed to encourage discussion, and every effort was made   to enable them to lead the discussions. Although the questions were in order, flexibility was used, and where participants, raised issues in a different order, then this was followed, and every effort was made to check that the participants led the interviews with questions only asked for clarification, or to raise a key issue that had been omitted (Ciesielska et al, 2018).

It was important to find an approach where the participants would feel free to discuss issues and although it was not possible to change the venue, chairs were moved to change the setting creating a more friendly setting. To prevent interruptions a do not disturb sign was put on the door. As the focus groups were not being audio recorded, a notebook was to allow to make a notes of their key points and did not include any personal details. Participants were reassured that their anonymity would be protected, and no comments would be attributed to any person. This had been included in the information sheet provided to participants, however, it was important to reassure participants that any notes taken were confidential. All participants accepted this and willingly shared their perspectives with each other and myself, seeming to enjoy the opportunity to relax after the more formal activities they had undertaken previously.

6.9.4 Field Notes/Memo Writing

Patton (2014) argues that memo writing is an essential component of data analysis, providing the researcher with a record of their observations, thoughts, feelings and ideas, which will ultimately inform the coding and categorisation of data. He suggests that memos should be written at all stages of the data collection process, enabling the researcher to immerse themselves in comparative analysis moving from the description to conceptual analysis, thus increasing the academic rigour of the coding and categorisation of data process. Ciesielska et al, (2018) supports this notion, advocating that memos should be written immediately after data is collected and as codes and categories are developed, and that in so doing, the researcher can reflect on their observations to assist them with the interpretation of the data collected to "sense check" understanding and to inform the final coding and categorisation. An approach with aligns with the principles of framework analysis (Davda, 2018).

6.10 Data Analysis

Consideration was given to the possibility of using a computer assisted qualitative data analysis system (CAQDAS) to support the analysis process, rather than a manual process (Odena, 2013). The overall theory, methodology and study aims were reviewed, as was the amount of data to be collected; the nature of the analysis needed in terms of depth and complexity (Parkinson et al 2015). However, the data collected was seen as manageable manually, and preferred particularly, when the time that would be needed to learn and master an appropriate software package, was included in the review.

6.10.1 Data Reduction

Miles et al (2014) state that there are three components in analysing qualitative research. Data reduction, engages the researcher in condensing and ordering data in a meaningful way, clearly portraying the researcher's knowledge and understanding of the collected data (Patton, 2014; Green & Thorogood, 2018). Data provides possible pointers to concepts that are subject to continual comparison to determine which concepts are the 'best fit' (Bryman, 2016). However, the method chosen for data

collection impacts on the way in which data is analysed. Regardless of method, there are advisory notes that can help the researcher as they move through the steps of data analysis (Miles et al, 2014) These are given in table 6 below.

Table 8: Initial description and Categorisation Process Properties

Initial Coding Process Properties
Remain open
Stay close to the data
Keep your codes simple and precise
Construct short codes
Preserve actions
Compare data with data
Move quickly through the data

During the initial stage, it is suggested that the researcher immerses themselves in the data, creating simple and precise descriptions, thoughts and initial codes whilst remaining open to the range of notions possible. However, as qualitative data collection yields rich and 'Thick' description (Denzin & Lincoln, 2018) it is a detailed description of the whole research process including the ways in which the participants and researchers' ideas and understanding develops. As a result of this thick description, anyone reading the study should feel part of the process and should be able to the recognise emergent categories and themes.

For this study in view of overall methods chosen, a method was needed that could be used for all qualitative data sets, including the open responses in the baseline survey. Framework analysis was identified as offering a structured approach that could be applied across the different data sets (Gale et al 2013). It was chosen because it facilitates analysis of cross-sectional descriptive data, enabling different aspects of phenomena being researched to be identified and through this increases transparency in the interpretation process (Arifin et al 2019). The first phase of framework analysis methodology is familiarisation of the raw data by listening repeatedly to the audiotapes, to confirm that the transcripts are an accurate representation of what was said, or where open text boxes have been used repeatedly checking that where the open responses have been faithfully transcribed. Once this has been done, memos and notes are made of key ideas and possible emerging recurrent issues are recorded. Following this data is coded against the initial thoughts and tabulated, so creating

the first stage of framework matrix (Gale et al, 2013) from this the data is rearranged and summarized, with columns created, indicating possible themes.

Thematic analysis is performed on the data at each stage to identify and check that the initial thoughts and indicators of themes reflect the context of the original data set (Davda, 2018). Open coding of the transcript line-by-line, using a constant comparison approach supports the development coding and recoding of the identified quotes, which leads towards the emergence of themes and categories and the chart is then interpreted. Following these initial steps, the processes of analysis it, a more focussed view of the codes initially formulated is carried out, selecting those most frequently cited, those considered to be the most significant, and comparing these with the original data sets to check the context has not been lost during analysis.

A second round of analysis is then carried out in which the initial chart is reviewed with the possibility of recoding each quote and set of quotes to enable the themes to be studied in more depth and revised where appropriate (Parkinson, 2016; Davda, 2018). The iteration of the analysis processes allows for the development of interconnected stages as the researcher can work backwards and forwards through the data sets until no more new themes emerge. (Davda, 2018; Arifin et al, 2019). The advantage of this two-way process is that it also facilitates study and analysis of data sets, both across individual data and within the stages of analysis (Parkinson et al 2016). Throughout the steps of analysis, it is essential that the researcher develops "theoretical sensitivity", in which they remain aware of their position within the research, taking a crucial and considered stance towards the coding process, acknowledging their own skills and experiences as part of the process of data analysis (Arifin et al, 2019; Parkinson, 2016).

All data was stored securely in a locked cabinet when not in use for the purposes of the research. To add rigour to the data collected, a process was employed whereby a colleague, an experienced researcher, also read the anonymised transcriptions to identify the emerging themes from their perspective. Their suggestions were then compared with the themes already identified, and where appropriate, modifications were made to the identified original themes. In essence, there were no major differences in the ethos of the themes identified by the researcher and colleague, with amendments only related to some of the descriptive terms applied.

6.11 Quality in Qualitative Research

Verification is concerned with the notion of bias and how this can be identified to ensure the rigour of the research. By undertaking all of the processes described below to promote transparency and the quality of qualitative research the risk of bias can be reduced. In examining the notion of quality in qualitative research, there are different schools of thought, as is reflected in the studies undertaken (Miles et al 2014; Patton, 2014).

Historically, it was argued that quantitative and qualitative research methods should be assessed using the same measures, however, it was later acknowledged that this theory may be difficult to apply, as the aspects being measured cannot be directly "translated" from quantitative to qualitative research. It was accepted that they may be applicable in part, but the focus on text and in-depth data, rather than quantifiable measures, limited the relevance of reliability and validity (Denzin & Lincoln, 2018). In response, constructivist researchers developed alternative measures which are now well accepted (Guba and Lincoln 1994; Denzin and Lincoln 2018). They propose two primary criteria: 'Trustworthiness' and 'Authenticity', each of which sub-divides into several criteria. This is the criteria adopted for the purpose of this study.

6.11.1 Trustworthiness

Trustworthiness is concerned with the robustness of the research design and has four criteria namely credibility, transferability, dependability, and confirmability.

6.11.1.1 Credibility

Credibility is one of the most important elements to evidence quality in qualitative research (Bryman, 2016; Cresswell & Cresswell, 2020). Relevance is an important component of credibility, in that the research needs to be significant and of relevance to the participants involved. The concept of 'relevance' is considered to be entirely significant in this study, as the aims and objective are directly concerned with providing the required education, to establish learning and enable practitioners to use their new

and/or refreshed knowledge to enhance practice and facilitate a reduction in the incidence of pressure ulcers.

Credibility requires the researcher to ensure that in the interpretation of data, they guard against their own views and standpoints inappropriately influencing the research, and that alternate or opposing views have been identified and discussed. The regular reflection activity applied throughout the study recognised the importance of the above. Equally, the overall relevance and credibility of the study was regularly assessed throughout the data collection and analysis process and was integral to the audit trail.

6.11.1.2 Transferability

Qualitative research strives to enable others to apply the ideas and findings from one situation into other similar situations (Strauss & Corbin, 1998; Charmaz, 2014). The concept of 'Transferability' is wholly relevant to this study, given the applicability of the subject - technology enhanced learning to all other aspects of care delivery.

Peer Review was applied in this study, during action research cycle one (see Chapter 8) in the focus group held with the Tissue Viability Link Nurses (see Chapter 10) who were asked to confirm the themes that emerged from the discussions to ensure the absence of bias and subjectivity. Cresswell & Cresswell (2020) contend that peer review is more effective when the peers have been involved in some way with the research.

6.11.1.3 Dependability

Dependability is likened to reliability (Denzin & Lincoln, 2018), as the researcher must make the context of the research clear and be able to describe the path, they followed in conducting the research. This is considered to be akin to an 'audit trail' (Holloway & Wheeler, 2013).

Within this study, the above was adhered to via detailed recordings of the decisions made before and during the research, and a clear description and understanding of

the overall research process. In addition, the reflective journal maintained throughout the process added to the audit trail and included the rationale for the decisions taken during the implementation of the research.

Although this study was commissioned by two NHS Trusts, it is relevant to NHS Trusts on a wider scale, and it would be possible for another researcher to utilise the approach taken within this study. However, It is recognised that it would not be possible to fully replicate the study, given that the participants and the circumstances surrounding the research would not be the same however, the process and the findings from the study would be transferable.

6.11.1.4   Confirmability

Confirmability is concerned with freedom from preconceptions and impartiality, a significant challenge for the qualitative researcher. To maximise confirmability, the researcher needs to clearly demonstrate that the findings of the research achieve the stated aims based on the actual study and not derived from the researchers' views and perceptions. Denzin & Lincoln (2018), contend that honesty and openness are essential attributes, with the researcher providing a clear exposition of all stages of the research process and, in particular the collection of data.

Confirmability was assessed through the audit trail and through member checking – a process whereby the researcher "checks out" that their interpretation of what the participant has said is correct and if not, it enables the researcher to make alterations to ensure the data reflects the views expressed by the participants and is accurate. However, this strategy is not without its challenges in that when reviewing for example, an interview transcript the participants might be concerned that they have said something they hadn't intended to, or they might not want to challenge the researcher given the relationship that would have developed over time. (Cresswell & Cresswell, 2020).

6.11.2   Authenticity

Authenticity contains several concepts, but this can only be assessed towards the end of, or on completion of a study. These are criteria of fairness, ontological, educative, catalytic, and tactical authenticity. **Fairness** is concerned with ensuring that the research is a fair representation of those taking part in the study which in the case of this study was the qualified and unqualified healthcare professionals and the tissue viability specialist nurses together with the senior NHS Trusts personnel who commissioned the research. **Ontological authenticity** involves the degree to which the researcher, research participants and those reading the research have been helped to understand the topic being studied. In the case of this study – is there a greater understanding of the assessment of individuals to assist in reducing their risk of developing pressure ulcers and the use of technology enhanced learning to facilitate this greater understanding. **Educative authenticity** refers to the ways in which the research participants understanding of others, as a result of their increased understanding through their participation in the research. In the case of this study how allied health professionals view their role in the assessment of an individual's risk of developing pressure ulcers. **Catalytic authenticity** considers the extent to which the research has impacted on the research participants to engage in the findings of the research and as a result change their behaviours. In this study this refers to, how practitioners use the knowledge and experience gained, to enhance their practice and, in addition understand the use and value of technology enhanced learning in their development. Finally, **Tactical authenticity** is, in some ways, similar to catalytic authenticity, however tactical is concerned with how inspired the research participants are to bring about the changes necessary not just in themselves and their behaviours but across for example a whole ward, care home or hospital (Bryman, 2016; Holloway & Wheeler, 2013).

6.11.2.1   Reflexivity

Reflexivity is a key concept that crosses both trustworthiness and authenticity when considering the quality of the research. It is concerned with the researchers' positionality within the research, their own biases and their interaction with the research participants who will have their own views and interpretations. It reviews all

aspects of every element of the research and of the researcher's professional background, expertise, current role, actions and interactions at each stage or step of the research. It is essential that the way in which these impact, positively or negatively is acknowledged and explored with conclusions and recommendations made in the light of these reflections. Reflexivity is therefore explored further in Chapter 12.

6.12   Summary

This chapter discusses the range of methodologies considered, and the rationale for the use of critical action research design within which a mixed of methods approach was used to achieve the research aims. It sets the scene for the chapters to follow, illustrating the processes used for both data collection and analysis.

Chapter 7   The Technology Enhanced Learning Tool

7.1   Introduction to the Virtual Case Creator

The Virtual Case Creator (VCC) was developed as an innovative, interactive teaching tool to enable students to enhance their learning through the use of simulation. This development was only possible once multimedia technology began to develop at the turn of the century: the first version of the VCC was released in 2003 through work led by staff within the **Online Simulation and Immersive Education Research and Development Group** (OSIME RDG), based in the Faculty of Health, Education and Life Sciences at Birmingham City University (BCU). An interdisciplinary team comprising - academics, software designers, software engineers and education technologists combining learning design, pedagogy, research, 3D design and user interface with back end software engineering skills. They work with academic colleagues to develop creative approaches to the facilitation of learning, to enhance and enrich the student experience. It is the combination of academics working with the help and support of specialist technology experts that has enabled creative ideas to be turned into usable and accessible learning resources.

The argument for developing the VCC was that online simulations augment more traditional teaching methods by providing flexible, context rich, authentic and learner centred skills development opportunities (Dunn & Kennedy, 2019). They can help learners to develop their observation, analytic, diagnostic, problem-solving and decision-making skills using a range of reward and recognition features drawn from the field of game based learning to promote learner engagement. The platform also provides analytics for teachers, trainers and students that reflect learner engagement, progression alongside knowledge and skills gain. As an educator, e-learning provides significant benefits for learners, enabling them to work at their own pace, to access materials 24/7, choosing when to study. They can fit learning around work-life balance, and direct and tailor their own learning experience, encountering and utilising different learning formats and styles (Fletcher, 2017). The education team constantly review

and update the materials, cross referencing the different learning resources to maximise the learning opportunities.

The built-in metrics that enable educators to check on student progress makes it possible to identify those learners that are not progressing through the programme. For this to be an effective mechanism for assessing learning, the quality of the simulations and accompanying materials is paramount, and every effort has to be made to check that the scenarios developed reflect the appropriate clinical settings.

Over time the online simulations have been integrated within a wide range of health and social care learning programmes at the University and other FE, HE and health care organisations within the UK and Europe. Further, the NMC has recognised the importance played by simulation in allowing NMC regulated undergraduate nursing courses to include 600 hours of simulations as part of the required 2,300 practice hours (NMC 2023). Within BCU, the team have assisted in developing some 30 online scenarios. as the composite images below illustrates.

Figure 17: Composite images of VCC scenarios

Primo Star Microscope
3D Orientation

Semina Akhtar – 161
Acute Hospitalisation of the Child and Young Person: Surgery

TALKTOWN
SLT Talktown 2.0

Steve's Hospital Visit
SHAREVILLE

David Fleming
Renal colic

Robert Powell – 160
Acute Hospitalisation of the Child and Young Person: Asthma

Adam Robinson – 96
Diabetic Ketoacidoisis

Diane Brown – 162
Home visit – FAST stroke assessment

Mental Health: Clive – 163

Janet Cole – 164
SLT Dysphagia

Hayden Smith – 165
SLT Developmental SLCN

Terry Carter – 166
ALD SLT

Each of the scenarios in the VCC have been designed to offer a simulated setting that reflects the appropriate health care context for the learners. As the screen shots below indicate in the acute setting it includes the overall ward setting, the bed space and for some simulations the nurses station.

Figure 18: Screen shots of one of the VCC simulations
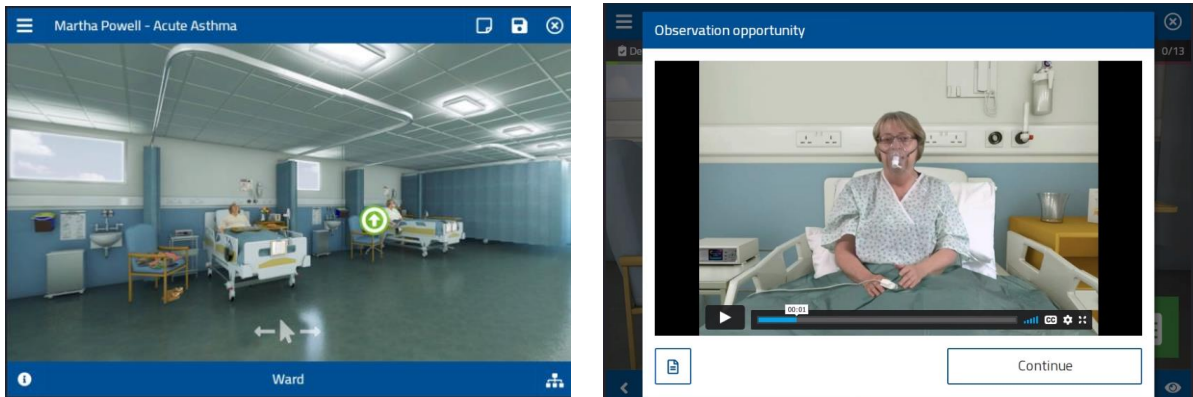
Indeed, one of its main attractions is that it contains both professionals and patients who can speak and respond to questions. The screenshots below portray the nurse introducing the learner to the ward area answering questions about the patient and the ward, and as the starting point of care is a patient handover, this can also be accessed and given verbally. This is important as in clinical practice most handovers include verbal instructions and guidance, and learners need to be able to utilise what they are told not just what they can read.

Figure 19: Screen shots of the VCC simulation nurses
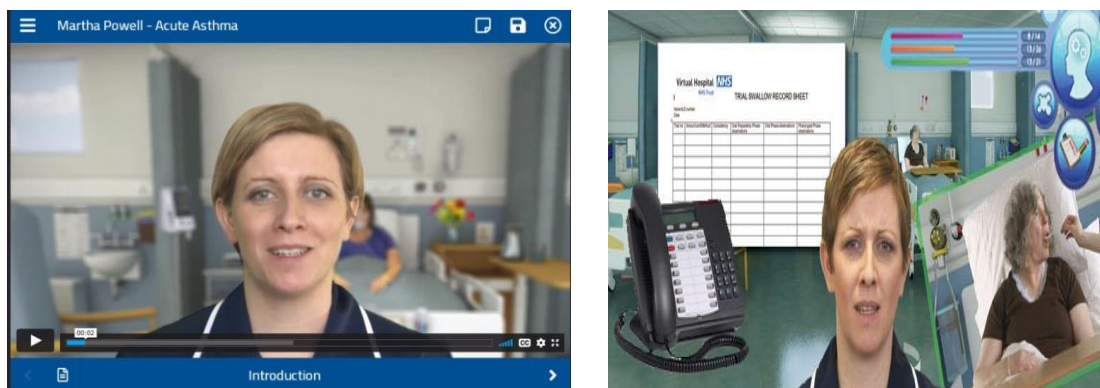
Giving handover   **Orientation to the ward**

The VCC can be used to assess a learners knowledge and understanding of all aspects of assessment. This includes the correct use of equipment and checking patient observations. In the scenario below the patient needs a full assessment. The highlighted sections in green and pink are all of key importance. The learner can click on each one in turn and is offered a number of possible decisions they can chose or information regarding resources to be accessed. The patient can also be asked set questions they can respond to.

Figure 20: Screen shot of one of the assessment scenarios movement icon.

Movement Icon

To help the learner assess the patient there is an icon illustrated to the right of the screenshot, that the learner can click on and move around the bed space to carry out the various elements of the assessment. Where appropriate, the area selected leads to specific nursing care tests such as urinalysis, with a series of illustrations from which the learner has to make a clinical decision (see below)

Figure 21: Screen shot of one of urinalysis testing showing the results.

"As technology has progressed so too has the VCC with the introduction of augmented and virtual reality. The most recent development utilises Unity3D games engine in the development of interactive 3D radiography simulations using head mounted virtual reality to support skills development in a simulated environment.

Figure 22: Screen shot of one of the radiography assessment scenarios.

See website for further details:
https://www.bcu.ac.uk/health-sciences/business-and-innovation/products-facilities-hire/online-simulations

To encourage and support learners, the VCC was developed with a range of game based learning mechanics. These include meters, digital badges, points, certificates, and leader boards. All simulations use these badges or 'Performance Awards' to indicate to students the range of cognitive skills the simulation is seeking to develop and their progress towards demonstrating these skills. The students are advised on screen that to successfully complete the learning they need to find all the available resources and to make all of the required decisions.

Figure 23: Metrics icons

Resource Icon   Decisions icon
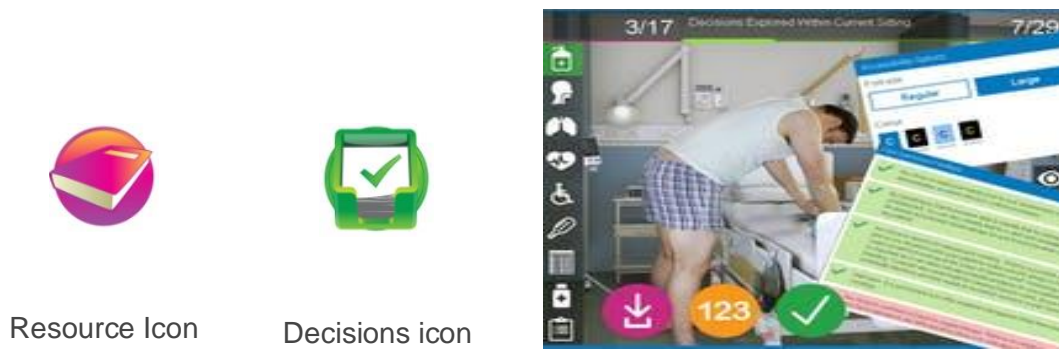
or if they want to be part of the leader board the decisions must be made in the required rank order as this enables them to access the Certificate of Completion. The metrics icons can be found at appropriate times on the screen.

As they work through the programme, a series of metrics are collected illustrating the total number of resources accessed, whether they have explored all possible decision options and which decision skills they have demonstrated. It also gives an indication of how long they took for each particular set of activities.

Figure 24: Screen shot of metrics table

These are then used to give an indication of individual progress against the three key issues of resources, exploration and the discrete skills used. Thus, the learner can plot their progress against their total cohort, although as pseudonyms are used no other individual learner can be identified.

Figure 25: Screen shot of the award icons in a cohort leader board.

Each simulation has a 'benchmark' number of awards set and this varies depending on the simulation and the learning outcomes that the simulation is contributing towards.

A key element of the programme is demonstrating that students can make clinical decisions based on use of the resources and other information found within the simulation scenario. However, the need to demonstrate that they can rank the order of decisions they make, prioritising appropriately is an optional feature. Only if they have completed all decisions using the resources available, in the correct order is the simulation counted as a successful completion and a certificate awarded. At the time this study started, there was no way for participants to change the order of ranking once they had made a decision, even if later information meant they wanted to review it.

Figure 26: Screen shot of the ranking for decision making and an example of one of the decisions made in the correct ranking order.
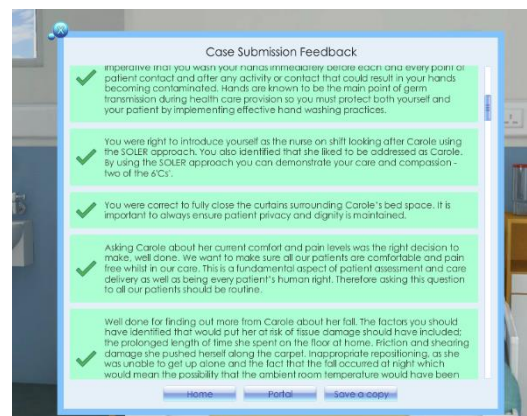
Should a learner be unsure of the correct ranking and want to explore more options then they click on the more decisions head icon to reveal a list of other possible decisions, including the opportunity to speak to the patient.

Figure 27: Starting the VCC: The opening screens.

The initial screen

To access and use the VCC every learner has to create their own unique account, first logging on, and then adding in key information. The second page is where they type in the required information to then be given a pre allocated authentication code. This prevents duplication and protects individual learner confidentiality. They are also given the opportunity to establish a pseudonym if they want to be part of the Leader Board. Once the student clicks 'sign up' they will be taken to the login page and login with the details they created.

The student can then select the scenario they wish to follow by pressing on the icons at the bottom of the screen to find the one they want, for example, if the student is a registered nurse working in an acute hospital they would press on that appropriate icon and press to start the VCC.

Figure 28: Accessing the VCC: the scenario screen.

7.2 Summary

The VCC is a flexible and interactive programme. The information presented here is the version in use when the study started. Since then, it has advanced and developed, and more information of the new version can be accessed from the website –

https://www.bcu.ac.uk/health-sciences/business-and-innovation/products-facilities-hire/online-simulations

Chapter 8 Data Collection, Collation and Analysis – Action Research Cycle 1 Developing the TELT

8.1 Introduction

This chapter provides the process adopted and outcomes met for action research cycle 1. This was the starting point for the research, focusing on the development of the commissioned Technology Enhanced Learning Tool (TELT), with each of the stages of the Action Research Cycle discussed culminating in the development of a TELT ready for testing in future cycles.

8.2 Action Research Cycle 1

8.2.1 Plan

Planning for the development of the TELT took time. This was a commissioned education and training programme, that the NHS Trusts wanted to be tailored to the specific needs of their various hosptial, community and care home settings. They had identified the need to reduce their level of pressure ulcer incidence and prevalence. The Trusts commissioners had clear expectations and requirements for the tool and therefore a series of meetings were held with key members of the commissioning Trusts.

8.2.2 Summary of planning process

Initial meetings took place at the university, as one of the reasons for commissioning Birmingham City University (BCU) was that they were aware of the VCC and wanted to see how it worked for themselves, to ascertain if it could deliver the required education. Accordingly key members of the commissioning group were invited to a formal demonstration of the VCC, given by the programme's originator, a senior lecturer and nurse educator, and the technology experts who had worked with him on the design and implementation of VCC programme scenarios. Those in attendance included representation from the Trusts executives, education leads, and managers, the research and governance team, a Tissue Viability Specialist Nurse and the Tissue Viability Nurse Consultant. Following a demonstration, they were all very enthusiastic at the possibilities of offering this form of learning to their workforce. The VCC was the

first programme they has seen that offered such interactivity in learning, with the scenarios offering such clear simulations of clincial settings. They particularly liked the problem solving and decision-making, opportunities it offered and recognised these as important components of nursing competence. From a CPD perspective, they appreciated the way in which the programme led them through each scenario, and the ways in which it could be used to revise and/or enhance their knowledge, skills and attitudes. They approved of the way in which the programme enabled the user to make clinical decisions in a safe environment, reflect on them and if necessary re-assess and learn from their mistakes. They wanted certification to formalise the CPD undertaken, to enable the nurses who undertook it, to use it as part of their NMC revalidation process, in addition to recording on the Trusts Electronic Staff Record. Further, it would provide evidence for the Clinical Commissioning Group of the Education undertaken.

The next stage involved the researcher, VCC originator, technology experts meeting with representatives from the commissioning Trusts, to explore their specific needs and expectations to determine if the VCC would be able to deliver the required results. Following this, it was confirmed that the university were confident that they could work with the researcher to develop new scenarios that would offer an appropriate programme.

The Trust was assured that the nature of the programme, with its scenario based learning could easily develop bespoke scenarios in 'Assessing a Patients Risk of Developing Pressure Ulcers'. Indeed, the technology team had recently particpated in an interntional project with the Netherlands, developing a Dutch programme that was ready for implementation The project originator and his technology team were keen to work with the researcher to develop the proposed new subject area, and offered to communicate with the Trusts Information Technology (IT) department team to check on the facilities available to facilitate completion. The Trusts IT team reported that they had the appropriate technology to support the programme, and it was agreed that the completed programme would be delivered in the Trusts Education Centres where there would be computers available, and that staff could travel to in nominated groups to access and complete the TELT.

The final stage in the planning process was the identification of key 'experts' to support the researcher in the development of the new scenarios, including the accompanying theoretical content and bespoke documentation from the Trusts. With the support of the commissioning Trusts in the form of the Tissue Viability Nurse Consutant, an experienced Tissue Viability Specialist Nurse was identified who agreed to undertake this work. The team of three were then able to start work on the development of the TELT alongside the techology development experts.

8.2.3   Act and Observe

A detailed review of all relevant government documentation, and guidelines regarding pressure ulcer risk assessment, were identified and consideration given to the strategies that had been developed, recommended and implemented. These were then compiled into the context chapter, and provided reference material for the development of the new tool.

A detailed literature search was then carried out to identify relevant literature on pressure ulcer risk assessment and, this was used to inform the development of the content for the TELT, and thereafter the new conceptual framework and model for practice. The selected articles from this literature search, were then compiled into two distinct chapters. One which gives the aetiology of pressure ulcers, and the other focussing on the challenges over the years in reducing the incidence and prevalence of pressure ulcers with a particuar focus on pressure ulcer risk assessment. Orignally planned as one document, for clarity they were divided, as they informed different aspects of the TELT and conceptual framework.

With this preparatory documentation complete, it was possible to develop the TELT itself. Following detailed discussions and with the agreement of the commissioning Trusts, it was agreed that two new scenarios would be developed, one for the hospital and one for the community setting.

8.2.4   Acute Setting scenario

As mentioned earlier, it was recognised that trained and untrained staff have different learning needs. Also, the nature of the care provided in acute settings does vary, with

registered and specialist nurses offering more complex care. Therefore, once the first scenario was developed for registered nurses, it was adapted for non-registered nurses. The technology processes underpinning the scenarios are the same, with the picture of the patient providing the entrance to the content. Therefore, the picture was adapted as indicated in figure 19 below and participants were then guided to the relevant series of activities, designed specifically for their learning needs. Using an Instructional Guide that leads them through the learning available.

Figure 29: Scenario 1: Pressure Area Risk Assessment - Acute Ward

Registered Nurses   **Non- Registered Nurses**

The introductory information was the same for both registered and non-registered nurses as this only sets the context. The activities within the programme follow those outlined in chapter 7, with all participants directed to appropriate Instructional Guide that leads them through the programme. The scenario is introduced via a short video which sets the scene for the user. For the hospital setting scenario this was

"This simulation is designed to develop your knowledge and skills in relation to pressure area assessment. During the simulation you will be expected to conduct a head to toe assessment of your patient's pressure areas. We understand that during a usual skin assessment you would routinely look at all areas for tissue damage – however the focus of this simulation is specific to pressure areas, so consider this when conducting your assessment. To begin the simulation, listen to the handover report and then navigate to the 'Learning Zone' where you will find lots of learning materials to help you to update and refresh your knowledge around pressure area assessment and care." Please see Instructional Guide at Appendix 4.

8.2.5   Community Setting scenario.

When considering community care and care homes, the evidence suggests that the majority of the care is given by nurses (Guest et al, 2020) who are often non-registered, who may be supervised by a registered nurse, may act independently. However, the complexity of the care varies little, and specialist tissue viability nurses would only work, in the community setting with those with overly complex needs. See instructional Guide at Appendix 5.

Figure 30: Pressure Area Assessment - Home (Registered and Non-Registered Staff)

The introduction in the community scenario states that:

"This simulation is designed to develop your knowledge and skills in relation to pressure area assessment. During the simulation you will be expected to conduct a head to toe assessment of your patient's skin. To begin the simulation, listen to the handover report and then navigate to the 'Learning Zone' where you will find lots of learning materials to help you to update and refresh your knowledge around pressure area assessment and care. Once you are ready navigate to the patient and begin to conduct your assessment." Please see Instructional Guide at Appendix 5.

8.2.6   Reflect and refine

In this cycle, reflecting and refining were separate activities. With completion of the two Technology Enhanced Learning scenarios, it was essential that these were reviewed. Following this process, an initial pilot of the scenarios was carried out. This initial checking had two elements. firstly, checking that the content was present and

accessible, and that the correct responses were correctly linked to the questions. This included checking that any spelling and grammatical errors had been identified and corrected

The second element involved the Tissue Viability Nurse Consultant from the commissioning Trusts, and an academic involved in teaching a module related to pressure ulcer prevention for qualified healthcare professionals. The Consultant Nurse, academic and the researcher each independantly worked through the scenarios to assess their usablity, accuracy in terms of content and to identify any issues they felt might impact on the student learning experience. On completion of the exercise a discussion was held with the relevant staff from the OSIME RDG team and the Tissue Viability Specialist Nurse who was working with the technology team to develop the content of the scenarios. During the discussions, the suggestion was made that the content would benefit from the inclusion of additional supporting literature, including, for example, the NICE Guidelines, NICE (2015). This was agreed, and additional information was added in a format that could be easily be updated when new guidance emerged. Also, articles were inserted with a specific link to facilitate replacement with more current versions. Once the requisite changes had been made the final refinement element of this first action research cycle could be completed. This phase was undertaken by "expert" nurses who had not been part of the development of the scenarios. Tissue Viability Link Nurses from across the health economy were asked if they were willing to participate the development process and pilot the programme.

Approval for the approach to this group was given by their managers, and although this was a convenience sample (Bryman 2016) this was not seen to be problematic as the decision to invite this group was that they all met the criteria of being "experts" in the field of pressure ulcer prevention and care.   Contact was made via the researchers attendance at a Link Nurse meeting. During the meeting, the nurses were given information on why the TELT had been commissioned, how it had been developed and by whom. They were advised that the overall aim of the TELT was to enhance the knowledge, skills and attitudes of the heathcare staff completing the tool to assist in reducing the incidence of pressure ulcers across the health economy. Further, It was to be anticipated that those completing the tool and undertaking Pressure Ulcer Risk

Assessments, in accordance with the evidence base, would act as role models for those yet to experiece the TELT.

The response was very positive and in total 43 nurses, piloted the tool. The participants were provided with the Instructional Guides and given the choice of completing the pilot either through attendance at the university, or as a self-directed activity. The majority opted to access the tool from home when they would have the time necessary to devote to the pilot. The remainder came to the university and undertook a structured tutorial to assist them in accessing the tool. The participants were given login codes to enable them to access the tool online.

It had been intended to follow up the pilot with focus groups, but it was recognised that this group had already given a considerable amount of their time to complete the TELT, and that to expect them to find more time was not appropriate. Instead a short, relatively quick to complete, online questionnaire was used to enable the participants to provide feedback on the tool. This was found to be an appropriate approach as all 43 reviewers completed it.

Although it was accepted that there might be some issues that needed to be addressed, it was seen as very important to find out what the partipants thought about both the TELT as a whole, as well as any issues or problems that had arisen while completing the Tool. Therefore, the questionniare was divided into two parts. The first set of questions related to the overall programme and comprised three questions based on a likert scale and the last one was open text. The questions were:

- Would you recommend the TELT be added to the Trusts portfolio's of education and training?
  - How do you think completing the TELT will affect professional practice?
  - How do you think completing the TELT will affect pressure ulcer assessment?
  - Do you have any overall comments abouh the TELT as a whole?

The second set of questions focussed on specific problems or issues, so these questions were open text with participants asked to explain their responses. They included:

- how easy was it to gain access to the TELT?
- how easy was it to navigate through the tool to find the resources available?

- could you access the resources you needed to make the clinical decisions the required?

8.3   Results from the feedback questionnaire

Overall, the feedback from the reviewers was positive, with all 43 reviewers responding positively to the idea of the TELT being added to the Trusts education and training portfolio.

Figure 31: Would you recommend the TELT be added to the Trust's portfolio of education and training?
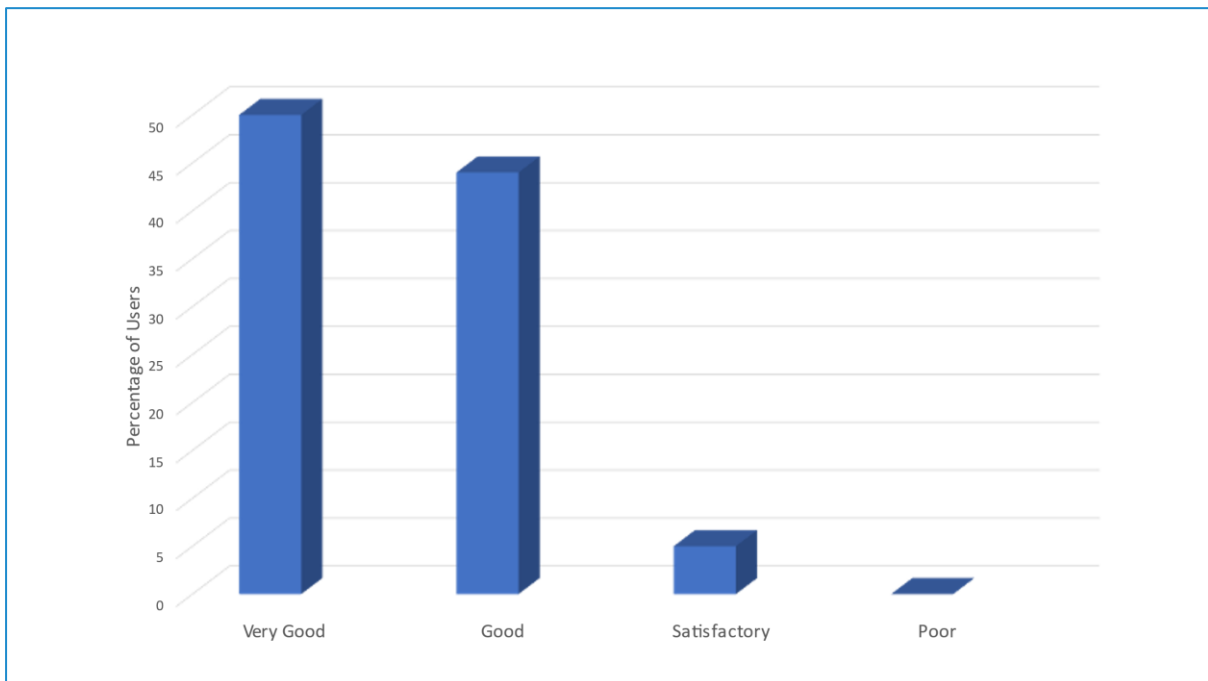
When asked how they thought completing the TELT would affect professional practice, the majority of reviewers responded positively. A small percentage 12% (n=5) reported that they thought that overall it would not change professional practice. The comments indicated that for this group as it only focused on one area – risk assessment, its impact on overall practice would be *"limited"*. However, importantly no one thought it would have any adverse affect on practice.

Figure 32: How do you think completing the programme will affect professional practice?
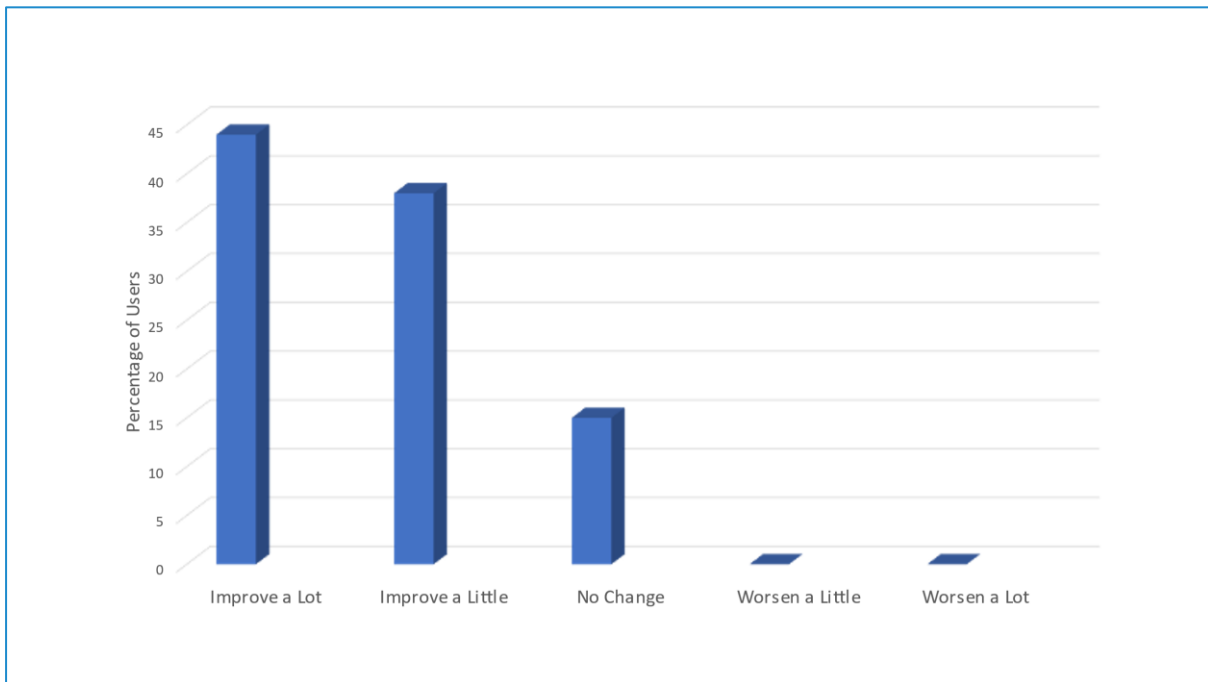
Interestingly, when asked how they thought it would affect pressure ulcer assessment, the majority were positive, but again 12% (n=5) saw it having little if any effect on overall professional practice, however, no one replied negatively.

Figure 33: How do you think completing the programme will affect pressure ulcer assessment?
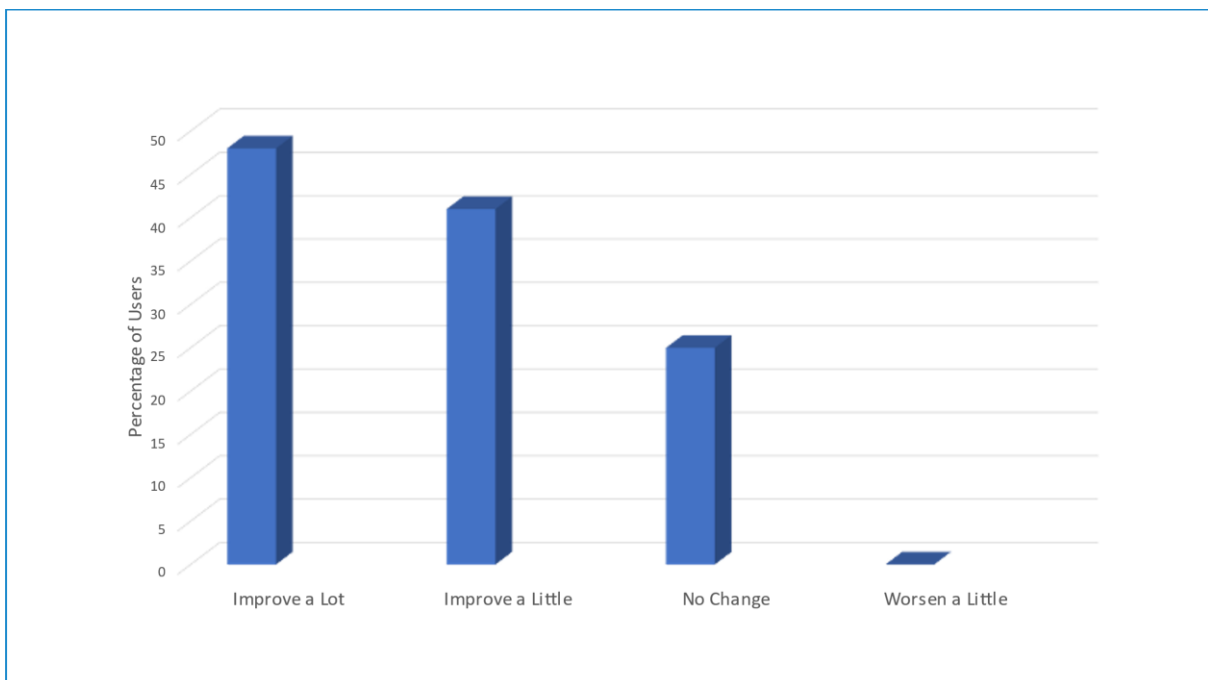
The answers to these three questions were important as they differentiated between the overall support for the TELT, and their perceptions of the impact on practice were interesting. In part, this could be because this was a new programme that they were peer reviewing, and while they could see what it offered in terms of learning , it was difficult to assess what effect if any it would have on either overall professional practice or pressure ulcer assessment. Neverthless this does not negate the finding that there was defintiely overall support for the TELT.

The final key question asked for additional comments, not all of the participants added additional points for this question, but interestigly, the majority of the responses in this section concerned the nature of the total programme with comments such as:

> *"I liked the interaction and it was good to be able to see the information and apply it to a 'real' patient*

and

> *"the scenarios are easy to understand and apply to patient care in the practice setting".*

Interestingly, some of the partcipants felt they would like more pressure ulcer scenarios:

> *" I would be happy to complete other scenarios, it would be interesting and it would give a more holistic picture of the patient"*

Such comments, were unexpected, however, they do reflect the ability of the VCC to engage interest and motivate learners, an important issue when considering a subject as important as pressure ulcer prevention. Over 50% reported that they would be able to complete the scenarios within one hour. A very positive finding for the funders.

8.3.1   Specific issues and conerns.

The reviewers had also been asked to indicate any specific problems they had encountered. The first one that needed to be addressed was a frequent comment that they had nowhere online *"to jot anything down…"* they gave examples of what they meant, pointing out that it would have been easier to follow the TELT if they had been able to record specific medical information such as weight, appetite, urinary and bowel

habits. As this would help them in questions that arose later in the TELT. They had *"to try to remember… it would have been much easier just to have it handy…"* These comments were taken to the VCC originator and the technology experts who saw no difficulty in adding an online notebook. They developed a 'note pad', function adding an icon as illustrated below, that led to a text based section which could be accessed from any sector of the scenario, and which could be used to compile information as they progressed through the TELT. This in turn would help them in the decision making sections and assessments that they needed to complete

Figure 34: Note pad icon.
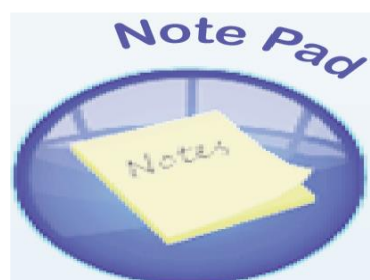
Another frequently raised issue was the concern that once they had made a decision, they then moved on and as a result of the additional information they then accessed, they wanted to be able to review their earlier decision. However, the format of the TELT did not allow this, yet in practice this is a key element of practice and it was seen as *" important to look at what I decided earlier… and change it because of the new information…".* They pointed out that to fit with practice the programme needed to mirror what actually happens in practice, where all decision are reflected upon and changed in the light of changes in patient status, test results, and physical asessment. Again this was taken back to the team, who this time adapted the programme to include the ability to review decisions at any time, as they progressed through the Tool.

Figure 35: Review decisions icon.

The inclusion of this icon meant that, where appropriate participants could change their decision re-ordering the ranking that they had given each item in the decision processs.

 For others, the challenge was remebering how the programme worked, and how to move through the sections. They accepted that they had started with the instructional guide, but once they started to work through the activities, they found that they couldn't remember the instruction guide, and then " struggled " to carry on and complete the Tool. As a result an icon was added that took them straight back to the instructions, enabling them to navigate their way through through the tool

Figure 36: The Quick Start Icon.

Another, issue for some was navigation round the system as a whole. This too was discussed with the team, who looked at the TELT as a whole, and accepted that for those with limited computer skills there could be a problem. Their suggetion was that in key areas of the programme, they would add navigation guides, making sure that they were placed where they would not adversely affect the simulation, but would still be easily accessible

Figure 37: Example of a navigation guide.

A small number reported that they could access and use the Tool, but when trying to make clinical decisions they found the photographs difficult to study in details as they were too small, this made it difficult to make decisions. They asked if it would be possible to increase the size of the clinical images. This was a significant issue because the activities require participants to make decisions based on observations. This led to the technology experts devising a way to include a zoom function which enabled participants to click on the picture and increase its size, while maintainng the details

Figure 38: Example of clinical with the zoom function in the left hand corner

These were the main issues and concerns, all of which were addressed, by the team developing a series of additions and modifications, that resolved the cited problems.

8.3.2 Summary of results

Overall from the feedback, it was evident that the the majority of participants had enjoyed the different approach to pressure ulcer prevention education that the VCC

offered, and whilst initially some had found that it took time to navigate they liked having a real patient as the focus for their assessments. It was a welcome finding that despite the challenges, the paticipants liked the TELT and saw it as a positive addition to education and training available in the NHS Trusts.

In addition, key stakeholders from the commissioning Trusts were offered an open invitation to view and if desired access the refined TELT. Six people attended including the commissioning Trusts senior managers, education leads and some ward managers, some of whom chose to access the tool. However, their focus was on checking that their requirements in terms ot the content for the education and training had been met as opposed to fully embracing all the tool had to offer. However, it has to be acknowledged that these were all busy people with constraints on their time. The Trusts staff were eager to check that they could access information that would confirm engagement by participants. The liked the fact that individual participants would be able to compare their performance against their peers. It is important to note here that the participant had been asked to use a pseudonym for annonimity purposes, so that way they could only identify their own position in the league table, but could not see the results for named individuals.

Figure 39: Example of the league table

The Trusts staff also wanted to have the facility to track their staffs engagement and to know when they successfully completed the tool, so that they could be added to

their training records. These would then be utilised to inform CQUIN decisions by the local Clinical Commissioning Group. The question was asked if it would be possible to link the VCC results to the individual Electronic Staff Record, but that had not been requested when commissioning and at the time this was not possible.

Finally, the Trusts group liked the notion of offering Certificates of Completion to provide the required confirmation to the Trusts. Further, that the participants could add this to their professional portfolio for revalidation purposes (NMC, 2016). They liked the design with awards that could be achieved and hoped that this would increase motivation to complete the programme.

Figure 40: Examples of the awards possible

8.4   Checking the modifications.

Following completion of the adaptations made to the TELT the "expert" reviewers were asked if they were willing to re-review the revised TELT to check that the changes made were reflective of the comments provided and had not impacted adversely on their overall learning experience. Eighteen from the original group of 43 worked through the TELT again. The feedback questions were adapted to reflect the changes in the TELT made after the initial peer review.

This second time results were, again, positive with 83.3% (n=15) of the reviewers reporting that undertaking the revised VCC scenarios now had the potential to improve their clinical practice and their ability to undertake a pressure ulcer risk assessment. When asked if they would recommend the VCC to other staff, they responded very positively but with the proviso that for some they would need more time and exposure to the overall programme.

Figure 41: Would you recommend the TELT to colleagues?
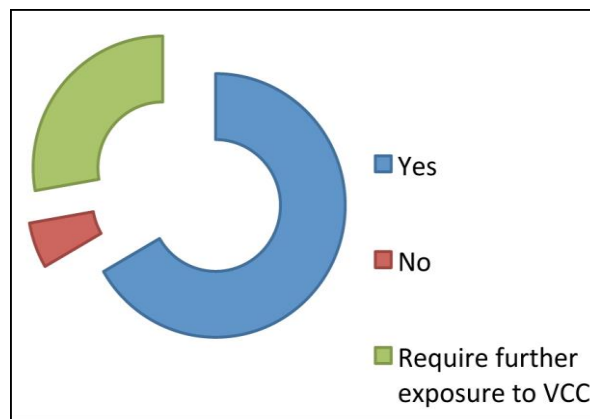
One respondent did report that they would not be willing to recommend the programme, but it has to be accepted that technology enhanced learning is a new and different approach to learning and for some not a welcome change.

Interestingly, the addition of the Note Pad function whilst requested by the group, was in reality not liked by all participants with 78% (n=14) reporting although they found the icon and note pad easy to use, in reality when given the option they reported that they would rather use a pen and paper. Nevertheless, they did state that it should remain giving the participants the choice as to whether they used the electronic note pad or pen and paper.

8.5 Memo and notes: Reflection

Reflecting on both the planning and the Act and Observe phases described above, although challenging and time consuming the activities undertaken did lead to the development of a TELT that was acceptable to both healthcare staff and the commissioning Trusts, it was fit for purpose, and ready for use.

However, it has to be noted that the initial peer review of the TELT, was undertaken by "experts" in the field, and it emerged that some of this group were familiar with the concept of the VCC, not necessarily this actual programme, but had had some exposure to technology enhanced learning, and this may have influenced their perception of the tools usability. The main comments from this key group related to the content of the tool and what would enrich the information available for students. They had experienced a few problems with navigation, and these were rectified with additional features added to improve the ease of use of the programme. The Quick

Start Guide, and the navigation tips were added to improve ease of navigation and the zoom function to improve the interpretation of the images. It was interesting to find that that the Note Pad function, requested by several of the initial review team was then felt not to be necessary by this second group which was much smaller in number, and some did find it useful, so the decision was made to keep it in place and review its use over time.

Overall, the commissioning Trusts managers and educators were satisfied with the product and remained keen to see, if in the future, it would be possible to link results to the NHS Electronic Staff Record. However as this was not possible, they accepted that having a Certificate of Completion would suffice for recording purposes. Having considered the outcomes from action research cycle one and despite the overall positivity surrounding the TELT, the researcher was of the view that further testing was required to ensure the usability of the tool. The actual content with the additional guidance and articles was Fit for Purpose, but the usability needed to be checked with the wider group for whom it had been commissioned. The "expert" peer review group had a higher level of expertise in pressure ulcer prevention, which may have made it easier for them to complete the programme. As a result, a further Action Research Cycle was planned.

8.6   Summary

This Chapter focussed on the "testing" of the newly developed TELT to enable any changes to be made in either content or technology prior to the tool being "rolled out" across the health economy. The commissioning Trusts accepted the researchers concerns that up to this point the participants had high levels of expertise and approved the plan for further testing with a wider range of participants to be undertaken by inviting staff to experience the tool. This would determine if any further changes were required to enhance the quality of the student learning experience.

Chapter 9 Baseline Survey - Data Collection, Collation and Analysis

9 Data Set 1: the Baseline Survey

9.1 Introduction

This chapter presents the findings from a baseline survey, completed at the start of the project. This was a descriptive survey and consequently the findings have been presented as an integrated results and discussion chapter.

According to IFRC (2013), baseline data is data that measures conditions before a project commences, with the intention that the data sets the scene for activities by illustrating the current situation and capturing the 'here and now'. As the project progresses this initial data set can be used to provide comparative figures, demonstrating change and where possible impact from the project activities. The researcher considered this as an essential step for this study, given its focus on the development of a technology enhanced learning tool. The survey formed part of the overall assessment of the current situation regarding pressure ulcer care, as it followed a review of the well documented challenges and the range of national and in some instances international initiatives that have been used, over the years, to prevent the development of pressure ulcers, and the strategies to improve treatment when they do occur. This survey also considered data on individual assessment, specifically their risk of developing a pressure ulcer. (see Chapters 2, 3 and 4).

9.2 Conducting the Baseline Survey

The baseline survey was completed during one of a series of training activities that took place within the commissioning NHS Trusts. These events had been initiated in recognition of their need to improve the quality of care given to patients in need of pressure area care, either to prevent or heal existing wounds and/or ulcers. The Trusts had linked them to the '**STOP THE PRESSURE**' Campaign (NHS Improvement, 2019), viewing this as an opportunity to improve continuous professional development. Those attending, were a self-selecting group that comprised Tissue Viability Specialist Nurses, Tissue Viability Link Nurses and those with a particular interest in tissue

viability. Before leaving the venue, each participant was asked to complete a survey regarding their knowledge and perceptions of current pressure ulcer care.

They were advised that the Trusts intended to develop their own tailored education provision regarding pressure ulcer prevention and that this baseline survey would help to inform the education content of the programme. Those present were given the free choice of whether or not to complete the survey, and of the 90 individuals present, 65 were eligible to complete the survey, and 57 completed it. No pressure was applied to increase the completion rate, and it has to be noted that a return rate of 89% was an excellent response and demonstrates the commitment of the participants (Bryman 2016).

9.2.1 Workplace

It was important to note that those that who completed the survey, represented all sectors of the commissioning Trusts as indicated in Table 19 below. This was particularly important as the education tool being developed needed to be suitable for use within all sectors. Interestingly, the highest number of participants were community-based nurses, which fits with the finding that the majority of pressure ulcers are cared for in the community by nurses (Nixon et al, 2019).

Figure 42: Workplace of those attending the Stop the Pressure Study Event
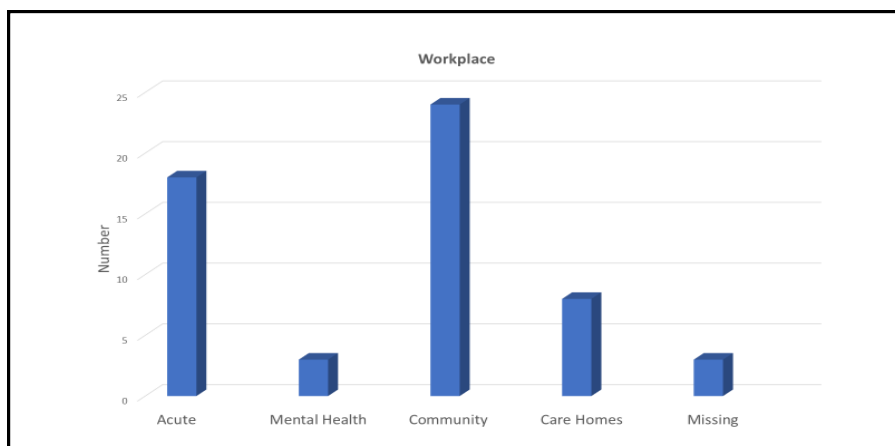
The second highest group of participants were from an acute setting employed within the commissioning Trusts, where there is increasing recognition of the number of patients being admitted with pressure ulcers and/or at greater risk of developing them whilst in hospital. The latter can result from the impact of co-morbidities, undergoing

surgery and/or reduced mobility, all which contribute to increasing the risk of the patient developing pressure ulcers (NICE 2015, NPUAP, EPUPA, PPPIA 2019; NHS Improvement, 2019).

9.2.2 Gender

The majority of those who attended were female, again an expected finding given that globally, females account for approximately 90% of the health and social care workforce, with the majority in nursing and midwifery roles (Boniol et al, 2019). The United Kingdom follows the international trends with females accounting for 99% of staff working in the NHS (NHS Digital, 2018).

9.2.3 Professional Status

Currently, pressure ulcer prevention is largely the domain of nursing (Guest et al, 2020) but it is increasingly being recognised that the prevention of pressure ulcers needs to be the business of all health care professionals (National Wound Care Core Capabilities Framework, (Skills for Health, 2021). This includes allied health professionals and health care support workers, and it was important to identify from the survey, which healthcare professionals had completed the survey, and whether they were qualified or unqualified.

Figure 43: The Professional Status of the survey participants
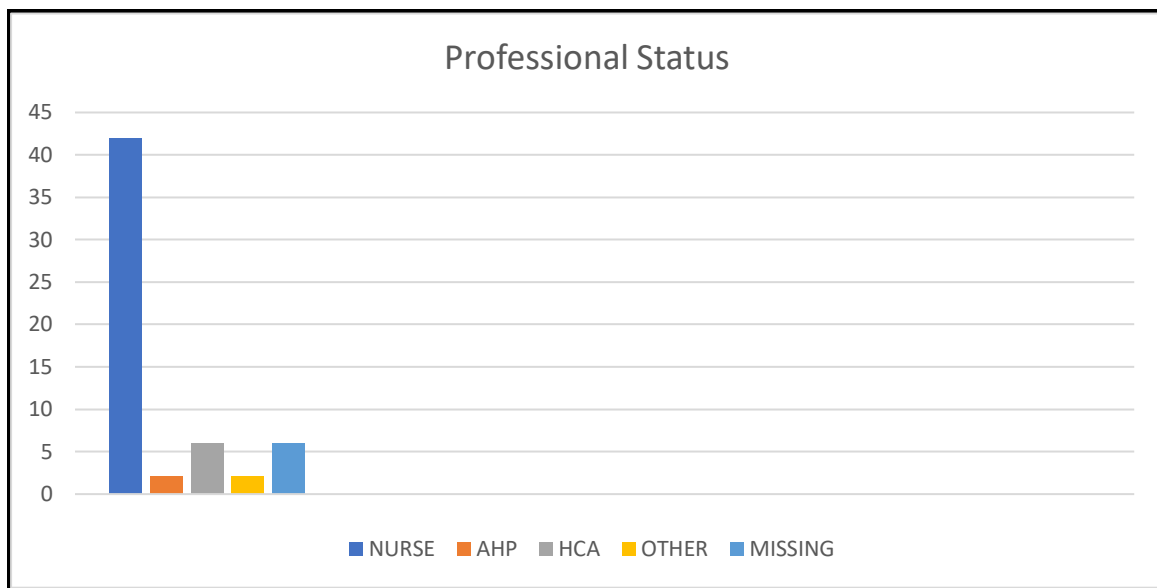
The largest professional group in attendance were nurses, with the majority of health care support workers coming from the residential/care home sector, with one being a Senior Residential Care Healthcare Assistant. There were two Allied Health Care Professionals present, one a Podiatrist, a profession frequently involved in care of individuals with pressure ulcers and their prevention, the other was a Physiotherapist, a Business Development Manager was also present, perhaps a suggestion of the increasing acceptance of the challenges brought to bear on organisations by undetected or poorly treated pressure ulcers. Indeed, Guest et al (2020) asserts that all professionals and providers involved in treating patients need to be involved in the prevention and care of pressure ulcers.

9.2.4 Age

Given that the aim of the study was to develop an online learning resource and there is evidence to suggest that practitioners are not always computer literate/active (NAO, 2020) and that age does enter into whether or not they are willing to use online learning to top up knowledge and expertise, the age profile of the respondents was ascertained.

Figure 44: Age range of survey participants
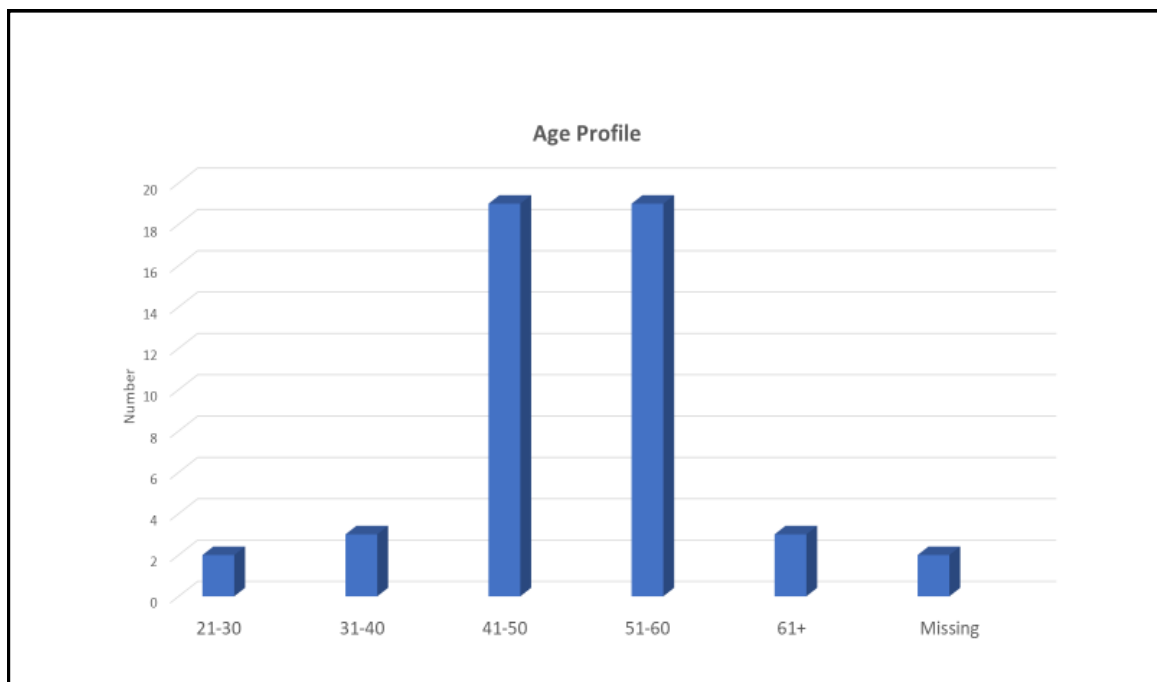
The majority of respondents were aged between 45 and 60, arguably an age range where individuals may have had less exposure to computer learning and would possibly need guidance to complete the programme (NAO,2020). Their perceptions of what would be appropriate or would help or encourage them to access computer learning was considered to be important for the design of the proposed online technology enhanced learning tool.

9.2.5 Pressure ulcer education

As identified in Chapter 2 despite the wealth of information available on pressure ulcer prevention, there remains a significant challenge for health care providers, particularly within community settings (Nixon et al, 2019). It is argued that a significant component of pressure ulcer prevention is attributable to a lack of education (Webb, 2018; Francis, 2013; Greenwood & McGuiness, 2016; Wynn, 2020), therefore asking participants whether they had had pressure ulcer prevention education was important. From the total sample 53 (89%) the vast majority of respondents had undertaken pressure ulcer education. However, the figures from the commissioning Trusts demonstrated that there had been no significant reduction in the incidence of pressure ulcers. The latter is supported by the wealth of research into pressure ulcer care, which confirms that

across international health economies, regardless of education, new treatment modalities and high expenditure, pressure ulcers remain a global health burden (Guest, 2020; Welsh, 2017; Larouche et al, 2018). However, It should be noted that the staff attending the event were on the whole Tissue Viability Specialist and Link Nurses and, as a result they would have a key role in supporting colleagues in pressure ulcer prevention. For this group, the planned tailored, technology enhanced programme could be a useful adjunct to their education role.

9.2.6   Use of Pressure ulcer assessment tools

Despite the ongoing debate regarding the uses of risk assessment tools (Fletcher, 2019; Moore & Cowan, 2014; Samuwiro & Dowding, 2014), the guidance provided and the evidence surrounding pressure ulcer prevention clearly advocates the use of risk assessment tools. However, a crucial prerequisite, is that those utilising them need to be competent in their use (NICE, 2015; EPUAP, NPUAP, PPPIA, 2019). Therefore, it was appropriate to ask this group of specialist practitioners, whether or not they used pressure ulcer risk assessment tools and if so, how competent they felt in using them. As the commissioning Trusts currently used the Waterlow Score, this was the risk assessment tool given as an example in the questionnaire. Given the nature of the respondents and their backgrounds, the majority, 49 (83%) of respondents reported that they always used a risk assessment tool, with only 2 (3.4%) from the entire group reporting in the negative.

Figure 45: Identifies the survey respondents use of pressure ulcer risk assessment tools
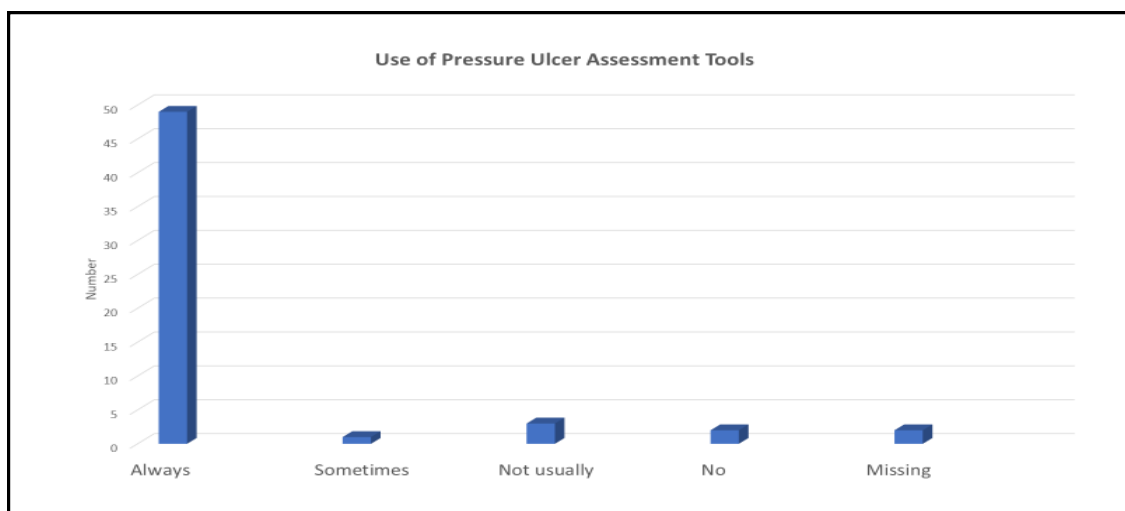
When asked how competent they felt in using such a tool, five respondents reported that they didn't feel competent at all. Cross referencing revealed that of this group 4 (6.8%) reported never, 48 (81%) felt competent and 5 (8.5%) responses were missing.

9.2.7   Use of a Nutritional assessment tool

A key element of care planning includes the use of nutritional assessment tools. Recommendations assert that they should form an integral component of assessing an individuals' risk of developing a pressure ulcer (NICE 2015, NPUAP, EPUPA, PPPIA 2019, NHS Improvement 2019). The survey results show that only 35 (59%) always followed these guidelines with every patient. The only tool cited was the MUST nutritional assessment tool (BAPEN, 2016)

Figure 46: Use of Nutritional Assessment Tool
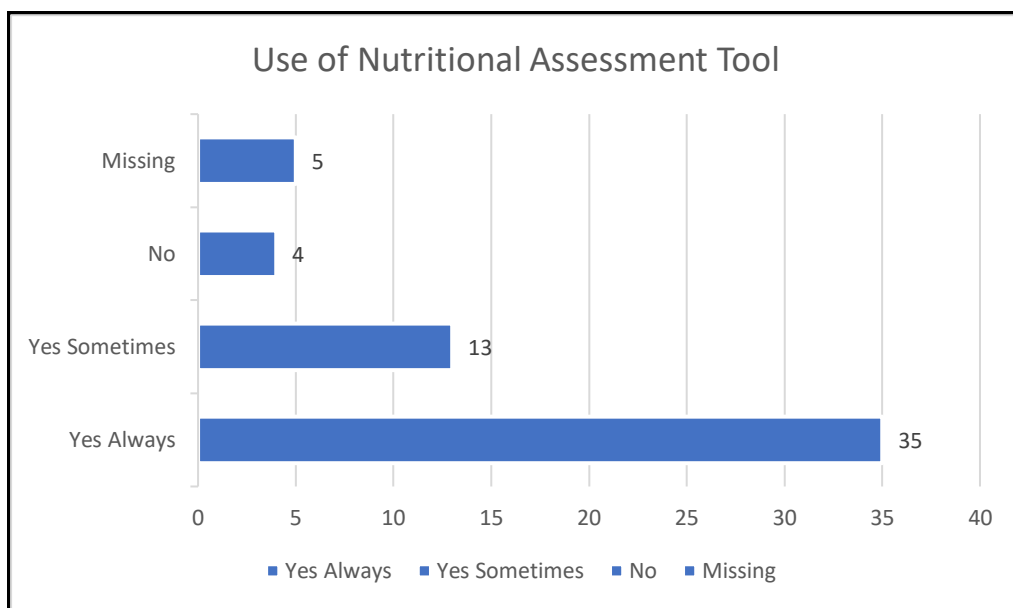
Again, there was a small number 4 (6.8%) who did not feel confident in their use, and this together with the numbers who only used the tool some of the time 13 (22%) and those who chose not to use one at all 4 (6.8%) suggests cause for concern.

9.2.8 Use of a Pressure Ulcer grading tool

The need to apply a pressure ulcer grading tool is also considered an essential requirement in assessing an individuals' risk of developing pressure ulcers (Fletcher et al, 2021; ERUAP, NPIAP, P.P.P.I, 2019). Responses identified that the majority of respondents do utilise a grading tool, 45 (79%) although as with the use of a nutitional tool, it was a concern that 12 (21%) respondents either did not answer, or did not use such a tool. It is important to acknowledge that at the time the survey was administered the term grading was still in use. However, this was replaced with Category a short time after (EPUAP, NPUAP, PPPIA, 2014).

The survey's findings demonstrated that not all of these key workers followed local, national and/or international recommendations for the prevention and treatment of pressure ulcers. This is likely to impact on the consistency of care, and ultimately on the outcomes of treatment (NPUAP, EPUPA, PPPIA 2019). The overall results suggest the need for an education tool, one aimed at engaging participants in the learning process and encourages them to retain the knowledge gained, integrate it into their daily practice and pursue ongoing development on the subject.

9.2.9 Experience of Online Learning

As the aim of the study was to develop a technology enhanced learning tool, it was important to consider whether respondents had experience of previous online learning, and if so what their perceptions of the learning experience had been. More than half of the respondents 36 (61%) had undertaken computer based learning If they responsed in the affirmative they were then asked to comment on their experience. 26 (44%) responded in the affirmative, indicating a reasonable level of satisfaction, but it was also useful to find out if those who had not tried online learning had been offered the opportunity, and what had influenced those who had not enjoyed the experience. The latter narrative was collected through an open text based question in the survey.

9.2.9.1   Reasons given for not enjoying Online Learning

The small percentage of respondents who didn't enjoy this type of learning provided the following reasons:

Table 9: Quotes from respondents

> "*Prefer classroom/interactive learning*"
> "*I like interaction and face to face*"
> "*You can't ask questions or enter into a discussion*"
> "*Prefer pen and paper, a real person*"
> "*Find it hard to take in and remember*"
> "*Not enough time to work through thoroughly*"
> "*Not enough time to complete in the work environment*"

These responses were reflective of the literature found regarding perceptions of on line learning. However, it has to be accepted that had this question been asked after the pandemic, responses may have changed as the technology advances that occurred during Covid-19 have led to more people become used to and willing to work online either through teams or using online information and assessments (Gannon et al, 2021).

9.3   Coded open responses

The final survey questions provided the respondents with an opportunity to express their personal views on what needs to be done to prevent pressure ulcers. Using framework analysis the open text responses were analysed in two cycles as described in the Chapter 6. The first cycle focused on reading and re-reading the extracted quotes, to develop firstly, initial thoughts, then from those descriptions were developed. These were used to develop initial codes and possible themes from within the data set (Parkinson, 2016). In analysing the data, it became apparent that there were areas of similarity and therefore responses were put together so the first set of

responses related to education, training, competence. The second set of responses related to staffing, skill mix, supervision and leadership. The third set of responses were concerned with the use of equipment, it's accessibility and expertise in it's use. The fourth set of responses related to skin care, turning patients, assessment, compliance and nutrition. The fifth set of responses had a focus on information for patients and carers. This was undertaken given the large amount of data being reviewed as this provided great clarity and facilitate completion of the second cycle of analysis.

This second cycle reviews and refines the first cycle, amending the intial thoughts and descriptions where appropriate. This second detailed study of the data facilitates a more indepth, focused descriptions giving more details regarding positioning of the quote from within the possible themes, into the final main and sub-categories, and checking that the context of the quote has been appropriately reflected (Davda, 2018). This second round of analysis with its further insights into the overall categories and sub-categories, enabled the researcher to check that the structured processes used in analysis had led to transparent and accurate positioning of the quotes, reflecting both context and content within the overall data sets (Arifin et al, 2019). Five main categories emerged, Education, Key Staffing Concerns, Equipment, Care, and Patient and Public Involvement. The initial analysis and subsequent second analysis have been presented in tabular form below to illustrate the development of the final main and sub-categories. For clarity the second analysis has be colour coded.

9.3.1 The main category Education

Table 10: Initial Coding and Emerging Categories

Quote from written open responses	Initial Description/ thoughts	Initial code	Emerging Categories
We need… more education for patients and nurses…. *Not enough training ….* *Need patients to understand why…*	Consistent mention of need for education and training Staff need to enable them to support their peers. Education needed for patients and their carers.	Education and training	Education and training

Quote from written open responses	Initial Description/ thoughts	Initial code	Emerging Categories
Need to know latest dressings… *Need better guidelines….* *Intensive training … not just short ….*	Need to check the levels of training as not meeting needs. Currency of knowledge and understanding	Ongoing professional education	CPD Competence
More education at right level …. *We have different backgrounds and training…* *Need training for HCAs.* *Needs to be practical…*	As above, but open comments that different levels of education and training are needed	Tailored education	Consistency Need to design education and training.
We all need more… staff keep changing. *Work in mental health … we have nothing.* *In care homes we don't have much…* *In A & E we just have to manage*	As above also need to make sure education fits different clinical settings. different settings have different contexts. Staffing levels and agency staff	Need professional education	CPD
Need to update… *Need CPD…* *Went for years with nothing…* *Expected to use my own time … don't have time at home…*	No consistent access to ongoing education and training challenges of access	Post qualifying education	CPD Competence
We all need to know… *Nurses change… some don't know…* *Every nurse should have training…* *Just left to do dressings…* *Never hear about courses…* *No time…* *Can't work at home… no time on duty…*	Suggests not all nurses have had ongoing education and training therefore how competent are they? Left without support or access to training. Staffing levels	Training Clinical practice – not time for CPD	Education and training CPD
Just use what we have … *Always had the same forms [in a care home]* *Don't think anyone checks what we write…* *Need shared forms in hospital and community …*	Suggests lack of implementation of new guidelines as lack of training Patient records	Consistency No ongoing training	Consistency Documentation

Quote from written open responses	Initial Description/ thoughts	Initial code	Emerging Categories
Would help if we all used the same ones… *Different nurses do different things.* *Reasons for change in dressing not given..*	Different settings using different forms and guidelines so no consistency in dressings	Shared training	Guidelines Consistency
Need to follow the same guidelines… *Need to know what I'm doing….* *Difficult to prevent in the community… patients and families don't know how*	Need to know what is needed and be able to deliver consistent care. Need to recognise the differing needs in the community	Consistency (in training)	Consistency
Prevention is better…. than trying to cure… *They [patients] don't always follow what we say…* *Difficult to prevent in the community …. patients and families don't know how*	Experience in caring for PU shows difficulty of care. Need to find ways to prevent	Prevention better Informa giving.	Prevention Patient and carer information
Need to increase pressure ulcer prevention for HCAs… *HCAs need more training [in prevention]* *I haven't had much…. Was keen to come to this; [training]*	Indicates the challenges faced by HCAs. HCAs not given training in PU prevention	Core education in prevention needed. Education and training especially for HCAs needed as different background to registered nurses	Prevention Education and training

This initial cycle was completed by reviewing the descriptionsmade and checking these against the original data set. The category of education identified four sub-categories, as indicated in the table 11 below.

Table 11: The final category of Education had four sub-categories.

Quotes from the written open responses	2nd Description/ thoughts and perceptions	Review and refinement of codes	Sub Categories
We need ….more education for patients and nurses *Not enough training ….*	**Patient and carer responsibilities in pressure ulcer prevention – education required to achieve this**	Training	

Quotes from the written open responses	2nd Description/ thoughts and perceptions	Review and refinement of codes	Sub Categories
Need patients to understand why.... *Need more....*	Staff education required for themselves but as appropriate to role and function, to support junior colleagues, patients and carers.		Tailored training
Intensive training ….. not just short.... *Need to know latest dressings …..* *Need better guidleines...*	Training may be being provided but not at the level or detail required	Bespoke training is required	
More education at the right level for the audience ... *We have different backgrounds and training....* *Needs to be practical....*	Different education and training required to ensure contextually relevant	Education and training needs to be at the right level to meet the needs of the target audience, be it patients, carers or healthcare professionals	
We alll need more training … staff keep changing … *..work in mental health we have nothing...* *In care we homes don't have much ….* *In A & E ..we just have to manage.....*	As above - needs to be evidence based but also contextually relevant	Bespoke Training needed Staff need updates in the care of individuals at risk of developing or who have a pressure ulcer Life long learning need	
Need to date regularly...... *Went for years with nothing....* *Difficult to get time off.....* *Expeted to use my own time...don't have time at home.....*	No consistency in updated education	No planned ongoing professional development to ensure the provision of current evidence based care.	CPD
We all need to know …. *Nurses change ….some don't know....* *Every nurse should have training ….* *Just left to do dressings...* *Never hear about courses...* *No time...*	Suggests not all staff attend education sessions and are therefore not necessarily competent	Without and agreed approach to the content and timing of professional development in pressure ulce prevention – staff may not provide care based on the best evidence.	CPD

Quotes from the written open responses	2nd Description/ thoughts and perceptions	Review and refinement of codes	Sub Categories
Can't work at home... no time on duty …..		Without a planned approach to ukskilling staff may lack the required knowledge, skills and attitudes to provide care based on the current evidence. and	Consistency in practice
Just use what we have... *Always had the same forms … [in a care home]* *Don't think anyone checks what we write....* *Need shared forms in hospital and community...*	Education and training required to meet individual practioner needs and documentation checked, through audit to ensure accurate completion	Not only is there a need for ongoing education and training, there is a need to ensure documentation is completed and as a result needs to be part of audit activity throughout the Trusts/other care providers.	
Would help if we all used the same ones... *Diferent nurses do different dressings.....* *reasons for change in dressing not given.....*	NHS needs to stop reinventing wheels – agree whats to be used and ensure education and training to support use	Trusts and care providers need consistency in the documentation to be completed so staff become very familiar with whats required and the education and training reflects the agreed documentation.	Consistency in practice
Need to be competent.... *Need to know what I'm doing ….* *We need to follow the same guidelines ….*	Do the right thing each time	Need to ensure current evidence based care is provided all the time for patients	
Prevention is better …..than trying to cure.... *They* [patients] *don't always follow what we say....* *Difficult to prevent in the community.... patients and families don't know how....*	Experience of caring for individuals who have developed a pressure ulcer	Lack of appreciaition of the importance of providing current evidence based care to ensure high quality care for patients to avoid pressure ulcer development.	Prevention
Need to increase pressure ulcer prevention for HCA's …. *HCA's need more training* *I haven't had much.... was keen to come to this [training] …* *Struggle at first first.... more confident now.....*	Acknowledgement of the key role of HCA's but as above – need the education and training	The Core Capabilitoes Framework makes it clear that care can be provided by a range of both qualified and unqualified staff. However, they will require the necessary ongoing education to facilitate high quality patient care.	

The themes that emerged from the qualitative aspects of the survey concurred with the findings from the literature reviewed, in Chapters, 2 and 4 of this study. Education and Training is deemed to be a significant factor in reducing the incidence and prevalence of pressure ulcers (NHS Improvement, 2018; Fletcher, 2019). Stephenson et al (2021) in their report on a national audit conducted across 36 hospitals, covering 18 NHS Trusts and 10,144 patients, identified the need for training of healthcare professionals, both nurses and other allied healthcare professionals. NICE guidance (2015, 2019) supports the need for education and training, as does Schofield (2018) who comments on the inconsistencies in the time awarded to healthcare staff to undertake education and training in pressure ulcer prevention. NHS improvement (2018) developed the Pressure Ulcer Core Curriculum, to support staff education and training. The NWCSP and the associated Core Capabilities Framework for England (Skills for Health, 2021) are all aimed at improving the education of healthcare staff, producing a wealth of supporting materials on their web site. There are a number of others as previously stated in earlier chapters 2 and 4 (Greenwood & McGinns, 2016; Adderley, 2019; Fletcher, 2019; EPUAP, 2014). The Department of Health & Social Care (2018) supports the education need in the context of safeguarding. The notion of a tailored education programme with a focus on Pressure Ulcer prevention certainly aligns with the aims of the TEL developed for this study.

9.3.2 Key Staffing concerns category

Table 12: Initial Coding and Emerging Categories

Quote from written open responses	Initial Description/ thoughts	Initial codes	Emerging Categories
Need strong leadership role models….. *Need clinical lead..*	Are there role models? Who is clinical lead - varies in different settings	Leaders and guides	Leadership
More supervision….	Do staff have any supervision of direct PU care? Are staff asking for more as unsure	Supervision at different levels	Leadership Supervision
Need supervision for…HCAs	What supervision do HCAs receive in all settings	HCA specific supervision	Supervision

Quote from written open responses	Initial Description/ thoughts	Initial codes	Emerging Categories
Proactive staff - information and support for patients and carers	Nurses need to advocate for patient but are they able to?	Being proactive	Proactive
We try our best … *We try .. every patient has a Waterlow score, equipment …. and monitoring as well*	Staff committed to delivering the best care Is the care evidence based on the individuals needs	Committed to do their best	Proactive
Need to go back to the bedside… *Spend more time with the patient…*	Suggests staff not always able to be at bedside Staff want to deliver good care but need time	Need to check staffing levels allow for bedside care	Staffing Levels
Need more staff on the wards… *Need more nurses…* *HCAs and not nurses [care home]*	Consistent comment of lack of staff, all reported needing more This could limit level of care and PU prevention	Higher levels of staff needed Skill mix would facilitate bedside care Leadership needed to decide levels and grades of staff needed	Staffing levels Skill mix

This initial cycle was completed by reviewing the descriptions made and checking these against the original data set. Following the second cycle of analysis (as described previously) the category of key staffing concerns had four sub-categories, as indicated in the table 13 below.

Table 13: The final category of Key Staffing Concerns had four Sub Categories

Quotes from the written open responses	2nd Description/ thoughts and perceptions	Review and refinement of codes	Sub Categories
Strong Leadership Role Models	**Raises the issue of what role models are available for staff and the leadership provided for staff in clinical areas**	**Staffing challenges and the presence of overseas and agency nurses so who is acting as a role model and providing the leadership required to set the culture for high quality care delivery.**	**Leadership**

Quotes from the written open responses	2nd Description/ thoughts and perceptions	Review and refinement of codes	Sub Categories
More Supervision	Is this because staff are unsure of what they are doing or do staff fail to do what they should be doing because they aren't not being supervised?	What staff are consistently present to ensure on the job education, training, and direction	Supervision
HCA Supervision	Same thoughts as above but raises issues of what happens to the care of at risk patients in a range of care settings.	Consistentsy of staff to provide the required guidance and direction of care	
Proactive staff	Are staff acting in the way they should advocating for the patients they provide care for.	Staff need to take action to ensure education and training, supervision and that they have the required resources.	Proactive staff
We try our best. Every patient has a Waterlow score, equipment and monitoring as well	Staff are committed to providing patient care and doing their best ensuing that	Staff committed to providing patient care to the best of their ability.	
Go back to the bedside. Spend more time with the patient	This suggests staff who are committed to providing care for patients but don't necessarily have the time to do what they need to.	Staffing levels and skill mix needs to ensure high quality safe care for patients.	Staff Levels and skill mix
More staff on the wards	It is clearly recognised that there are shortages of health care professionals and this comment would appear to reflect this. This could contribute to the ability of staff to carry out the required care. However, as stated previously pressure ulcer challenges have been evident for many years and at times when there were no staff shortages.	High levels of sickness, overseas and agency staff potentially disrupting care delivery. Skill mix essential to faciliate high quality care. Leadership required to determine the culture and whats acceptable safe, high quality patient care.	

The workforce shortages in the healthcare sector are well recognised, across all services, particularly nursing. In 2019, it was estimated that there were 41,000 nursing vacancies across the NHS (Health Foundation, 2019), despite a 14% increase in the number of students accepted onto nursing courses (UCAS, 2020). A new role the Registered Nursing Associate was developed, and apprenticeship routes into nursing were all aimed at recruiting into and retaining the nursing workforce. These developments formed part of a strategy to increase the numer of nurses in the workforce by 50,000.

Despite the initiatives identified above the shortages remain, with a 24% attrition rate amongst student nurses (Buchan et al, 2019) and many newly qualified nurses leaving the profession (Collard et al, 2020). This has lead to healthcare providers increasingly seeking to recruit clinicians, including nurses, from overseas. It is currently estimated that 18.5% of the nursing workforce has been recruited from outside of the UK (Palmer et al 2021). Whilst this will increase staffing numbers on wards, it has to be recognised that nurses from overseas may come from different cultures and have different perceptions of care provision.

Students, apprentices, newly qualified nurses and overseas practitioners all require education, training and supervision (NAO, 2020). Consequently, there is an increasing need to provide the necessary education and training to ensure that practitioners have the required knowledge, skills and attitudes to deliver safe evidence based care for patients across the entire system. This is particularly relevant to pressure ulcer prevention due to the need for education training and supervision, often at the bedside.

The survey's results identified the need for staff to be more 'proactive', suggesting that often they are not fully aware of a patients needs or their risk of developing a pressure ulcer, possibly a consequence of a lack of time, support, education and training. Sandoz et al (2021) suggest however that the time taken to complete a pressure ulcer reporting tool, takes staff away from direct care delivery and the support and supervision of junior colleagues.

Leadership is a significant consideration in respect of pressure ulcer prevention at all levels in an organisation, given that the incidence of grade 11, 111 and 1V are reportable (NHS Safety Thermometer 2012c). The NHS invests significant resources to faciliate management and leadership development from CEO level downwards.

However, it could be argued that despite this investment changes in practice have been very slow, and that all programmes developed in this area of clincial should consider adding in a focus on leadership in education to support the development of best practice at local levels?

9.3.3 The main theme of Equipment

Table 14: Initial Coding and Emerging Categories

Quote from written open responses	Initial Description/ thoughts	Initial codes	Emerging Categories
Don't rely on equipment… Not enough equipment..	Suggest problems with equipment access or availability	Equipment problem	Lack of equipment
We do assessment .. and order equipment but some people don't want it… Takes time…	Need to further study why equipment not used Is the equipment appropriate for the individual Is the patient informed as to the need and the consequences of not using the equipment?	Acceptability of equipment to staff and patients	Acceptability Patient information
More access to equipment …. heel pads If people had more mattresses… Need equipment available 24/7	Indicates lack of or limited equipment No indication if for individual patients or if it is a general lack	Accessibility of equipment	Accessibility
More awareness of pressure relieving devices… And repositioning on a regular basis Use of equipment Correct assessment of mattress	Knowledge and use of assessment processes for equipment Need to know what is available and what isn't	Knowledge of assessment processes	Expertise Education and Training

This initial cycle was completed by reviewing the descriptions made and checking these against the original data set. Following the second cycle of analysis (as

described previously) the category of equipment emerged and this revealed three sub-categories, as indicated in the table 15 below.

Table 159: The final category of Equipment had three sub-categories.

Quotes from the written open responses	2nd description/ thoughts and perceptions	Review and refinement of codes	Sub Categories
Don't rely on equipment	Suggests equipment is either not available or doesn't work	Lack of useable resources	Challenges with equipment
We do assessments and order equipment but some people don't want it	Why do people not want the equipment? Has the staff member explained the rationale for its use? If the best equipment isn't what the patient wants – could there be an acceptable alternative for the patient.	Effective interpersonal skills to communicate effectively with patients, carers and staff to ensure everyone understands the rationale for equipment use and potential compromises.	
More access to equipment - heel gel pads If people had more mattresses Equipment available 24/7	This comment suggests that there is insufficient equipment to meet patient requirements, however, it doesn't indicate if the patients have been assessed to determine the need.	Use equipment appropriately to ensure those who are assessed as having a need for equipment are able to access it as and when required	Equipment
More awareness of pressure relieving devices and repositioning on a regular basis Use of Equipment Correct assessment for mattress We try our best. Every patient has a Waterlow, equipment and monitoring as well as brief education	Do staff know the equipment available – is it available in a timely manner and when available the correct equipment for individual patients. Staff trying their best to do what's right.	Knowledge and understanding of the assessment process to determine care requirements, including equipment to ensure what is available is used correctly.	Expertise in equipment usage

The survey data in respect of the equipment available to assist in the prevention of pressure ulcers reflects the literature, and raise questions in relation to the availability, and suitability of equipment and the understanding of its value to patient care (Jackson

et al, 2019). Stephenson et al, (2021) identified that patients using pressure relieving devices were between two and three time more likely to develop a pressure ulcer than those not using equipment; moreover, many patients were provided with specialist equipment that was not appropriate to their level of risk. Commenting that often this was not necessarily related to the clinical judgement of the "prescriber" but reflective of Trusts policies and procedures. These findings suggest that there is a lack of knowledge in determining the most appropriate equipment to be selected based on the patient's level of risk. Fletcher (2020) argues that there is a dearth of evidence to support health care professionals in choosing the right equipment for individual patients; acknowledging it's use as a crucial component in both the prevention and management of individuals at risk of developing or with a pressure ulcer. Additionally, any equipment selected needs to be acceptable to the patient and take account of the location of the equipment, particularly in the patient's own home.

The survey results once again support the importance of education and learning in enhancing clinical decision making based on individual need, rather than availability.

9.3.4 The main theme of Care

Table 16: Initial Coding and Emerging Categories

Quote from written open responses	Initial Description/ thoughts	Initial codes	Emerging Categories
Skin care and mobility… Regular skin inspection… Good skin hygiene Provide adequate treatment or referrals	Suggests knowledge of requirements for skin care Aware of need to escalate or refer	Skin integrity Specialist guidance	Skin care
If on a turn chart ensure these are used correctly Reposition them…… Reposition patients who are unable to do so themselves Strictly adhere to movement of patients to relieve pressure and prevent pressure damage…	Suggests nurses have knowledge of need to move and reposition Need to relieve pressure and use of turning charts	Plan repositioning as essential Charts and equipment	Turning

Quote from written open responses	Initial Description/ thoughts	Initial codes	Emerging Categories
Continued structured assessments….. *Identify pressure areas at risk….* *Have appropriate dressings available…..*	Acknowledge need for ongoing assessment Need to identify areas at risk of pressure damage Available dressings	Plan for care includes assessment of risk areas Education and training	Assessment CPD
Encourage diet and fluids to promote good nutrition… *Adequate food and drink…*	Importance of nutrition and fluids	Nutrition and fluids	Nutrition
Compliance….. *Ensure all strategies are adhered to…..*	Deliver planned care Check care plan followed	Patient carer and staff compliance	Compliance

This initial cycle was completed by reviewing the descriptions made and checking these against the original data set. Following the second cycle of analysis the category of care emerged and this contained five sub-categories, as indicated in the table 17 below.

Table 17: The final category of Care had five sub-categories.

Quotes from the written open responses	2nd description/ thoughts and perceptions	Review and refinement of codes	Sub Categories
Skin Care and Mobility Regular skin inspection Good skin Hygiene Provide adequate treatment or referrals	**Suggests knowledge regarding the need for inspection and skin care.** **Awareness of onwards referral as necessary**	**Maintain skin integrity through inspection, hygiene and identified care e.g. moisture damage.** **Seek speciatlist guidance as required.**	**Skin care**
If on a Turn Chart ensure these are followed correctly Reposition them Reposition patients who are unable to do so themselves Stictly adhere to movement of patients to relieve pressure and prevent pressure damage	**Suggests knowledge of the need to move individuals to relieve pressure and the use of turning chars to direct actions**	**Plan for repositioning essential to relieve pressure using charts and appropriate equipment**	**Turning**

Quotes from the written open responses	2nd description/ thoughts and perceptions	Review and refinement of codes	Sub Categories
Continued structured assessments Identify pressure areas at risk Have appropriate dressings available	**Acknowledgement of the need for ongong assessment.** **Recognition of the need to identify what areas are a risk of pressure damage** **The availability of dressings**	**Plan of care includes when to reassess and ongoing assessment of areas at risk in line with any changes in the individuals condition**	**Assessment**
Encourage diet and fluids to promote good nutrition Adequate food and drink	**Recognition of the importance of nutritional and fluid intake**	**Food and fluid intake essential for healthy skin**	**Nutrition**
Compliance Ensure all strategies are adhered to	**Care needs to be delivered as planned**	**Patient, carer and staff compliance is essential in respect of assessment and care delivery**	**Compliance**

These findings suggest that the respondents have an awareness of the many challenges associated with preventing and managing pressure ulcers. It could be argued that if patients have not been consulted or do not understand why they need to have for example, a support surface or a particular dietry intake, they are unlikely to comply/concord with treatment. The need to turn and, where required, reposition the patient features highly in the qualitative comments received. Good skin hygiene, skin inspections and referral to others where required is also included. Whilst this is laudible, it has to be remembered that the respodents are specialist nurses, link nurses or other professionals with a special interest in pressure ulcer prevention (Fletcher, 2019). It is clear that education and training is required for both patients and healthcare professionals, empowering patients to take some responsbility for their own healthcare and for professionals to maintain the currency of the knowledge and understandng of pressure ulcer care to advocate and provide support for patients and their carers.

9.3.5 The main theme of Patients and Public Involvement had three main categories

Table 18: Initial Coding and Emerging Categories

Quote from written open responses	Initial Description/ thoughts	Initial codes	Emerging Categories
Patients need to take some responsibility… *for those caring for people at home* *Awareness and prompt action…*	Recognises patient role but not carers role Also need to consider cognitive capacity Enable patients to take responsibility for own care	Increase patient knowledge Responsibility for PU risk reduction	Staff and patient responsibility
Awareness campaigns everywhere and anywhere… *With greater awareness things could possibly improve* *Widen awareness of how pressure ulcers start and associated misery…* *If people had more awareness….* *Generally public awareness especially*	Need for more information in all settings to reduce PU risk Recognise suffering cause by PU Timely care	Education of all Education of public in PU prevention	Public awareness
Raise awareness campaigns… like smoking *Give patients leaflets.* *More education for patients and staff*	Staff and patient need knowledge of risks for high level care Raise awareness in public Leaflets need to be appropriate for audience	Social media campaigns Patient and staff education Target leaflets	Raise awareness Information

Quote from written open responses	Initial Description/ thoughts	Initial codes	Emerging Categories
Our community patients with no previous input… *Report a sore to the GP* *How can we stop them if we have never met them*	public awareness make every contact count	Social media Target leaflets	Knowledge sharing Professional and patient

This initial cycle was completed by reviewing the descriptions made and checking these against the original data set. Following the second cycle of analysis (as described previously), the category of Patients and Public Involvement emerged and this was found to have three sub-categories, as indicated in the table 19 below.

Table 19: The final category of Patients and Public Involvement had three sub-categories.

Quotes from the written open responses	2nd description/ thoughts and perceptions	Review and refinement of codes	Sub Categories
Patients need to take some responsibility	Acknowledgement of the patients role but no mention of careres or where the individual is not cognitively competent	Increase patient's knowledge and understanding to enable them, where possible to take actions to reduce their risk of pressure ulcer development	Responsibility
Awareness campaigns everywhere and anywhere With greater awareness things could possibly improve Widen awareness of how pressure ulcers start and associated misery If people had more awareness General public awareness especially for those caring for patients at home Awareness and prompt action	More information to raise awareness of pressure ulcers and the pain and suffering caused to faciliate timely recognition and care	Education of the general public so there is greater knowledge of pressure ulcers and how they develop	Public awareness
Raise awareness campaigns – like smoking Give patients leaflets More eduation for patients and staff	Staff and patient need the necessary knowledge to understand the risks to enable the provision of high quality care. Raising awareness in the general public	Social media campaigns	Raising Awareness

Quotes from the written open responses	2nd description/ thoughts and perceptions	Review and refinement of codes	Sub Categories
	Leaflets and information approriate for the target audience – e.g. language barriers	Patient and staff education Targeted leaflets	Information Giving
Our community patients with no previous input report a sore to the GP. How can we stop them if we have never met them	Public awareness campaigns to help increase knowledge. Making every contact count with a healthcare professional as an opportunity to raise awareness	Social Media campaigns Targetted leaflets and education opportunities in community settings	Patient and professional knowledge sharing

Fletcher (2020) suggest that the lack of communication and information giving are the most frequently cited concerns identified from the root cause analysis of pressure ulcer incidents and complaints (ACT Academy, 2018). Durrant et al, (2019) suggests that when providing patients with written information, this should be in support of face to face/verbal communication relevant to the patients needs. This followed a study in which the researchers found that patients in the community had difficulties in understanding written leaflets resulting in disengagement. NHS England, (2018) advocates that it is essential to ensure that patient's can understand the information provided: are they cognitively competent, what is their first language, does the information avoid the use of jargon? It is also vital to ensure that all of the professionals caring for the patient are giving consistent information in an accessible format. It is also recommended that anything produced should be short and easy to read adding, where possible the use audio and video's to make the information clearer. The DH Toolkit for Producing Patient Information is a useful guide, as is the Act Academy Online Library of Quality, Service Improvement and Redesign Tools: Patient information (Act Academy, 2018).

Public awareness campaigns (Your Turn, 2013) and the annual Stop the Pressure Day are useful events but there is little evidence to show how effective they are in reachng their target audiences. It is acknowledged that the government is clear in its commitment to patient and public involvement as discussed in the National Wound Care Strategy Programme and supported by Coleman et al (2014 p2229) in the

development of their new conceptual framework, which included the involvement of a patient and public involvement group of service users - the Pressure Ulcer Research Service User Network: (PURSUN) - who commented on "*the acceptability of proposed assessment elements*". Stephenson et al (2021 p54) in their national audit across 36 hospitals, identified that "*Evidence for patients being given or understanding information about pressure ulcer prevention was poor*" arguing the need for healthcare professionals to devote more time to providing patients and/or their carers with the essential education and training they require to meet their individual needs.

The survey results tend to reflect the associated literature, confirming that there is a lack of public awareness and, in some instances, healthcare professionals awareness of pressure ulcer prevention, despite the wealth of information and support available, together with the ongoing government drive to improve the situation. The National Wound Care Strategy Programme (2016) includes patient and publice involvement, however, it is not clear the impact of their initiatives at present.

9.4   Outcomes of the survey

The outcomes that emerged from the analysis of the baseline data revealed that the majority of the respondents were nurses who had undertaken some education in the prevention of pressure ulcers. That the majority do use a pressure ulcer risk assessment tool – Waterlow; a Nutritional risk assessment tool - MUST and the EPUAP grading tool. Many have had experience of online learning.

9.5   Summary

This chapter provides the results from the baseline survey conducted with staff from the commissioning Trusts. It provides a range of biographical information together with qualitative data that was analysed and coded into 5 main categories: Education, Staffing, Equipment, Care, and Patient and Public Awareness, with each of the categories further broken and considered in relation to the underpinning literature.

Having undertaken and analysed the baseline survey the intention had been to utilise the findings to inform the development of a new survey questionairre to be used by individuals accessing the TELT. However, the Trusts decided that they wanted the

same tool as used in this baseline survey and hence this formed the survey for the future Action Research Cycle Workshops that followed. See Appendix 2.

Chapter 10   Data Collection, Collation and Analysis – Action Research Cycles 2 ,3 and 4 (Pilot)

10.1   Introduction

This chapter provides the results and outcomes for each of the action research cycles undertaken using a modification model of Plan, Act and Observe, Reflect and Revise the Plan (Adapted from Lewin, 1946; Carr & Kemmis 2003). It also includes the outcomes from the pilot, which equates to a further action research cycle – cycle 4. The cycles were implemented through the research workshops, all of which followed the same format, with data from the activities, collated, analysed using the processes described in Chapter 6.

10.2   Action Research Cycle 2

10.2.1   Stage 1 Plan

The planning for this action research cycle had two components. Firstly, following discussions the Trusts education department wanted to arrange the venue, as this was a testing/pilot of the programme that they hoped would become a leading element of their ongoing Continuous Professional Development. Therefore, it was agreed that the workshops would take place on Trusts premises, as the Trusts IT team were confident that they had the required equipment to run the VCC scenarios in the Education Centres. The technology experts from the University discussed the requirements prior to the first workshop, and the Trusts IT team offered to be available throughout the days allocated for the workshops, to, in their words "troubleshoot" any IT problems.

The second component was planning the workshop. The TELT programme was complete and ready for use, but this alone was not sufficient to provide the information needed to develop a conceptual framework and model for practice. It would give an indicator of correct completion, and the number of attempts needed to achieve success, but it would not provide any indication of their knowledge regarding issues such as pressure ulcer risk assessment or nutrition assessment tools. Therefore,

these participants would also be asked complete to the survey questionnaire that had been used to gather the baseline data as discussed in chapter 8. This could then be used in two ways, firstly to gain direct information from participants, and secondly to facilitate comparisons with the baseline survey. Although this whole programme was based on online learning, to avoid confusion with participants having to move from an online survey to the TELT, the questionnaire was printed out as hard copy that could be completed and returned at the start of the workshop.

During action research cycle one, the peer reviewers had completed a short hard copy questionnaire to give their feedback on the use of the TELT, but as this was now being tested prior to wider use, it was decided that a more in-depth exploration of the participants perceptions of their learning experience would be appropriate. Therefore, as indicated in the chapter 6, focus groups would be the last workshop activity for all participants, following completion of the VCC Scenario.

It was also agreed with the commissioning Trusts that as this was the first time the programme had been used in the Trusts it was important for the researcher to be free to assist participants if needed. Therefore, it was decided that the total attendees would be divided into two workshops, one of six members would be held in the morning, and the second of seven participants would be in the afternoon. Details of the participants expected to attend were emailed to the researcher who then compiled a pack for each participant. This consisted of an information sheet about the TELT and the workshop activities, a copy of the survey questionnaire which had been used to gather the baseline data, an individual workbook to support their use of the TELT and information about the final activity, the focus groups.

10.2.2   Stage 2 Act & Observe

Although two workshops were held, because the format was the same, and the division of participants was purely to facilitate access to support and guidance, the memos and notes taken contained considerable duplication, therefore, they have been combined, as have the findings from the two workshops.

10.2.3   Memo and notes

The researcher welcomed the participants to the venue and asked them to take a seat at one of the computer terminals. The venue chosen by the Trusts, was a large sized computer room and the attendees on each occasion were asked to space themselves out across the room.

The workshops followed the same format as had been used in cycle one for the peer review. Although the participants had been sent information regarding the workshop in advance, it was seen as important to recapitulate this, checking that they understood the purpose of the TELT, and the activities that they were expected to carry out. The survey questionnaire was also discussed, as was the final activity, the focus group (one focus group was held following each workshop). The participants listened, and had only minor queries on each occasion, they all progressed to reading the information sheet reporting that they had no additional queries. They were again reminded that they could withdraw from the activities at any time if they chose; all chose to complete the activities. As a result, they were asked to move on to the first exercise, the survey questionnaire, which once completed, was collect by a participant and placed on a desk at the front of the room. These were collated and analysed after the workshops.

The participants were next asked to start the main activity, accessing the online pressure ulcer education tool. They logged onto the computer, then opened and read the workbooks which included instructions on how to access the opening screens of the online learning package. There seemed to be no problems with these first steps as in both workshops all participants found it easy to open the TELT. Firstly, they needed to access all of the learning resources available to them within the package, and review these as they had been designed to inform the scenario questions and decision making in the assessment of an individual at the risk of developing pressure ulcers. Watching them work they seemed to have few problems in accessing the materials, and the researcher was able to help the one or two who struggled with navigating through the programme.

Some clearly found it easier to complete than others, and on observation seemed to move between the different screens as they made their decisions. The resource materials were designed to help them make decision, but it seemed that a minority

fund it difficult to access the materials as they continued through the programme. I did work with these participants and was concerned that there were incidences of this is both morning and afternoon groups. If the TELT was to be successfully used across the Trusts, this was clearly an issue that needed to be reviewed with the technology experts. It had not arisen in the peer review, but these nurses attending this second workshop lacked the expertise of the reviewers and needed more time to access the resource materials. As a result of these issues some took longer to complete the programme, and this was also something that would need to be considered further as it left some of the participants with a gap in activities.

Following completion of the online learning by all participants, they were invited to take part in the focus group discussed at the start of the workshop. The transcripts from the two semi-structured focus groups held during Action Research Cycle 1, revealed that as with the memos, the data contained considerable similarities, and overlap, therefore the data sets were analysed together. The questions explored included:

- How useful the workbook had been and how it could be improved?
- Was the VCC easy to use?
- Has your knowledge of assessing an individual's risk of developing pressure ulcers improved/been refreshed?
- Having completed this programme would you be happy to undertake online learning in the future?
- If you have tried online learning before was this time better or worse and why?
- Would you recommend this programme to your colleagues?
- Is there anything else you want to say?

10.2.4   Results from the workshop

There were two main data sets from the workshops the quantitative data from the completed questionnaire and the qualitative data from the focus groups.

10.2.4.1   The Survey Data

The survey data was analysed and compared with the baseline data. However, with such small numbers it was difficult to draw conclusions from the similarities and

differences, particularly as the baseline data was gained from nurses that were either nurse specialists in the field or those with a strong interest in pressure ulcer care. It was therefore decided that only essential comments regarding key points such as the use of assessment tools and previous education and training would be presented in this section. The most effective use of the total survey data was to ask participants from all planned action research cycles to complete the questionnaire and then to carry out a summative comparative analysis. This would then be used to assess any further changes needed for the final TELT, and to support the development of the conceptual framework. Therefore, in this section only the qualitative analysis has been presented.

Table 20: Details of participants attending the workshops.

Participants	Numbers
Professional Background	
Number of Nurses	10
Physiotherapist	1
Podiatrist	1
Not disclosed	1
Total number	**13**
Female	**13**
Age range	**41-50**
Previous experience of online learning	**8**

Table 101: Key findings in pressure ulcer care

Participants	Numbers
Education and training in pressure ulcer care	
Previously completed	**12**
No response	**1**
Use of risk assessment tools	
Waterlow risk assessment tool	
Number using the tool	**12**
Confident in its use	**12**
MUST nutritional assessment tool	
Number using the tool	**12**
Confident in its use	**10**
EPUAP pressure ulcer grading tool	
Number using the tool	**10**
Not using a pressure grading tool	
Number	**2**

10.2.4.2   Findings the Focus Group Interviews Data Analysis

Analysis started by reading the transcripts line by line, checking each comment and marking the ideas and perceptions of the TELT. As used for the open responses from the survey, the processes for framework analysis can be carried out as iterative cycles (Davda et al, 2018) and this structured approach was repeated for all the qualitative data from the focus groups. The initial descriptions helped to develop the thoughts and then initial codes, from which emerging categories were sought This approach supported the search for specific words or contexts within the text, to explore the perceptions and descriptions of the participants. Specific responses were grouped together and then reviewed as the basis for the formation of categories and emerging themes. Each code and then category was checked and rechecked and examples of the results of the analysis are given below in table 22 below.

Table 22: Qualitative Data Analysis - first cycle

Quote from written open responses	Initial Description /thoughts	Initial codes	Emerging Categories
"This is much more interesting than anything I have ever done before	New learning approach different to previous enjoyed	More interesting willing to use	**Motivation**
Enjoyed the doing the programme …	As above	Positive experience	
think more about what you are learning	Thought more about learning	reflection	**Learning**
This was a refresher course for me	Revisited previous learning	reinforcement	
the technology challenges detracted from the potential learning	technology can be difficult	learning affected	**Technology**
embarrassed that I couldn't get onto the online learning without help	Lack of confidence embarrassed to ask	Needed assistance to access learning	
Spent more time trying to get round the programme than answering the questions	Participant struggled with technology	Wasted time learning the programme	
needs to be more intuitive ..	As thoughts above	Technology not flexible to use	
We don't all have much access to internet at home	As thoughts below	Access to internet	**Home working**
Frustrating, not easy to use	Resources	Using online learning at home	
Access to resources	The TELT needs to be more intuitive to maintain		Resources
Workbook not online	risk score needs to be available		
the workbook needs to be online".	technology resources need to be online		

To complete this analysis, a second cycle was carried out into each of the emerging categories. This revealed the need to review the description and context for each, and in doing this links and associations were revealed, such that on completion of the analysis two key categories emerged.

- The Online Learning Tool – it's accessibility and usability - green in the table below.
- The participants perceptions if this approach to learning in the context of the assessment of an individual's risk of developing pressure ulcers- blue in the table below.

Table 23: Qualitative Data Analysis - second cycle

Quote from written open responses	2nd Description /initial thoughts	Review and refinement	Categories
"This is much more interesting than anything I have ever done before	The difference in the approach taken in developing the TELT was more interesting for the participants	Positive experience Motivating and engaging	Participants perceptions
Enjoyed the doing the progamme …	As above	Engaging	
think more about what you are learning	The challenges posed whilst working through the TELT facilitated greater engagement and learning	Encourages reflection content	Participants perceptions
This was a refresher course for me	Could be positive as the TELT offered an update or negative as it was learning they had already undertaken	Appropriate content reinforcement	
the technology challenges detracted from the potential learning	If using technology it needs to work well as if it doesn't wastes time and is off putting	Problems with technology affecting learning	Online Learning Tool
embarrassed that I couldn't get onto the online learning without help	Individuals have varying skills in using IT and may not want to seek help or embarrassed to seek help. Need to ensure that the guidance provided meets the needs of novices to experts.	Needed assistance to access learning	
Spent more time trying to get round the programme than answering the questions	The TELT needs to be more intuitive to maintain student engagement and learning as opposed to having to read a workbook to assist in navigating the TELT	Wasted time trying to navigate the programme	
needs to be more intuitive ..	As thoughts above	Technology not flexible to use	

Quote from written open responses	2nd Description /initial thoughts	Review and refinement	Categories
We don't all have much access to internet at home	**As thoughts below**	**Access to internet**	**Online Learning Tool**
Not able to work online much at home	**There needs to be accessible facilities available in the workplace that staff can use as needed to enable them to complete online learning. Don't assume everyone can access at home.**	**Using online learning at home**	
found it quite frustrating and disappointing that I needed to read the workbook to try and navigate to get the resources or make decisions"	**The TELT needs to be more intuitive to maintain student engagement and learning as opposed to having to read a workbook to assist in navigating the TELT**	**Frustrating and disappointing not easy to use** **Workbook not online**	**Online Learning Tool**
The Waterlow and Must scores need to be online	**To enable the students to identify the individuals risk score needs to be a pop up that the students can access and fill in on line**	**Access to resources**	
the workbook needs to be online"	**If using technology all resources need to be available online**	**Workbook not online**	

10.2.4.3   The Online Learning Tool – Accessibility and Usability

This first of these was important as if the programme can be easily accessed and used, participants can fully engage and consider whether the content was appropriate, and how it had impacted on their leaning. Overall, the number of participants was small, but nevertheless, there were some areas of consensus regarding the accessibility of the programme. Overall, the participants were positive about their online learning experience, and the way in which the programme worked. They had access only to the scenarios specifically developed for this TELT, but as one reported:

P3   *"I really enjoyed going through the programme and would like liked to do the other scenarios as well…"*

However, as had been noted in the observations, for some accessing the screens and navigating round the programme had not been so easy, particularly for those for whom this had been their first experience of online learning:

P4:   *"I am embarrassed that I couldn't get onto the online learning without help. My kids always help me to get onto the internet".*

This was an important point, the overall aim of the commissioning Trusts was to have a programme their staff could access independently, and therefore it needed to be easy to access and use. It is recognised that different individuals have different levels of expertise, and it may be that with the move to technology enhanced learning Trusts may need to offer individual tutorial sessions for all staff expected to access online learning. It had clearly been distressing for this participant to have to ask for help to start the learning experience.

For others, although they had been able to access the programme, as they tried to work through the activities, they found it difficult to navigate their way through the different steps in the online learning programme. One of the challenges was that of accessing the resources, they had been given the workbook which provided information and guidance, but this was in hard copy, resulting in them having to repeatedly move from the computer to the workbook. The consensus was that had it been online they could have simply moved from screen to screen. Instead, they felt they had spent more time looking at the workbook and trying to navigate their way through the learning than engaging with the content:

P10:   *"I found it quite frustrating and disappointing that I needed to read the workbook to try and navigate to get the resources or make the decisions".*

Or as another participant reported, the programme had limited flexibility, which made it difficult to progress through the activities.

P2:   *"The whole thing needs to be more intuitive, and the workbook needs to be online".*

The comments regarding the challenge of working with only online material was also repeated regarding the risk assessment tools used in the programme, such as the Waterlow and MUST scores. These were both key to the overall risk assessment, but were not available for completion online, and for some this adversely affected their ability to complete the programme.

P10   *"I am not familiar with using assessment tools so it would have been good to have had a copy of the Waterlow and Must tools to complete as it was not possible to do this on screen. Being able to do it on screen would have been ideal".*

For this group it would seem that even if the tools were not available online hard copies would have been helpful and would have extended their learning.

The final issue in this theme was the ability to be able to reassess their decisions. Some reported that having made a decision and then moved on through the programme they wanted to go back and review and revise their original answers. However, they had not been able to do so, and were unhappy that *"I couldn't go back…"* this meant that they had completed the programme, unhappy with some of the responses they had given. There were also a number who felt that they wanted the opportunity to be able to stop for a break and then go back into the online learning and to, in effect, "pick up where they left off" however this too was not possible with the tool at that time. These last two concerns clearly needed to be considered by the researcher and discussed with the originator and technology experts.

When commissioning the programme, the key stakeholders in the Trusts had articulated their long term plan to have a CPD programme that could be completed either at work or at home. This information had been shared with participants at the start of the workshop, as part of the explanation and introduction to the TELT. While participants could appreciate the rationale for this decision there were mixed views about this move. For some it was a *"practical choice"* as it offered them the opportunity to undertake CPD activities without having to apply for and take time away from their clinical role. However, for others having the time to access online learning at work was not feasible, they reported that their days were too busy to take time out for study, with cover for their usual activities. The result of their high workload was that when they finished work and went home, they were too tired to try and study. Some of this group were also concerned about the expectation that they could be expected to study in their own time, openly stating that this approach was to reduce the need to release staff:

P5:   *"They expect us to work all day and go home to access online learning which saves managers giving us time off in the working day."*

and

P4:   *"It saves them money.*

They wanted to continue to have protected time to study, arguing that this was the best way to gain maximum benefit from learning opportunities, an argument that was difficult to refute. There was also another issue linked to this, while participants may have been willing to complete CPD at home, not all had the internet access to do so. This may be because access has to be shared with other family members, or because they had only limited or no personal access, and in consequence it is essential that the option of completing the programme at work must be retained,

10.2.4.4   The participants perceptions of this approach to learning in the context of the assessment of an individual's risk of developing pressure ulcers.

The starting point for discussing this theme, has to be table 36, as this indicates that twelve of the thirteen participants in this group, had all undertaken education and training relating to pressure ulcer prevention. Further, eleven of the thirteen used the **Waterlow** score, and regarding the nutritional assessment **MUST,** again eleven were using it in practice with ten confident in its use. Similarly, most used the **EPUAP** classification grade / categorise pressure ulcers. Therefore, it could be argued that for the majority of the participants completing the technology enhanced learning tool this was not new learning, instead as one reported, it was:

P1:   *"For me this was a refresher to ensure I remain up to date with everything"*

Therefore, these participants were an appropriate group to pilot and assess the TELT as they had previously undergone education and training in this field and were confident in the use of the assessment tools that had been included in the programme. However, the needs of the small group who did not use assessment tools or were not confident in their use needs to be remembered, and as suggested in the previous theme, consideration needs to be given to adding this content to the programme.

When considering the programme content as a whole, there was overall a positive response with some reporting that:

P1:   *"This is much more interesting than anything I have ever done before. I liked the way you could find the resources and that there was a real person involved.*

and

P3:   *"I liked the awards bit…"*

For this group, on further probing, they were comfortable with online learning, this programme offered a welcome way to extend their knowledge, and as had been reported many times when reviewing the VCC, they appreciated that the multimedia technology meant they could see a real patient, bringing the education experience alive. For those less familiar with online learning to use the programme was not so easy, however, they did appreciate the programme and the content it offered:

P10   *"I enjoyed working through the package, but the technology challenges detracted from the potential learning".*

it may be that to help these participants, additional guidance may prove supportive, enabling them to navigate through the programme more easily, and extend their learning. The final comment included here gives both a positive and negative response to the programme. But also illustrates the problems that can arise when non-interactive approaches are used.

P2:   *"It makes you think more about what you are learning instead of just death by power point.*

It is important to note that when asked, the two allied health care professionals who attended both stated that they didn't use assessment tools themselves and as a result didn't feel competent in using them for assessment purposes. However, they said that they did look at the tools completed by nursing staff and found them useful when planning care.

P14:   "*I am a podiatrist, and we don't assess risk either we just use what nurses complete".*

Interestingly, both participants went on to report that using the online learning tool had given them increased understanding of these tools and motivated them to learn more. They had reflected on their roles and decided that it was important for them to know more about this area of care.

P12:   *"Physiotherapists don't assess patient's risk of developing pressure ulcers but maybe we should"*.

In summary, the majority of the participants reported that they liked the technology enhanced learning tool and welcomed the technology that allowed them to *"look" at* an actual patient and assess them, rather than trying to work out care plans, from a number of power point slides. Another positive finding was that those who had had experience of online learning stated that it was much better than other online learning they had undertaken. The liked being able to move around the scenes to access resources to aid decision making. However, the challenges with the actual operation of the online learning were disappointing and at times frustrating, and as many of the concerns as possible needed to be addressed. Therefore, despite the positive views of the technology enhanced learning the challenges identified above needed to be addressed as for some participants these had had an adverse effect on their overall learning experiences.

10.2.5 Stage 3 Reflect

Following completion of the online learning, the focus group analysis and analysis of the researcher's field notes, reflection on the results was necessary to enable any possible changes to be discussed with the originator and technology experts to enable consideration to be given to ascertain which changes were feasible and which were not, prior to proceeding to Action Research Cycle 3. Reflecting on the total data sets, the issues that needed to be considered included:

- the ranking associated with the decisions that needed to be made was felt by some of the participants to be inappropriate as the order would be dependent on the actual patient being assessed.

- some of the resources to assist in the decision making process could not be opened even those documents that were the NHS Trusts own policies and procedures e.g., Infection Control Policy
- whilst the Waterlow and Must assessment tools could be opened; it was not possible to score them on screen and nor could the assessment tool be viewed with the information available to inform the assessment.
- participants were unable to stop the online learning and go back to the point where they left off which they felt was frustrating and off putting.

Most of the issues identified related to the accessibility and usage of the online learning and the impact of these issues on the participants perceptions of their learning. Therefore, the researcher arranged to meet with the lead of the Virtual Case Creator Team who created the Online Learning Tool. As a result of the meeting, it was identified that:

- Concerning the ranking order of decisions, the learning had been set up for decisions to be made in rank order and therefore no changes could be made at that time.
- The team felt that the problems with opening resources may have been because the Trusts was found to be using an older version of Internet Explorer that did not have the technological processes to allow all of the resources to be accessed.
- It was not possible within the existing programme, to enable the Waterlow and Must assessment tools to be completed online and be viewed when decisions were being made to determine at risk score.
- The ability to start working on the learning tool, log off, then log back on and start from where they left off was not possible within the current technology, but the team were willing to work on this issue to see what could be possible.
- The awards system liked by some participants and disliked by others, could not be removed, they were integral to the online learning, but it was not necessary to achieve them.

Following this meeting, the researcher made contact with the Trusts IT department to discuss what version of internet explorer was in use and to see if it could be adapted to support the technology enhanced learning package, addressing the access issues identified by the focus groups and through the observations of the researcher.

However, the service was based in South Africa and a help desk request form was completed but no response was received prior to the planned third action research cycle. It was disappointing firstly, to discover that the Virtual Case Creator Technology was not sufficiently developed to facilitate individual's accessing the online learning and being able to log off and on logging back on to start where they left off. Also, it was not possible to complete the Waterlow and MUST risk assessment tools online and the rank order (and rewards) were built into the learning and there was no possibility of changing them in preparation for Action Research Cycle 3.

10.3   Action Research Cycle 3

10.3.1   Stage 1 Plan

The planning stage of this cycle followed the process as for cycle two with the Education Department arranging the venue and participant attendance, or participants asked the education department if they could attend. Details of the venue and the participants expected to attend were e mailed to the researcher who ensured the correct number of information sheets, survey questionnaires and workbooks, were available in readiness for the cycle. Additional information sheets, workbooks and surveys were taken in case more participants attended than had been expected. As before, there were two sessions planned one with 12 and the other with 7 participants. As this was the second action research cycle it would have been reasonable to assume that changes to this cycle would be evident following the reflections on the survey questionnaire and analysis of the Focus Groups and field notes from cycle 2. However, as identified in 10.2.3 above it was not possible to make the changes identified by the workshop participants and the researcher. This was a challenge for the researcher as it was to be expected that the same issues would arise with cycle 3 participants as with cycle 2 but on this occasion the researcher was prepared and could advise why the issues were occurring.

10.3.2　Stage 2 Act and Observe

10.3.3　Memos and notes

On arrival at the venue, it was found to be a converted wooden building used as a computer facility for education purposes by the Trusts, situated in the grounds of a community hospital, it was locked. Therefore, it was not possible to prepare the room prior to the participants' arrival and indeed everyone had to stand in the cold until a member of staff arrived to unlock the door and let everyone in. It became apparent that many of those attending the morning session were due to go for their Christmas function straight after the event. In addition, the venue was also the office for the onsite IT staff for the Trusts, one of whom who arrived and let us in.

On entering the venue, the researcher asked the participants to sit at computer and distributed the information sheet and survey questionnaire explaining as in the previous cycle the purpose of the workshop. The venue was much smaller than that available for cycle 2, yet the group was double the number, as for this cycle there were 2 workshops held with 12 participants in the first group and 7 in the second, so a total of 19. In addition, this time there were some enthusiastic participants who were eager to access the learning tool turning the computer on to start the online learning without reading the workbook. It has to be recognised that, the participants were from a wider range of practice settings including mental health services and overall had more queries.

As with the previous cycle, in each of the workshops, the participants were asked to complete the survey. However, as the session began, the researcher sensed that they were eager to get through the workshop as quickly as possible so that they could go on to attend their Christmas event. The researcher sensed that the initial enthusiasm detected may well have been from the desire to start and complete the programme as rapidly as they could, as opposed to eagerness to complete the online learning. As soon as they started the challenge of the small size of the venue became apparent, as the 12 participants all had to sit close to each other. Partly because of the numbers and the apparent closeness of the group, it was much noisier than the previous workshops, and participants were constantly talking to one another or speaking out

loud as they worked through the activities which was distracting for those who were trying to concentrate on the online learning.

As had happened previously, the issue of not being able to access all of the resources became apparent and the researcher decided to ask the IT staff if they could be of assistance, especially as the central IT has confirmed the systems suitability. They came into the room and advised that if everyone downloaded Google Chrome they would be able to access the resources. However, they advised that it could not be saved as the browser, as this was not allowed by the Trusts. All participants managed to access Google Chrome which did enable them to access the resources namely, policies, procedures and NICE guidelines.

The biggest frustration expressed by participants was in not being able to turn off, log back into the computer without starting from the beginning again, as was evident from the discussions the researcher could hear. On this occasion a quick guide to help with navigation was provided at the start of the workshop and the attendees were told to ignore the awards. In respect of the resources the participants were advised of how many there were to be found, and how to access them, with, to some extent less emphasis placed on the rank ordering. The afternoon workshop had fewer in attendance, was quieter and there was no sense of the distraction found during the first workshop. This time because Google Chrome had been downloaded the participants progression through the activities was easier, and two of them completed all activities. However, they were not awarded a certificate because some of the decisions were not in the correct rank order, which was a cause of frustration and disappointment, particularly as they had not be able to review and revise these decisions.

The focus group took place once the online learning package was completed and as with Action Research Cycle 2 each focus group discussion, using the same questions as had been used in the previous cycle, namely:

- How useful the workbook had been and how it could be improved?
- Was it easy to use?
- Has your knowledge of assessing an individual's risk of developing pressure ulcers improved/been refreshed?

- Having completed this programme would you be happy to undertake online learning in the future?

- If you have tried online learning before was this time better or words and why?

- Would you recommend this programme to your colleagues?

- Is there anything else you want to say?

10.3.4   Results of the workshop

10.3.4.1   The Survey Data

As with the previous action research cycle, the survey data was analysed, and compared with the baseline data. Therefore, the same decision was made for the data from these participants, and only essential comments regarding key points such as the use of assessment tools and previous education and training would be presented in this section. The data from this action research cycle was carried forward to complete a summative comparative analysis, which would inform any further changes needed for the final TELT, and to support the development of the conceptual framework. Therefore, as before, only the qualitative analysis has been presented in detail.

Table 24: Details of participants attending the workshops.

Participants	Numbers
Professional Background	
Mental health services	9
Community health services	5
Occupational health	1
Not disclosed	1
Palliative care	3
Total number of participants	**19**
Age range	
21-40	**9**
41-65	**9**
Not disclosed	**1**
Previous experience of online education and training	**9**

Table 25: Key findings in pressure ulcer care

Participants	Numbers
Education and training in pressure ulcer care	
Previously completed. No response	14 5
Use of risk assessment tools	
Waterlow risk assessment tool Number using the tool. Confident in its use	 12 9
MUST nutritional assessment tool. Number using the tool. Confident in its use	 12 12
Pressure ulcer grading tool e.g., EPUAP Number using the tool	 14
Not using a pressure grading tool	5

10.3.4.2   Qualitative data analysis

As with the previous action research cycle, framework analysis, as discussed in chapter 6, was utilised to analyse the focus group data with data initially coded thus enabling the emergence of categories. In essence this meant that any comments that had similar connotations and were repeated or where there was seen to be a conceptual relationship were grouped into categories as part of the data collection for action research cycle 2.

10.3.4.2.1   Findings from the Focus Group Discussions

This time the data from the two workshops was combined before analysis began and as table 26 revealed, the findings from these workshops were remarkably similar to those of the first group, and therefore it was possible to use similar codes, and the refine these into the existing categories. Therefore, it is the results of the second focussed analysis that has been tabulate below.

Table 26: Qualitative Data Analysis - Action Research Cycle 2

Quotes from the written open responses	2nd Description/ thoughts and perceptions	Review and refinement	Categories
"enjoyed it … much better than sitting through PowerPoints	**Positive experience Motivating and engaging**	**Engaging and motivating**	**Participants perceptions**
It was relatively easy to use but there is a need to think logically – things not necessarily in the right order to facilitate this.	**Problems with technology affecting learning**	**Technology and usability**	**Online Learning – accessibility and usability**
Couldn't navigate the programme which hampered engaging.	**Problems with technology affecting learning**	**Technology and usability**	**Online Learning – accessibility and usability**
Disappointing as couldn't always make it work for me	**Problems with technology affecting learning.**	**Technology and usability**	
I was interested in them [risk assessment tools because of other patient assessments I undertake	**Encourages learning new content**	**Positive learning**	**Participants perceptions**
"Having a real person keeps you engaged with the learning"	**Appropriate way to learn - closer to clinical practice.**	**Positive learning**	
Difficult to work athome only one pc and one ipad for everyone	**Access to internet**	**Access**	**Online Learning – accessibility and usability**
I don't mind online learning when someone is presenting but find accessing it on my own quite difficult	**Need help with accessing and using online learning.**	**Access**	
Want better and clearer images	**Wanted more resources.**	**Resources**	**Online Learning – accessibility and usability**
Wanted risk assessments on line.	**Access to resources**	**Resources**	
Couldn't open the resources	**Access to resources**	**Resources**	

10.3.4.2.2 The Online Learning Tool – Accessibility and Usability

As with the previous research cycle the majority of participants had been able to access the online learning tool. However, in this cycle some of the participants had

found the order of activities different to the way they worked in practice. For them this had made it difficult to work out the decisions and how they linked together.

P1:   "It was relatively easy to use but there is a need to think logically – things not necessarily in the right order to facilitate this".

This was an important point, as this was a tailormade programme for the commissioning Trusts and it was important that the activities fitted well within the Trusts policies. Exploring this comment with other participants it was not clear if this was just an individual comment, partly due to working with an unfamiliar programme, or if the order of activities was a problem. One or two others did express the view that the order of activities had been fixed in the programme and sometimes in practice they had to adapt what they did. However, the participants had accepted that as it did cover all aspects, and this was a simulation all they need to do was check all the steps were covered. Nevertheless, this issue did need to be considered, and if necessary, the order of activities reviewed with the originator and technology experts.

One other difference regarding access to the programme for this group was that some were happy to engage with the programme with colleagues, but reported that:

P4   "If I had been on my own I would have found using the tool difficult but luckily my colleagues helped me".

This was interesting as the programme had been developed with individual access in mind, but there is evidence that computer literacy among nurses varies (NHS Digital, 2020) and therefore until this has been addressed, and tutorials offered, support may need to be available when the programme is undertaken in Trusts premises, or a more detailed online instructional guide provided. Others had struggled with access and had had to be helped by the researcher to access the varying screen and activities, and for this group it was evident that they had appreciated the support and would be happy to continue with online learning, but only if someone was there to guide them.

P5   "I don't mind online learning when someone is presenting but find accessing it on my own quite difficult".

Again, this reinforces the need for tutorial support, but also suggests that for this new programme to be used effectively it may be necessary for, at least the first few cohorts to be supported by a member of the Trusts practice development team / educators. They would of course be supported by BCU, but ultimately need to totally on their own to run the programme.

Challenges with navigating around the tool to access resources to facilitate the decision making activities was again problematic for some, particularly when trying to use the workbook at the same time. This group also had members who:

P1: *"Spent a lot of time navigating".*

However, others felt that the Quick Reference Guide was particularly useful and made navigating through the tool easier, but nevertheless, overall, there were comments expressing their disappointment in not being able to easily work through the activities and gain the expected information.

P2: "Not easy to use and was quite frustrating – was disappointed"

One or two had a more radical take on the programme, they wanted it to be more responsive to their needs, and more flexible to use with the idea that, if that happened there would be:

P1: "…no need for the workbook"

As with the previous workshops, many of the participants expressed the desire to be able to go in and out of the tool and wanted to be able to restart where they had stopped. The idea of having to restart from the beginning every time they had to stop their learning activities was not well received and seen as a negative aspect of the programme affecting their willingness to engage with the TELT.

Another similarity with the previous participants, was the challenge of trying to work and study, with some reporting that they felt it was difficult to access online learning at work because the practicalities of their clinical role that would always overtake the need to take time out to study.

> P7:   *"Accessing online learning is particularly difficult at work"*

They were not happy to leave colleagues trying to cover the activities they "*stepped out*" from, and thus having to cope with an increased workload albeit temporarily. They too reported that their home commitments made it difficult to complete online learning at home, for two reasons. At the end of a busy day, they were very tired and did not have the energy to start to study, whilst also dealing with family concerns. In addition, for some their PC and internet had to be shared with the whole family and gaining the extended period of time for this programme would be difficult, particularly as they could not stop and start again where they left off.

> P8:   *We only have one computer at home and one I pad so we are all constantly competing for access"*

This meant that every time they were interrupted by a home activity, or it was someone else's "*turn at the pc*" they would be in the position of having to begin the whole process again, leaving them a vision of never actually finishing the programme. Further, some argued that if employers wanted staff to undertake online learning they should allocated them the time and where necessary equipment to do so at work, and they should not expect staff to do all their studying at home because there is no time in the working day. They accepted that where that had asked to go on a programme they would need to use some of their own time:

> P1:   *"I don't mind doing work at home when it's something I have asked to do e.g., a CPD module"*

However, they saw this as entirely different to mandatory training and updating with the Trusts own education and training programmes.

The one allied healthcare professional was also disappointed with the inability to go back to specific points. This process of pressure ulcer risk assessment was new for her, and she wanted to be able to go back into the online learning tool and download some material while at the same time having access to hard copies of the assessment

tools so that that she could complete then offline. She then wanted to be able and insert the answers on online to see if her answers were correct.

10.3.4.2.3 The participants perceptions of this approach to learning in the context of the assessment of an individual's risk of developing pressure ulcers.

There was a difference between these participants and the previous group, as here they were relatively evenly divided, with only 9, half the group, having had any experience of online learning. This may, in part, be why this time there were more participants who were only happy to engage with online learning if they had help and support. The time spent trying to navigate through the tool and learning how to access the various screens to undertake all the activities was seen as frustrating. For these participants still struggling to use the programme it was difficult to assess the extent to which they had been able to see any impact from the programme on their practice. However, there were positive comment made during the focus groups, with this time the majority commenting that.

P3:   *"Having a real person keeps you engaged with the learning".*
and
P3:   *"It was refreshing to have a patient at the centre of the online learning, much better than previous experience of sitting though power point slides ... which is what you usually get…"*

The patient based scenarios were welcomed, and it was interesting that both groups commented on how much they preferred being able to relate to a patient even though they were simulated, as against the more usual approach of Powerpoint lectures. Similar to those in the previous action research cycle, participants commented on how much easier it was to "*relate to"* what they saw as a practice setting. It was described as making the learning "*more real* "and engaging, one of the motivating factors for learning that had led to the Trusts preference for this approach.

Nevertheless, in this cycle, for the first time there was a participant who volunteered that they did not really like using online learning, for them to enjoy the learning experience they wanted to be with their peers and an educator.

P10: *"I like to learn face to face as I enjoy the social interaction. I get bored easily and like to discuss things with colleagues".*

It had been hoped that the way in which the programme had been developed with its range of interactive processes, would have helped to reduce the risk of boredom. However, for this participant, the interaction with the educator was a key component of the learning experience, which no amount of interactivity could address. This is a perspective that has to be noted when planning CPD, as a mix of approaches with some online and some face to face teaching may be an appropriate solution.

The Occupational Therapist, the only allied health professional in attendance reported that prior to this workshop, she had never considered using pressure area, or nutritional risk assessment tools, having always relied on the nurses to complete them. However, having had the opportunity to study them while attending the workshop, she could now see the value of them and had wanted:

P9: *"to have been able to display the risk assessment tools and go back and forward to determine the risk score".*

She felt that had she been able to go "*backwards and forwards"* she would have been able to gain a better understanding of their use in practice. As with the previous workshop, she had also wanted copies of each assessment tool, and it may be that as each group had requested this, copies could be made available in future workshops until such time as the technology could be completed online.

A final point that needed to be made was that overall, the feedback from the mental health services staff did not vary from that of the general nurses, but this may because the changing demographics mean that increasingly, nurses from that sector are taking on the role of caring for vulnerable patients who may well be at risk of developing pressure sores.

10.3.4.2.4   Summary

In summary, as the findings above demonstrate, the comments from participants in action research cycle workshop 3 were remarkably similar to those of action research cycle 2. The positive comments continued, and the presence of a "real" person with the scenario who could actually answer questions made it seem "*much more real*" and closer to the practice setting. By having both acute and community scenarios enable the participants to link it to their own specific settings. For those who had previous experience of online learning, this programme was seen as much more engaging.

Participants were pleased to have been advised how many resources they were looking for and that there was no need to consider the awards. However, as with the previous groups, they were not able to complete the tool as whilst they might have identified all of the learning resources they did not necessarily get them in the correct order. They were disappointed as this meant their completions were not seen as successful and they could not be awarded a Certificate of Completion.

It seemed that whilst there were positive outcomes, some of the challenges remained. The participant's responses together with the researcher's field notes complimented one another, however, the researcher felt that there needed to be headphones for each of the attendees so they could concentrate on the learning and not be distracted by others. When this was suggested in the focus groups, the agreement was unanimous. Further, it has to be noted that the researcher also thought that a group of those in attendance in the morning did not really engage as they might have, seemingly distracted by the thought of their imminent Christmas lunch.

The main challenges were:

- not being able to display the Waterlow and MUST assessment tools on the screen to facilitate their completion and inform decision making.
- not being able to complete the overall tool as resources identified were not necessarily done so in the rank order.
- not being able to go back to the online learning tool and restart where they left off was disappointing and off putting.

Therefore, again, whilst there was some positive feedback regarding the online learning, the associated challenges with its use had had a negative impact for the participants in terms of their learning experience resulting in them not being able to maximise the learning opportunities available to them.

10.3.5   Stage 3 Reflect

It was important to reflect on the results to inform the final Action Research Cycle 4, the pilot of the TELT which was planned for when the originator and technology experts had been able to complete some modifications to the programme that had arisen from the feedback from the action research cycles to date.

Reflecting on the analysis of the data from both cycles it was evident that the findings were similar, the only differences were:

- Firstly, the participants were able to access the resources embedded in the technology enhanced learning tool, facilitated by enabling those in attendance to access Google Chrome.
- Secondly, the use of the Quick Reference Guide to facilitate navigation was found to be useful by some participants.
- Thirdly, prior to starting the programme the participants were informed of the number of resources that needed to be accessed.

The inability to correct the ranking given to decisions, made it impossible for participants to complete and achieve their Certificates of Completion, had affected participants in both action research cycle, and each time it had led to phrases such as disappointing and frustrating. This issue certainly needed to be discussed with the BCU team to secure the required alterations to the tool to be made if this was possible. Further, it had to be acknowledged that it would not be possible to resolve all of the other issues identified in both research workshops until the online platform utilised for the technology enhanced learning tool was updated. The researchers' field notes were reflective of the findings from the focus groups, however, the issue of noise and being distracted through the participants talking with one another was something that could be resolved and as a result, the researcher decided to make headphones available during the next action research cycle workshop. Further, the Quick Reference Guide

would be given to participants at the start of the workshop, hard copies of the Waterlow and MUST assessment tools would also be made available for participants.

10.3.6 Summary

In summary, the findings of the workshops were discussed with staff from the commissioning Trusts, and they were informed that the changes necessary to make the tool more user friendly, and intuitive, as well as modifications to enable individuals to be able to log off and back on resuming where they left off were being developed. It was then agreed that the pilot should proceed as measures could be put in place to resolve all the issues except logging on, off and back on again to be able to resume where the individual had left off. It was recognised that the Technology Team were working on this development and would make it available as soon as possible. The next research workshop would be the final trial of the programme and was designated as the official pilot for the online learning tool.

10.4 Action Research Cycle 4 – The Pilot

10.4.1 Stage 1 Plan

The planning stage of this cycles followed the process as for cycles two and three with the Trusts education department arranging the venue and identifying the participants to attend, or participants asked the education department if they could attend. Details of the venue and the participants expected to attend were emailed to the researcher who then made sure that the correct number of information sheets, survey questionnaires and workbooks, were available. Again, as with cycle three, additional information sheets, workbooks and surveys were taken in case more participants attended than had been expected. As this research workshop was the pilot for the roll out of the technology enhanced online learning tool across the health economy it was essential that the researcher checked carefully that all of the learning from the preceding Action Research Cycles were reflected in the pilot.

A key difference for the pilot, was that this time, all participants would be issued with headphones. Given the noise experienced during the second workshop, and the distraction this had caused, these were seen as essential. In addition to the

workbooks, participants now had access to the Quick Reference Guide which made the navigating the programme much easier. Further, in addition to identifying the number of resources there were for individuals to access, a checklist was also made available, not to be given to the participants, but for the researcher to check with the participants that they had been able to access resources and could progress to completing the online learning.

Another addition was that following the requests from both cycles two and three, hard copies of the Waterlow and MUST risk assessment tools were also made ready to take to the venue. The final change was that given the issues with accessing resources in previous cycles, prior to the workshop the researcher contacted the venue manager and asked if it would be possible to download Google Chrome onto the computers in preparation for the Workshop. Thankfully, they said yes and did so before the researcher arrived at the venue.

10.4.2   Stage 2 Act and Observe

10.4.3   Memos and Notes

The venue for this final cycle was much better than that provided in cycle 3, it was situated within a relatively large community hospital which has a modern education centre, and they had arranged for this to be the venue for the workshop. The researcher arrived early to meet with the staff to make sure that Google Chrome had been downloaded on all the machines. To check there were no problems both the researcher and the IT manager based in the centre, accessed the learning tool and were able to open the resources. The Workbook, Quick Reference Guide, Waterlow and MUST assessment tools were placed by each desk in readiness for the participants' arrival.

It was interesting to see that the IT manager actually worked through the online learning package and even more interestingly was able to access all of the resources and make some of the decisions many of which were correct. When this was discussed with her at the end of the workshop, she said she was interested as she had previously cared for her elderly father who had developed a pressure ulcer shortly before he died in a care home. Further, she had been involved in organising Trust study sessions on

pressure ulcer development and prevention, and that had increased her knowledge, understanding and interest in the topic.

As with previous cycles, two workshops had been planned, one for the morning and one for the afternoon. Unfortunately, the numbers were much smaller than had been planned, as a number of those scheduled to attend had been unable to do so as a result of sickness amongst colleagues. In total, there were 5 participants for the morning session and 2 in the afternoon, however, the researcher noted that the education centre administrator also attended and also accessed the online learning in the same way that the IT manager had. Her reason for doing so was quite different, when asked why, she stated that she liked to have an understanding of what the staff would be doing. Also, she was interested in the tool given the feedback from those who had completed the workshop in the morning. All of the 7 attendees were female. Their ages were 31 to 55 with 4 in the 41-50 range. 5 were from community services and 2 from mental health with 4 registered nurses and three health care support workers.

On entering the venue, the participants all sat together despite it being a large room. They were advised of the purpose of the workshop, including the completion of the survey and directed to the Workbook, Quick Reference Guide, Waterlow and MUST assessment tools with an explanation of each provided by the researcher. They were asked to complete the survey if they were happy to, and, once this had been completed by all participants, they were collected by the IT manager. The attendees were then asked to put on the headphones and follow the guidance in the Workbook/Quick Reference Guide. The researcher noted that the participants fully engaged with accessing the online learning and did not talk to one another, rather working through the learning tool.

As Google Chrome was already set up on the computers the participants only needed to follow the instructions to log on to the online learning. It was quickly apparent that they were able to access the resources available and these together with the Quick Reference Guide and the hard copies of the assessment tools assisted them with following the programme and engaging in decision making regarding the patient in the simulation exercise. Observing the workshop as it progressed, it was evident that unlike the other action research cycles this group, albeit small, appeared to really

engage with the online learning only asking for assistance as required. Interestingly in these workshops the researcher played a more active role, discussing the resources with the group when necessary and relating them to decision making skills.

There was no talking between the group members and all of them were able to access all of the decisions required but as with previous workshops, not necessarily in the right order. In addition, some reported that apart from introducing themselves and washing their hands they wouldn't necessarily do things in the order suggested but would use their own judgement to determine the way in which they would assess their patient. This had not featured significantly in the other two action research cycles.

The afternoon participants were one district nursing sister and one health care support worker who both engaged with the online learning and even though there was only two of them they did use the headphones provided. As on previous occasions the focus group took place once the online learning package was completed and as with the previous cycles each focus group discussion included the following questions:

- How useful the workbook had been and how it could be improved?
- Was it easy to use?
- Has your knowledge of assessing an individual's risk of developing pressure ulcers improved/been refreshed?
- Having completed this programme would you be happy to undertake online learning in the future?
- If you have tried online learning before was this time better or words and why?
- Would you recommend this programme to your colleagues?
- Is there anything else you want to say?

10.4.4 Results from the workshop

10.4.4.1 The Survey Data

As with both previous action research cycles, the survey data was analysed, and compared with the baseline data, but this time the numbers were small, with an overall total of seven participants. Therefore, the same decision was made for the data from these participants, and only essential comments regarding key points such as the use of assessment tools and previous education and training would be presented in this

section. The data from this final action research cycle was carried forward to complete a summative comparative analysis, and to support the development the conceptual framework. Therefore, only the qualitative analysis has been presented in detail.

Table 27: Details of participants attending the workshops.

Participants	Numbers
Professional Background	
Mental health services (Nurses and HCA's)	2 *
Community health services (Nurses and HCA's)	5*
Nurses	4
Health care assistants	3
Total number of participants	**7**
Age range	
21- 40	**3**
41-65	**4**
Previous experience of online education and training	**4**

Note: Due to the small number of nurses and healthcare assistants were not differentiated by professional background for this table as this could have led to the identification of individuals participating.

Table 28: Key findings for the Education and Training in pressure ulcer care

Participants	Numbers
Education and training in pressure ulcer care	
Previously completed.	**5**
No response	**1**
Use of risk assessment tools	
Waterlow risk assessment tool	
Number using the tool.	**6**
Competent in its use	**4**
MUST nutritional assessment tool.	
Number using the tool.	**5**
Confident in its use	**5**
Pressure ulcer grading tool EPUAP.	
Number using the tool	**5**
Not using a pressure grading tool	
Number	**5**

10.4.4.2 Findings from the Focus Group Interviews

In this Pilot, as with the previous action research cycles, the same two overarching categories emerged. Therefore, as with action research cycle 2 it is the results of the second focussed analysis that has been tabulate below.

Table 29: Data Analysis

Comment	2nd Description/thoughts and perceptions	Refine and refinement	Categories
I don't really like online learning, but I enjoyed this because it was a real person in the scenario and having the earphones meant that I didn't get distracted"	**Positive experience Motivating and engaging**	**Engaging and motivating** **Positive experience**	**Participant perceptions**
"It was useful having the researcher present as they were able to assist with making the decisions and to ensure all resources were accessed	**Positive learning experience**		
Need to be able to go in and out of the tool	**Problems with technology affecting learning**	**Technology and usability**	**Online Tool - accessibility and usability**
It was frustrating that the online learning wasn't clearer to navigate	**Problems with technology affecting learning**		
Would be useful for colleagues in the clinical area	**Encourages learning**	**Positive learning**	**Participant perceptions**
The learning made me really think as I had to look for resources to aid in my decision making"	**Encourages learning new content**		
"Good to be away from the workplace so can concentrate"	**Appropriate way to learn closer to clinical practice**		
Very difficult to access the internet at work	**Access to internet**	**Access to internet**	**Online Tool - accessibility and usability**
Accessing online learning at work is difficult as we don't have many computers available, and time is limited unless built into the working day.	**Access to online learning**		
Resources were very helpful	**Access to resources**	**Access to resources**	**Online Tool - accessibility and usability**
Ability to access the assessment tools online with the form being visible alongside the sections where decisions are required to aid decision making	**Access to resources**		
"Instructions could have been clearer"	**Access to resources**		

10.4.4.3   The Online Learning Tool – Accessibility and Usability

The findings from the small group who completed the pilot were very similar to those from the other action research cycles, and therefore there was inevitably some duplication in the quotes, and the same codes and categories informed the themes. As with research cycles 2 and 3, the majority of participants liked using the online learning too, and for one participant, who had previously tried online learning this workshop was much more enjoyable:

P2:   *"I don't really like online learning, but I enjoyed this because it was a real person in the scenario and having the earphones meant that I didn't get distracted"*

For this participant and for others reporting similar perspectives, there were two important points. Firstly, as others had previously reported, the design of the programme around patient simulations made it much more interesting, particularly as the "*patient*" could speak and answer questions. The headphones too had been a success, enabling the participants to focus only on the programme. Interestingly in this cycle there was a different response to the need to go backwards and forwards through the tool to access the resources. For this participant:

P2:   *I enjoyed having to go back and forward through the tool to access the resources as it made me more aware of everything needed to assess and individual's risk of developing pressure ulcers."*

Possibly because this participant was used to online learning navigation around the programme had been easy and she had enjoyed the challenge of seeking for, and then opening the different resources. This supports the researchers view, that differing levels of computer literary impact on the extent to which learners benefit from the programme. For others in this small group, there was a need for support not only in navigating the tool, but in helping when they were unsure which decision to make:

P1:   *"It was useful having the researcher present as they were able to assist with making the decisions and to ensure all resources were accessed"*

This fits with the researchers suggestion that help, and guidance make a difference to the participants ability to utilise the programme effectively, indeed as another remarked:

P3:   "Once you get into it and learn how to access the resources can make the decisions"

The availability of headphones had been appreciated, and had supported concentration, it avoided distraction when participants had asked for help and totally removed the problem of noise and chatter that adversely affected the previous action research cycle:

P6:   "Having the earphones prevented me from getting distracted and talking to colleagues".

It is therefore suggested that for future use of the TELT, it would be appropriate to have headphones available for all participants. These can be removed when asking for help and guidance but enable the participants to focus only on their own learning needs and activities. This group appreciated the opportunity to leave their work setting for this CPD activity, appreciating the time to sit and study whilst still at work, something that previous groups had also commented on, arguing that it was important for Trusts to recognise their need to study in work time.

P5:   "Good to be away from the workplace so can concentrate"

However, a new point was made by the nurses who were from the community settings. They pointed out that for them it was difficult to access online learning at work given that they were part of a small community team with limited access to computers or time to complete during the working day.

P4:   "Accessing online learning at work is difficult as we don't have many computers in the community available and time is limited unless built into the working day".

However, they felt if a way could be found for them to be allocated the time and equipment, through careful team work to arrange cover for work, it might be possible to complete the TELT during the working day. As with the other participants, this would be preferable to completing the online learning at home given home commitments. There was a suggestion that it could be a useful tool for colleagues to complete especially those new to the community hospital/home environment and for students.

Whilst some of the quotes given above were positive, others offered comments about aspects of the programme that could be improved. These were very similar to those made previously, with the challenge of having to restart the whole programme whenever they stopped was seen as something that needed to change. Otherwise there were no new comments.

P2:   *"Having to go back into the learning and starting again is very annoying"*

Yet another matching perspective was made regarding the risk assessment tools, for this group hard copies were available, and this was appreciated, but nevertheless they would have preferred the tool to be online in a format that they could complete.

P3:   *"It would have been good to have had the assessment charts visible on the screen so they could be completed online to determine the patient's risk of developing pressure ulcers. It wasted time".*

As with comments from previous workshop participants, navigating the tool was a challenge and whilst they found the Quick Reference Guide useful and the hard copies of the assessment tools they felt it would have been better if the tool was more intuitive to lead the participant through it.

P2:   *"Time wasted in having to go back into the tool and not being able to start off where you left off. This was very annoying."*

However, others felt that having to search for resources to aid their decision making whilst time consuming had made them think more about the scenario they were studying, and reported that overall, the challenges had not hindered their learning.

10.4.4.4   The participants perceptions of this approach to learning in context of the assessment of an individual's risk of developing pressure ulcers.

Of this small group 5 had undertaken relevant education activity with only 1 advising that they had no previous education regarding pressure ulcers. This was a positive finding as 3 were healthcare support workers. 6 always or sometimes used a the Waterlow pressure ulcer risk assessment tool, however, only 4 felt competent in its use. MUST was used by 5 and they felt competent in its use, with 5 utilising EPUAP to determine the category of a pressure ulcer.

When the programme was being developed it had been recognised that increasingly health care support workers were taking more responsibility in pressure ulcer prevention and care, and in consequence a separate workbook had been developed for this group. One of the healthcare support workers advised that prior to attending the workshop her view had been that much of the work in this field was the province of the qualified nurses. However, having completed the programme, she had found it useful to gain more knowledge to understand what the qualified nurses were looking for.

P7:   *"As I am a healthcare support worker I don't get involved in some of the activities the qualified nurses have to do. However, I found it useful to have more understanding of what they are looking for and why".*

Clearly this workshop had extended her knowledge, and would support her in her future work, even if for much of the time she continued to access *"the charts completed by the nurses"* she will have a much better understanding of the assessment and prevention of pressure ulcers and may in time be able to extend her role further.

When asked about the content of the programme, again the comments matched those of previous groups, in that it had made them think more about the decision they made and had carefully looked for the resources and evidence to support their decision making. The use of a simulation that involved a patient was seen as a positive move forwards, and the fact that the patient could answer questions and interact with them made the simulations seem real and linked to the clinical setting.

One participant who had previously experience of online learning expressed the following view:

P3:   *"I preferred this online learning to other experiences of this as it had a patient that I could relate to as the focal point for the assessment."*

comparing the TELT to the way in which they were usually taught previously – "*death by Powerpoint but online".* A view shared by a colleague:

P1:   *"The online learning I have experienced before was just lots of power point slides, but this had a real patient involved."*

It was encouraging that overall, all the cycles had made positive comments, with the few who did not like online learning, from this group, only one reported that they did not like technology enhanced learning. This may in part be because of their level of computer skills and familiarity with this form of learning. However, it is an issue that needs to be considered, and every effort will be required to ensure the TELT is as user friendly as possible.

10.4.5 Stage 3 Reflect

Reflecting on the final cycles, it was evident that the trends identified in action research cycles 2 and 3 also featured in this cycle. However, overall, the workshop felt more positive with participants fully engaged in the process. The differences were:

Google Chrome was available at the outset of the workshop and as a result there were no issues identified by participants in respect of not being able to access the resources to aid decision making.

The use of the hard copy Waterlow and MUST assessment tools to aid decision making was deemed a useful addition to facilitate the determination of the risk assessment scores. Although it would have been preferable to complete these online.

Once the participants had identified all of the resources and had made all of the decisions, discussion took place to enable them to place their decisions in rank order so they could achieve the certificate. All bar one were able to gain their certificates

during the workshop. One of the attendees was unable to achieve this during the workshop, however, on her return to work, she accessed the online learning and achieved the certificate the same evening as the workshop took place.

The researchers' field notes were reflective of the findings from the first two action research workshops focus groups, however, the reflections on workshop four revealed groups who were clearly the most engaged of all the workshops. The use of headphones made a significant difference in the engagement of the groups as there were no distractions. This together with being able to access the resources to aid decision making and the hard copies of the assessment tools clearly enabled the participants to successfully complete the online learning achieving the associated certificate. The awards that had been part of the TELT at the outset of the action research cycles were ignored after action research cycle 1 and the intention was to remove this element from the final tool.

In summary, the findings from action research cycle workshop 4, the Pilot for future "roll out" identified very similar trends to the previous two action research cycles specifically:

- not being able to display the Waterlow and MUST assessment tools on the screen to facilitate their completion and inform decision making.
- not being able to complete the overall tool as decisions whilst made were not in the rank order.
- not being able to go back to the online learning tool and restart where the participant left off.

Despite these challenges participants liked the fact that there was a patient involved in the scenario making it more "real" and engaging. For some searching for resources to inform decision making was appreciated by many of the participants.

10.5 Comparison of Survey Data Sets

This survey was completed during every action research cycle, and while the numbers from each cycle are small, nevertheless comparisons across the cycles has been made for the issues in the survey, such as use of pressure ulcer grading tools, and risk assessment scores.

The original plan for the comparative data sets had been to use descriptive statistics but this proved difficult. The data sets were mainly nominal and ordinal, and therefore non-parametric tests such as chi square and spearman rank order correlation had been planned, but the small participant numbers in some of the later action research cycles (for example there were on two in the final workshop) meant that these tests were not always feasible. Where tests were carried out, no significance was found, and therefore a simple integrated description of the frequencies was completed, and the results are given below.

10.5.1 Numbers of participants attending each workshop

Although the numbers of participants attending each workshop was cited in the chapter results, it was seen as useful just to recapitulate the total numbers. As the Bar chart shoes, the baseline survey was by far the largest group were those who completed the baseline survey. Action research cycle has the smallest number, but this was due to potential participants have to cover for colleagues who were ill.

Figure 47: Participants
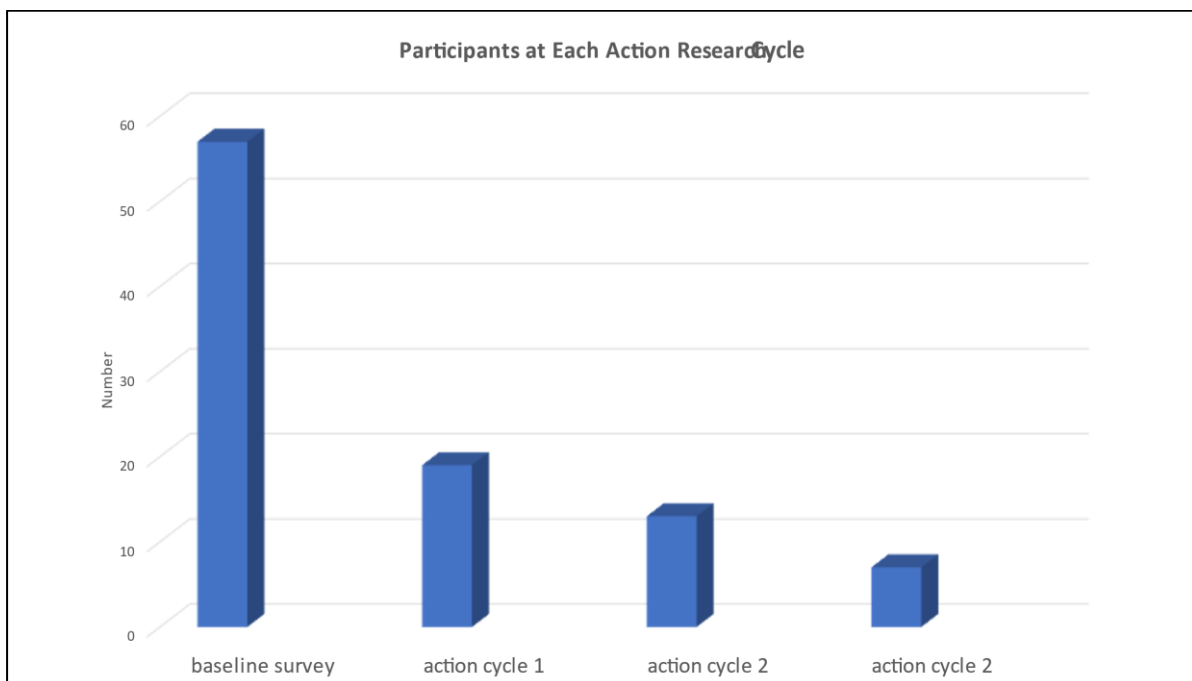
10.5.2 Gender

As figure 32 (below) indicates that nearly all of the participants were female. There were one or two male nurses, from mental health services who attended, and one of the Allied health Professionals; was male, but overall, the figures are representative of nursing, where the vast majority are female. When discussed with the commissioning Trusts they confirmed that most of their nursing workforce was female, thus the participants also represent the local workforce.

Figure 48: Gender of participants
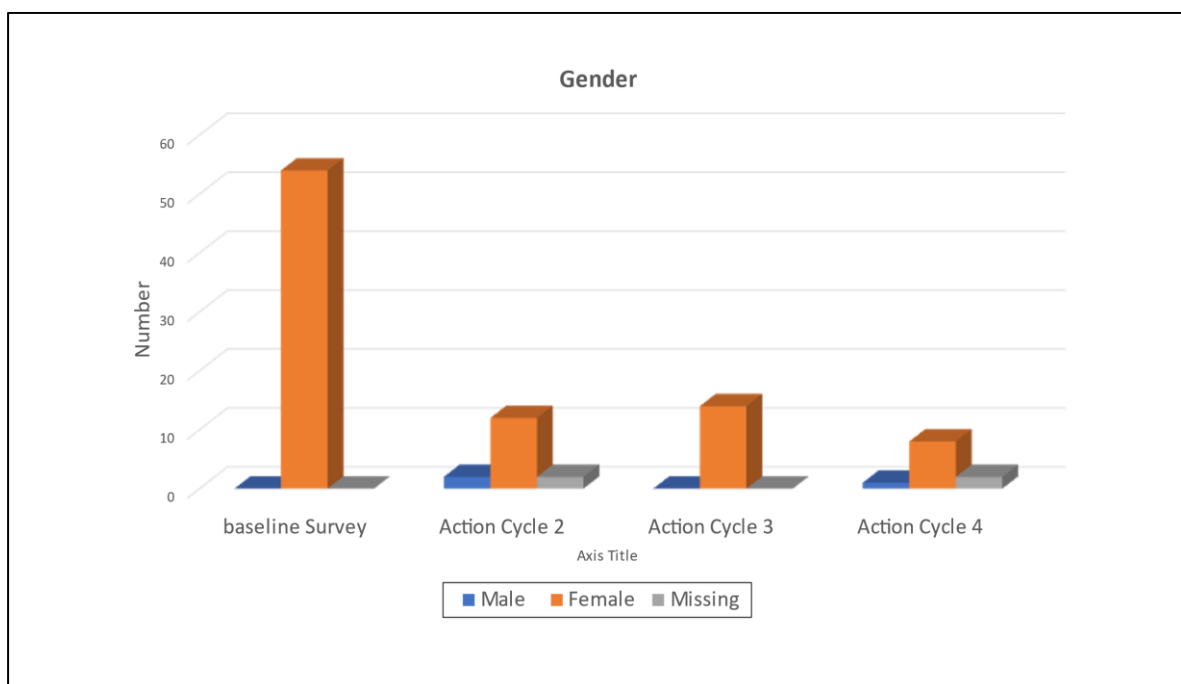
10.5.3 Age distribution

All participants were asked to give their age, and with the exception of three people, participants included their age.in the questionnaire. As Figure 33 indicates, participants came from aged 19 to those over 60 years old. There were few in the lower age range with the bulk of participants in the categories from 41 years to 60 years. Looking at these figures, if typical of the commissioning Trusts, considerable numbers of the workforce will retire in the next decade, this has implications for service provision.

Figure 49: Age distribution
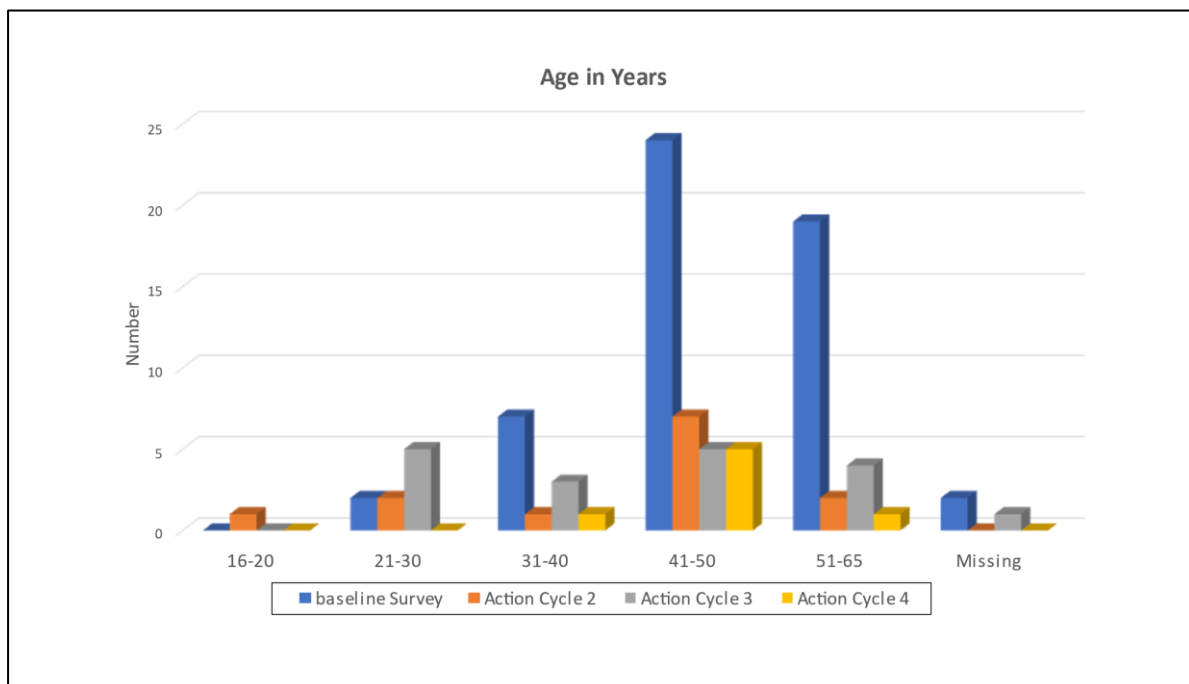
The commissioning Trusts were contacted, and they confirmed that much of their workforce is in the older age groups. This also has implications for online learning, with older staff less likely to have already encountered other form of technology enhanced learning. As this study found, on the whole those who needed help were from groups that had had little exposure. Similarly this were the participants who showed les computer literacy.

10.5.4   Workplace

All participants were asked to indicate the setting the normally worked within. Comparison of the data sets showed that all major commissioning Trusts were represented. However, the largest group of participants from all action research cycles came from the community.

Figure 50: Workplace setting for participants.
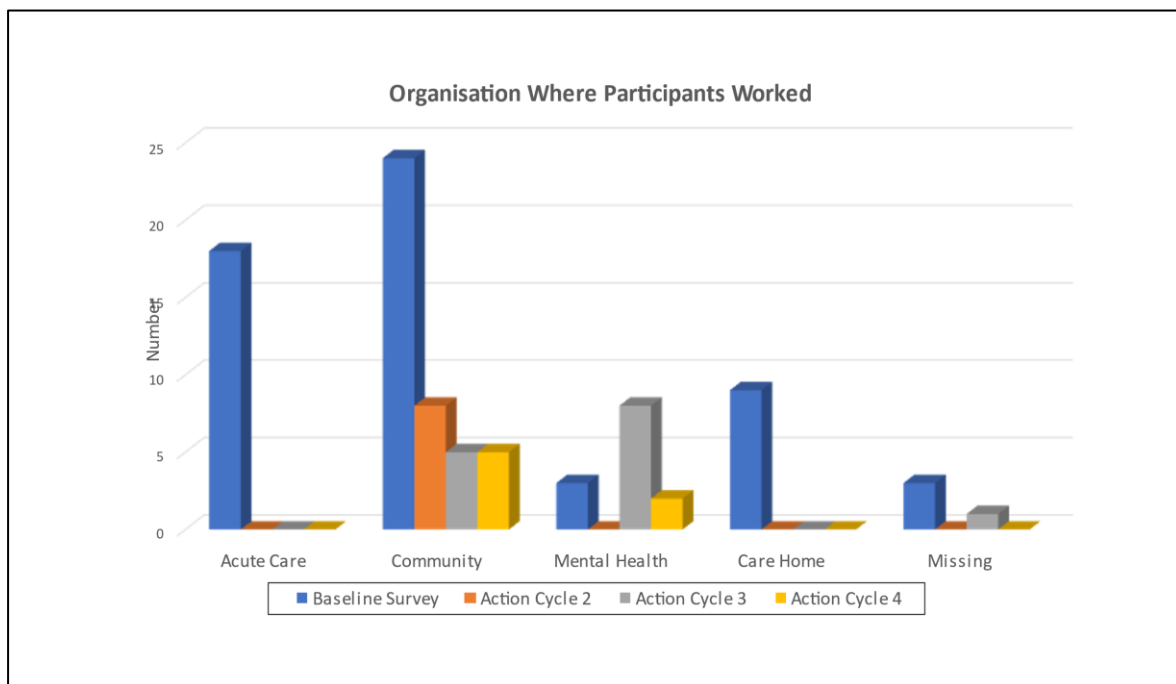
It was an important that when the comparisons were made, overall finding that those that completed the survey, did represent all sectors of the commissioning Trusts as the education tool that had been piloted had therefore been completed by representatives from all the key settings. This gave it an increased likelihood of being suitable for use by all sectors. Looking across all workshops the majority of participants were nurses in the community, which is appropriate, given that the majority of pressure ulcers are cared for in the community (Nixon et al, 2019).

10.5.5 Profession

Again the results were as expected, with by far the highest number being registered nurses, the group most likely to be dealing with patients with pressure ulcers. There was some interest from the Allied Health Professionals with a podiatrist, a physiotherapist and an occupational therapist choosing to attend. These three were at different workshops but nonetheless had the same reasons for attending, they wanted to know more about risk assessment and the tools used. Each reported that prior to the day they had not tended to carry out assessment, although they did use the nurses assessments when planning care. They wanted to know more about the assessment categories and each one wanted hard copies of the various tools so that they could

familiarise themselves. It may be that this will lead to them trying the assessments out, and making their own assessment, a small step towards consistency.

Figure 51: Profession
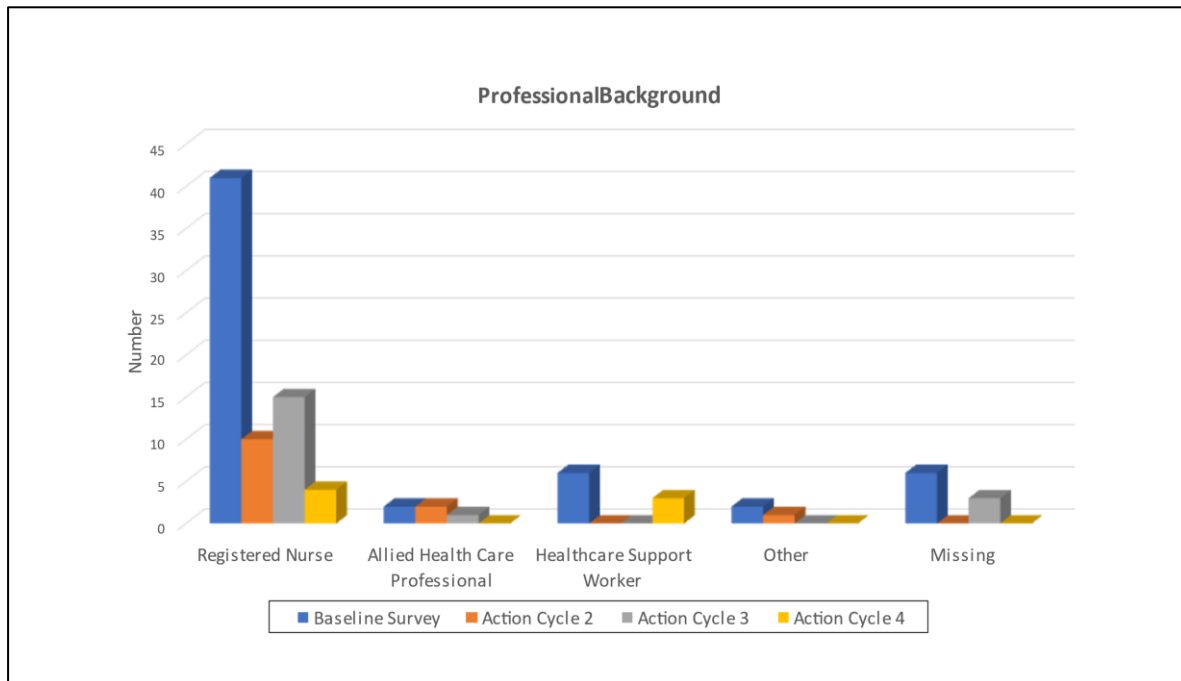
10.5.6 Online learning

Of importance for this study and for the long term use of the TELT, was the extent to which participants had had exposure to online learning, and whether they enjoyed technology based learning. Overall as figure 6 shows over half of the participants had tried online learning before, the comparative figures fit with the observations of the researcher, with several in each workshop that needed help and guidance, but that overall most seemed able to start the VCC and navigate the program.

For those with no previous exposure it has to be accepted that they will need more time to familiarise themselves with the programme. If time for acclimatisation is not allowed prior to starting the programme then they may need extra time.

Figure 52: Previous online learning
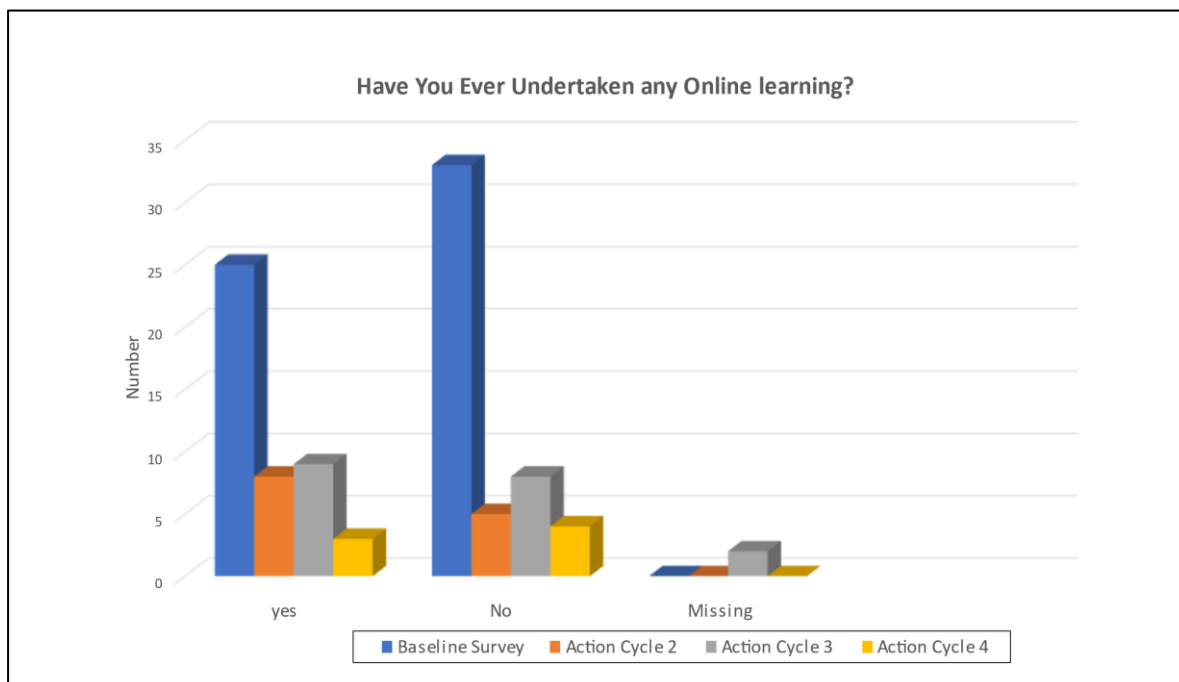
When asked if they had enjoyed this interactive approach to learning the response was overwhelmingly positive. They were asked if this learning experience had been more positive that previous experiences and for most the answer was in the affirmative but there was a small minority who did not like this form of teaching. Reasons for this included missing the interaction with the educator and with their peers, One or two, simply did not want to use the computer, one reporting that they quickly lost interest without the human contact, and the other just stating the *"I don't like it…"*

Figure 53: Enjoyment of online learning
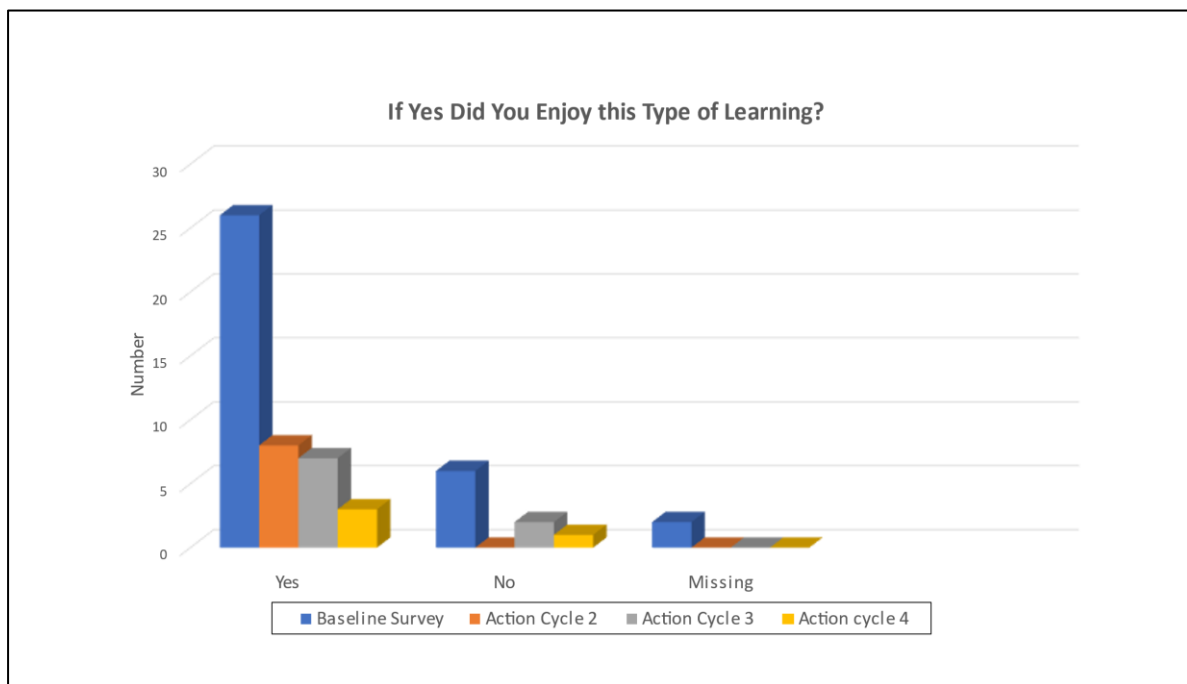
10.5.7   Pressure ulcer education

Participants were asked if they had previously undergone any education and training in pressure ulcer care, again for all groups the majority had had specialist pressure ulcer training, yet the Trusts, still has a major problem with the incidence and care of pressure ulcers. Hence their request for the TELT. These findings fit with the national and international situation where it seems that however much effort is made to address the problem, their incidence or prevalence does not reduce. However, as this study has revealed, there is little research into the effectiveness of education and training, the frequency of training or the assessment and maintenance of competence.

Figure 54: Previous pressure ulcer training
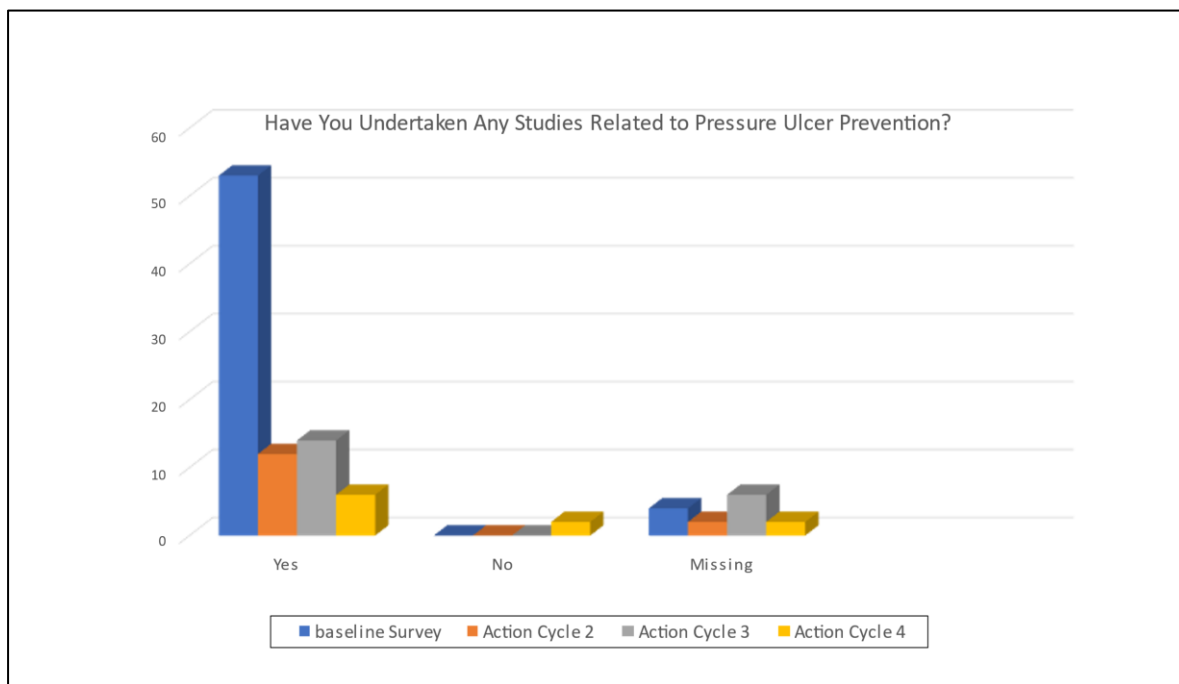
Participants were then asked if they used a pressure ulcer risk assessment tool, and if so which one. All reported use the Waterlow score, as this is the commissioning Trusts policy choice.

Figure 55: Use of a pressure ulcer risk assessment tool
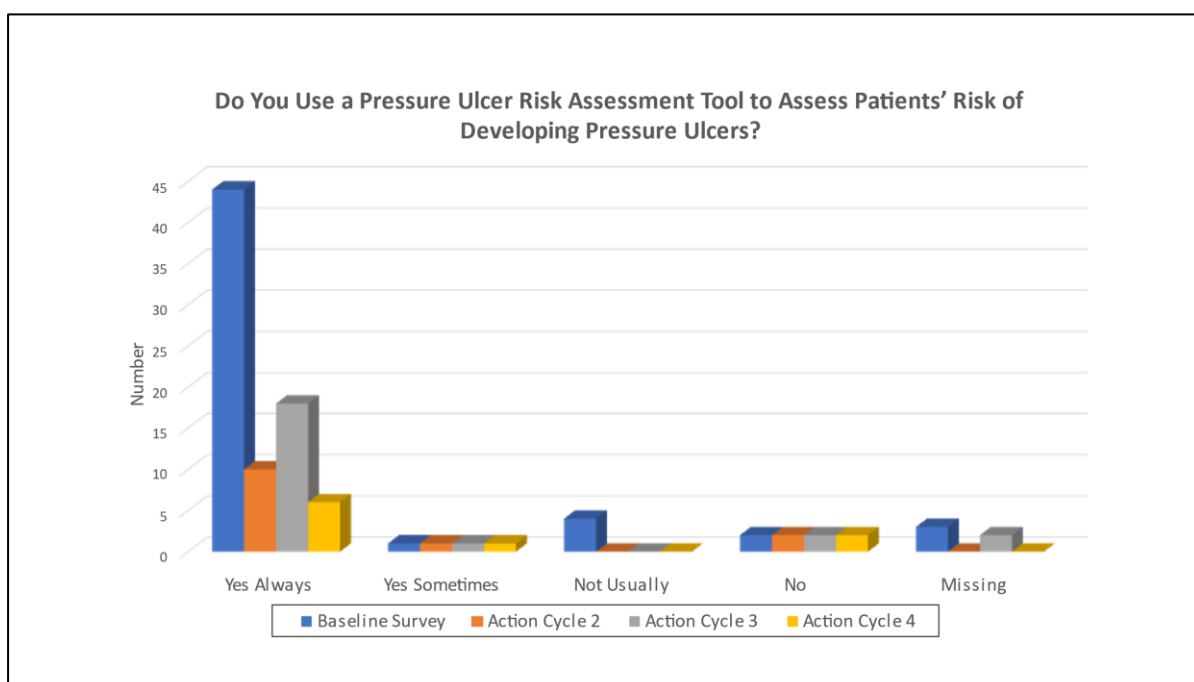
As figure 39 indicates the majority of participants in all cycles has reported that they did so, of the remained, some gave not response, but others opened admitted that they did not use one. This was a cause for concern, because accurate assessment is essential if the patient is to receive optimum care, but it was interesting of the several wanted hard copies of the Waterlow score, to be able to *"practice and then check their results with the programme"* Such comments were interesting as they indicated a willingness to continue to explore the use of the Waterlow score, and indeed two of the Allied health Professionals reported that they would *"consider using it "* an important move in the united efforts to address the challenge of pressure ulcers..

They were also asked if they felt competent to use the Waterlow score, but some of those who stated that they used the risk assessment, admitted that they did not feel competent when doing so. This is yet another cause for concern, because in accurate or inappropriate use of a risk assessment tool has two problems. Firstly, the patient does not receive optimum care, and indeed the risk of developing a pressure ulcer may be missed. Secondly, colleagues may assume that a full and effective assessment may have been made, and not themselves repeat the score, particularly when short staffed and overstretched.

Figure 56: Competence is used in the risk assessment tool.
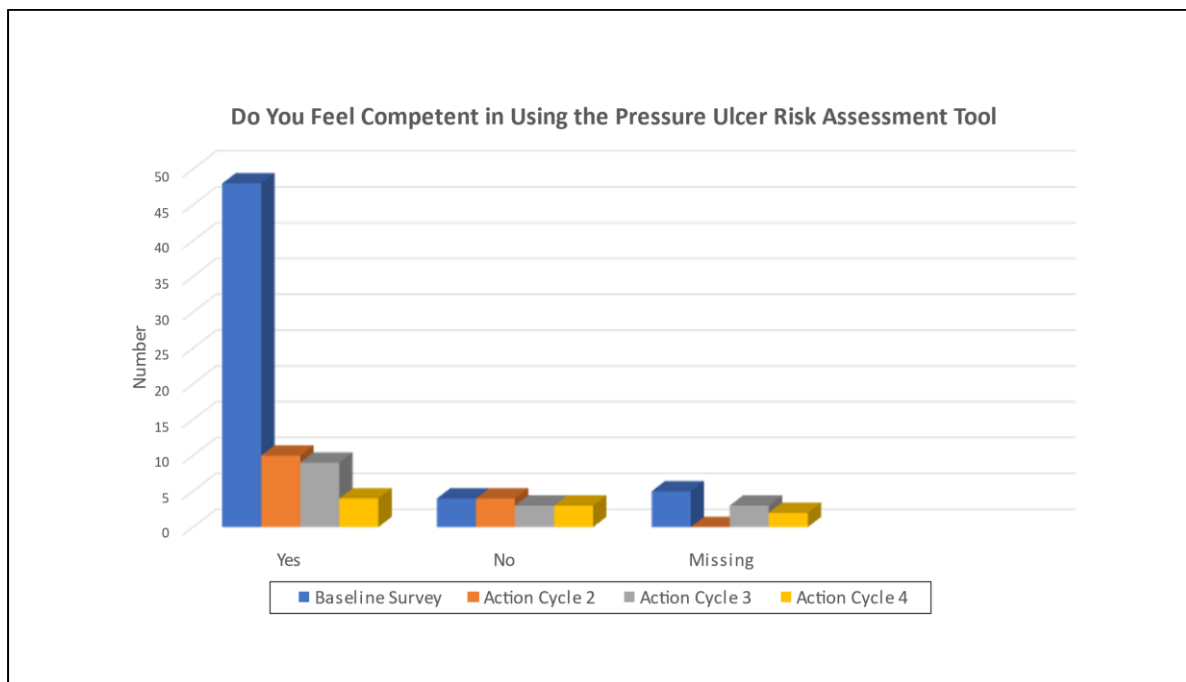
The Waterlow score, although important is not the only assessment measure that should be used when assessing a patient. The nutritional status should also be assessed, and the most usually used score for this, MUST is the most usually used assessment score. Therefore, participants were asked if the used this or any other nutritional assessment tool.

Figure 57: Use of a nutritional assessment tool
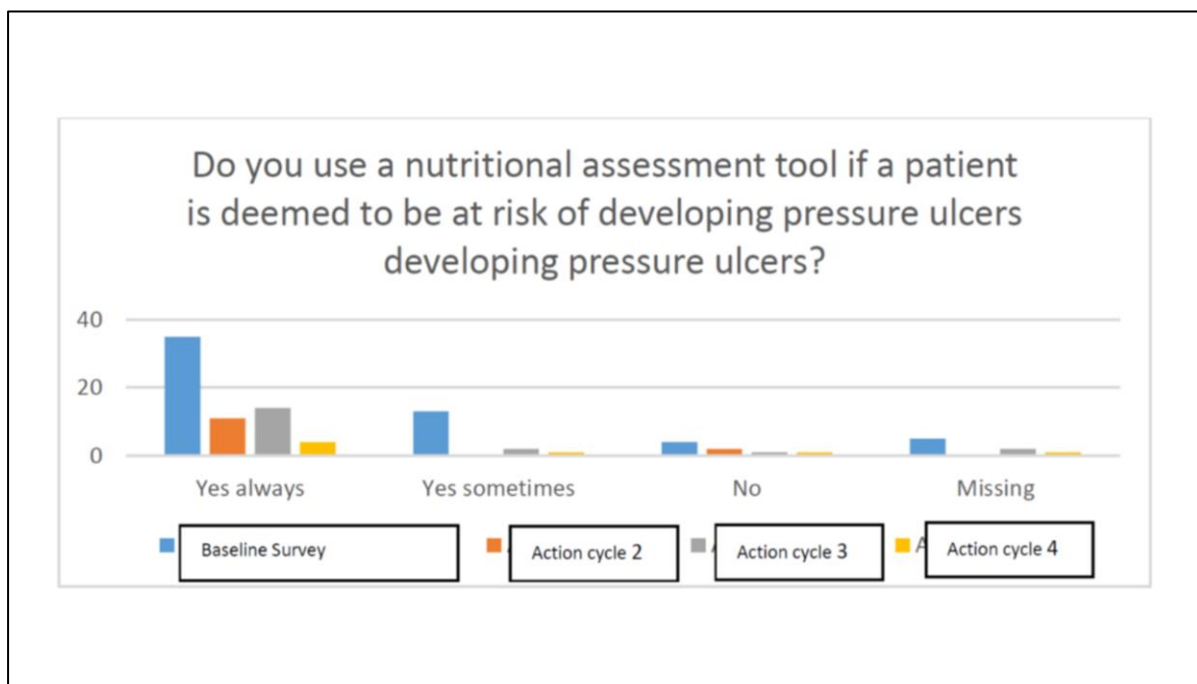
Here the figures were not so positive, most did report using the score, all or some of the time, but again there was a gap between numbers using the MUST, and those who felt competent to do so. Again, as with the Waterlow score, MUST has to be used effectively, or the mutational status will not be correctly assessment and therefore there may well no mitigation of the patient's risk.

Figure 58: Competence in using the MUST assessment score.
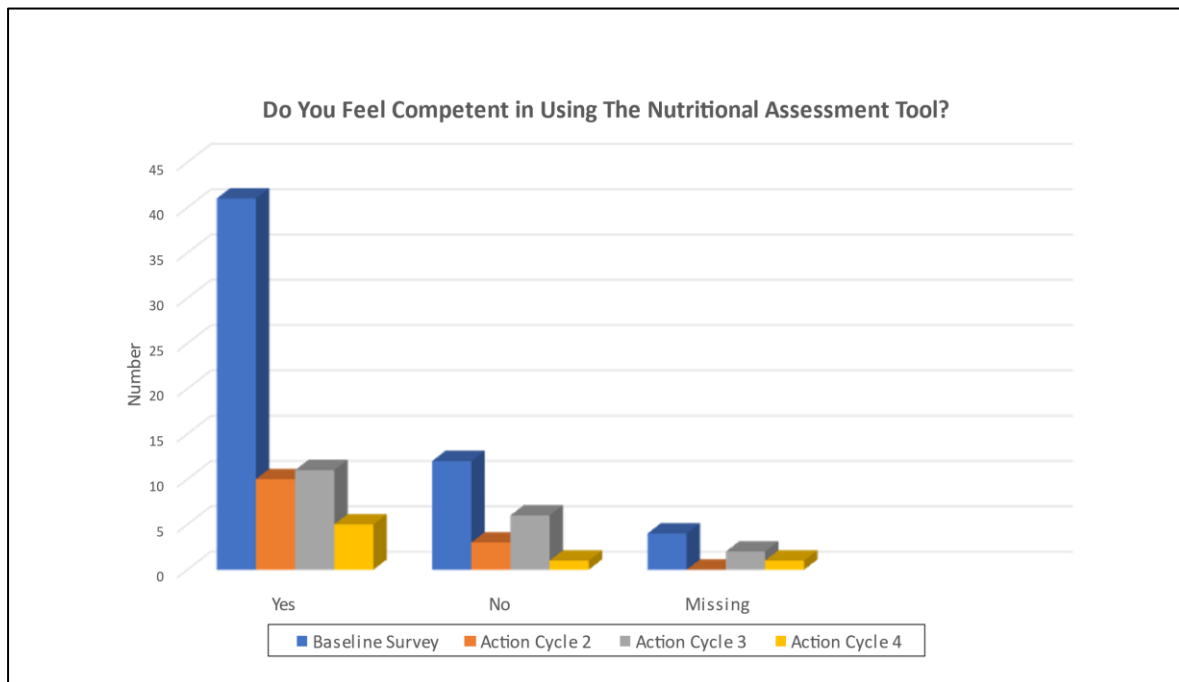
The final area for comparison was over the use of pressure ulcer grading tools, and again, most reported that they did use a grading toll, some if not all of the time, but in every workshop, there were some who used no tool at all.

Figure 59: Use of a pressure ulcer grading tool.
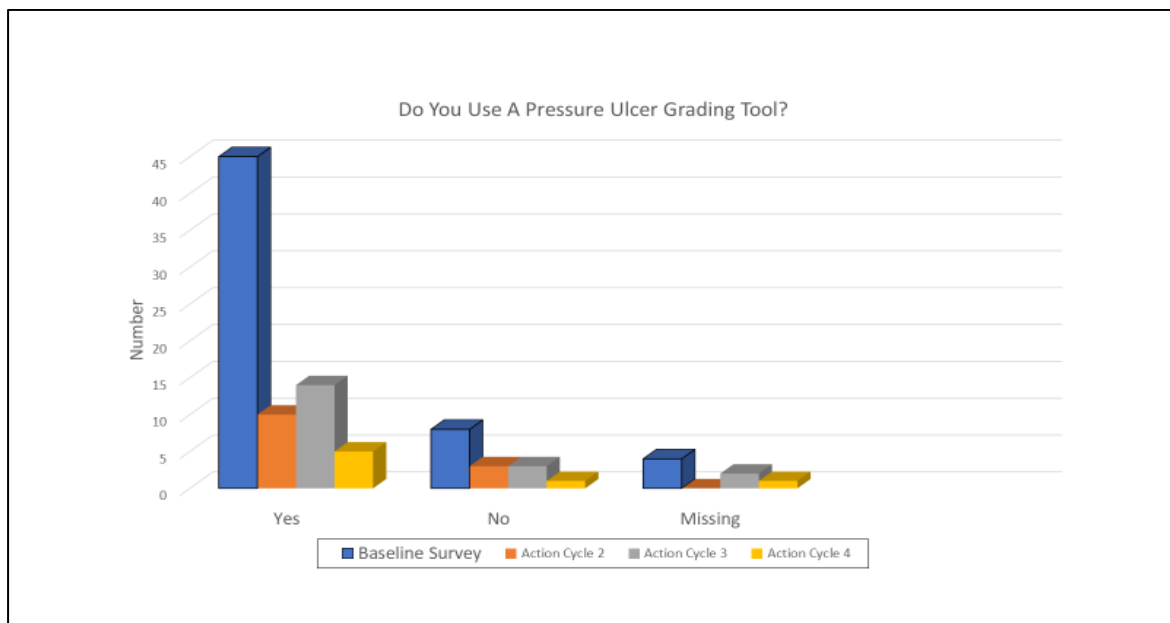
Overall, while it was reassuring that in all the cycles the majority of participants did use the assessment tools, the gap in competence meant that they may not always be used properly. It was unclear whether the lack of competence was due to never having been trained in their use, or having been trained, some time ago and the accurate techniques not retained.

Whichever factor is the cause, it does support the need for additional education and training and the establishment of a time frame to check competence. Only when all staff have been fully trained, and the care offered is consistent will there be any possibility of reducing the ongoing challenge of pressure ulcers.

10.6   Summary

In summary, the findings from the three action research cycles were very similar, with cycle 4 proving the most successful, given that all of the participants successfully completed the tool and were awarded a Certificate of Attendance. The challenges identified during the workshops were addressed and solutions put in place, where this was possible, to enhance the participant learning experience. However, whilst the TELT developed has many positive attributes it became clear that further modifications would be required to improve the tools usability specific to the target audience if it's to be successfully "rolled out" across the health economy to determine the impact on the reduction of pressure ulcers**.**

Chapter 11 Developing the Conceptual Framework – a new Model for Practice

11.1   Introduction

Reflecting on the findings as detailed in chapters 8, 9 and 10, it was evident that the key findings needed to be collated and used to support the development of a conceptual framework and a new model for nurses and allied healthcare professionals to use to increase their knowledge and practice in pressure ulcer prevention. Any Conceptual Framework or Model for Practice needs to be appropriate in context, and for this study, the framework needs to be in a format that can be embedded in practice, enabling practitioners to extend and develop their knowledge, skills and expertise while remaining within their practice setting. Further, given the government drive in respect of wound care, encompassing pressure ulcers, the model needs to align with the National Wound Care Strategy (2016) to be adopted by the NHS Trusts.

> "*The National Wound Care Strategy Programme was established to enable care that is organised and research-informed, to achieve improved healing rates, better experience of care, greater cost-effectiveness and prevent incidence and recurrence. Education forms a major part of this national programme with one of the aims to develop core capabilities for health and care practitioners that will both improve care and promote supported self-management.*"
>
> (NHS England and Improvement 2019)

The structure for the conceptual framework emerged from a combination of research, evidence, theories of adult learning and data analysis from the empirical data gathered in the first three cycles of action research and the subsequent action research pilot. The framework builds on the Virtual Case Creator, to develop a technology enhanced learning tool initially developed for the use of student healthcare professionals as part of an ongoing programme of learning. However, there is a major difference between pre-qualifying students and the target group for this new education approach. This group comprised adults, qualified healthcare professionals and non-qualified staff with a range of "professional" knowledge and skills relevant to their role. Therefore, it was necessary to move away from a pedagogical approach, and use the principles that underpin andragogical educational processes, as these recognise the specific learning

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needs of adult learners (Jarvis and Watts 2012, Illeris 2017). It is important to acknowledge their diversity in terms of professional knowledge – the mix of both qualified and unqualified staff and their experience of using information technology to aid learning.

Over three decades ago, Knowles (1990) in his androgogical theory of learning identified key assertions about adult learners, which are still accepted today (Illeris 2017). These include recognising that as mature adults they move from dependence to independence in their learning, they are more likely to engage in learning if they understand why the learning is necessary. They bring a wealth of life experiences that inform their choices, which with the accompanying move from extrinsic to intrinsic motivation means they are more likely to be motivated to learn if it will bring about their desired outcome. The context of this study, a request to develop a technology enhanced learning package for qualified and unqualified health care staff suggests they are likely to have relevant practice based experience and will have had the opportunity to reflect on their learning needs in respect of their practice. As a result, educators for this type of group need to check that the assertions associated with adult learning pervade into all aspects of the programmes they design and deliver, rather than using pedagogical principles (Knowles et al, 2015).

In consequence, an important aspect of planning this study was to determine how Technology Enhanced Learning influences adults learning, which factors were enhancers, and which were barriers to learning. Then, using the principles of adult learning, a conceptual framework would emerge to underpin the design of a model for ongoing education and training. Given that this form of CPD is based on recognition of the need to maintain and extend competence in practice, and demonstrate ongoing learning, the planned participants needed to ascertain the relevance of the approach adopted, and to find it an easy and accessible learning tool.

This chapter details the processes and steps used in the development of the conceptual framework and how this informed a new model for practice that has the potential to have a significant impact on the way health and care providers facilitate the ongoing education and training of their qualified and unqualified workforce. It will be essential to ensure that the outcome will be in a format that meets NHS requirements for CPD and pressure ulcer prevention expertise among their staff.

However, it would be possible for the Model to be translated to other key fields of healthcare across a range of mandatory and self-identified areas for education and training.

11.2   Conceptual Framework

The decision was made to develop a conceptual framework. Adom, Hussein and Agyem (2018) argue that theoretical and conceptual frameworks can be used to explain how new knowledge emerges from research, grounding it within recognised theoretical constructs. This gives added meaning to results and supports overall generalisability, with the possibility of emerging new knowledge giving direction to the research. They can also be used as a vehicle to demonstrate the thoroughness of the research process used and as Imenda (2014) suggests give life to an explanation of the complex social phenomena implicit within them, with the inclusion of qualitative research methodologies being an appropriate means to explore such multifaceted events and experiences. A conceptual framework makes it easier for readers to recognise and understand the concepts of the study (Luse, Mennecke & Townsend, 2012), by illustrating the phenomenon under study and the way in which the research has moved the subject onwards (Akintoye, 2015).

One of the challenges is the multiplicity of definitions, many of which give conflicting arguments as to whether a theoretical framework is the same as a conceptual framework. Maxwell (2013), Robson and McCartan (2016), Merriam and Tisdell (2016) all consider the terms to be interchangeable, while Anfara and Martz (2015), although not openly stating this, imply that they are synonymous. In contrast, Crawford (2020) argues that there are distinct differences, with Ravitch and Riggan (2017) giving one of the clearest explanations, averring that theoretical frameworks are based on identified, published theories, while conceptual frameworks present an overall structure for the phenomenon studied. Therefore, a theoretical framework may be found within a conceptual framework, explaining the relationships between concepts and/or variables. Adom et al (2018) support this view as the table below illustrates.

Table 11: The differences between theoretical and conceptual frameworks (Adom, Hussein and Agyem 2018 pp 440)

Theoretical Framework	Conceptual Framework
It provides a general or broader set of ideas within which a study belongs.	It refers to specific or narrower ideas a researcher utilises in his/her study.
It is based on existing theory/theories in the literature which has been tested and validated by other scholars.	It is based on the concepts which are the main variables in a study.
It is in the form of a model that pivots a study, with its exponents and the results of their studies.	It is a researcher's own constructed model that s/he uses to explain the relationship that exists between the main variables in his/her study. It can also be an adaptation of a model in an existing theory which a researcher adapts to suit his/her research purpose.
It is well developed, designed and accepted.	Its design is not accepted, but it's a proposal of the researcher's answer to the research problem s/he has defined.
It offers a focal point for approaching the unknown research in a specific field of enquiry.	It is the framework that shows logically how the research inquiry is to be undertaken.
It consists of theories that seem interrelated with their propositions deduced.	It consists of concepts interconnected to explain the relationships between them and how the researcher asserts to answer the research problem defined.
It is used to test theories, to predict and control the situations within the context of a research inquiry.	It is aimed at encouraging the development of a theory that would be useful to practitioners in the field.

Using this table proved to be an appropriate starting point to construct a conceptual framework for this study. It needed to contain both theoretical and practice based concepts, with the findings from the cycles of action research used to offer insights into the overall logical structure needed, helping to describe the relationship between the main concepts (Grant & Osanloo, 2014; Imenda 2014; Adom et al 2018). Ravich and Carl (2016) describes a generative framework that reflects the entire research process and can entail diagrams to help illustrate relationships between constructs and/or variables within the research.

Accepting that a new conceptual framework can be based on an adaptation of an existing framework, a review of the literature presented in chapters 3 and 4 revealed that work on pressure ulcers by Coleman et al (2014) that, from the researcher perspective, would be an ideal starting point upon which to build. When developing their framework, Coleman et al (2014) took account of previous studies undertaken by

a range of researchers across the last two decades (Braden & Bergstrom 1987; Defloor 1999; NPUAP/EPUAP 2009; Benoit & Mion, 2012;). Through the recognition of, and combination of previous studies their work enhanced the developing evidence base. For the purposes of this study, Coleman's (2014) conceptual framework was considered as it aligned with the programme requested by the commissioning Trusts. Their work offered very useful insights and indicators that could guide planning and design. Coleman et al (2014) believe that conceptual frameworks can be used as a basis for health care professionals to increase their understanding of the key issues that increase an individual's risk of developing pressure ulcers.

Figure 60: Factors leading to Pressure ulcer development (Coleman et al, 2013)
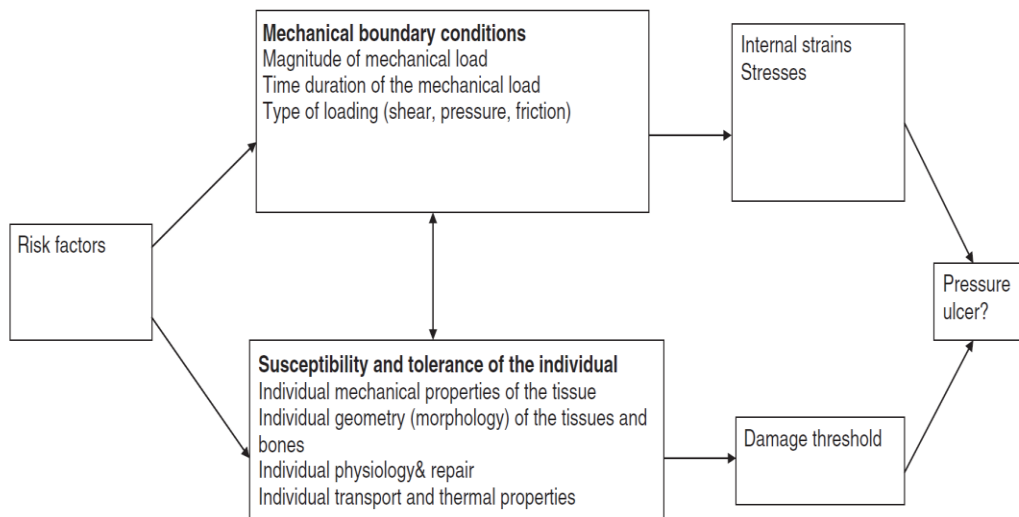
Figure 31 illustrates the factors that impact on pressure ulcer development, clearly identifying this to be complex process, with physiology, biomechanics and aetiology as core components. At the start of planning the development of the Technology Enhanced Learning Tool (TELT), an assumption was made that because of their professional backgrounds, those participating in the learning would have appropriate underpinning physiological knowledge, particularly those who were qualified staff. This assumption resulted from the information provided by the commissioning Trusts, who advised that previously study sessions had covered the aetiology of pressure ulcers. Thus, the plan was to focus less the risk factors that increase an individuals' risk of developing pressure ulcers. However, it emerged during the second action research cycle that the participants had not all, been exposed to education related to the aetiology of pressure ulcers. One AHP reported:

> *"I would really like to understand how shearing forces cause pressure ulcers".*

when asked to clarify her answer and give an indication of her concerns she explained:

> *"I know it's about friction caused when someone is dragged as opposed to lifted up the bed. I understand pressure reduces the blood supply, but shearing forces is a bit different isn't it?"*

While a qualified nurse working in a care home reported

> *"I know we have to complete risk assessment tools, but I sometimes don't know the answers to the questions patients, or their families ask!"*

when asked to give an example she said:

> *"I know the basics of what is needed to maintain healthy skin but not anything further" It can be embarrassing when asked by a family member or a student for more specific information".*

When considering this quote in the context of the study, this nurse was from a group who stated that they use risk assessment tools in their practice, thereby raising an important question. Do the participants who stated that they use a risk assessment tool sometimes or always actually understand the tool or were they merely "ticking a box". These findings led to a review of the content and format of the TELT, as it was evident that the information needed to include more detail on physiological and aetiological factors if participants were to gain maximum benefit from the programme. Without such revision, the final model could, as Kirkwood & Price (2013) argued, fail to enhance learning and add little value to the healthcare professionals existing knowledge. This finding reinforced the appropriateness of building on Coleman et al's (2014) framework.

Figure 61: Colman's (2014 p2232) conceptual framework
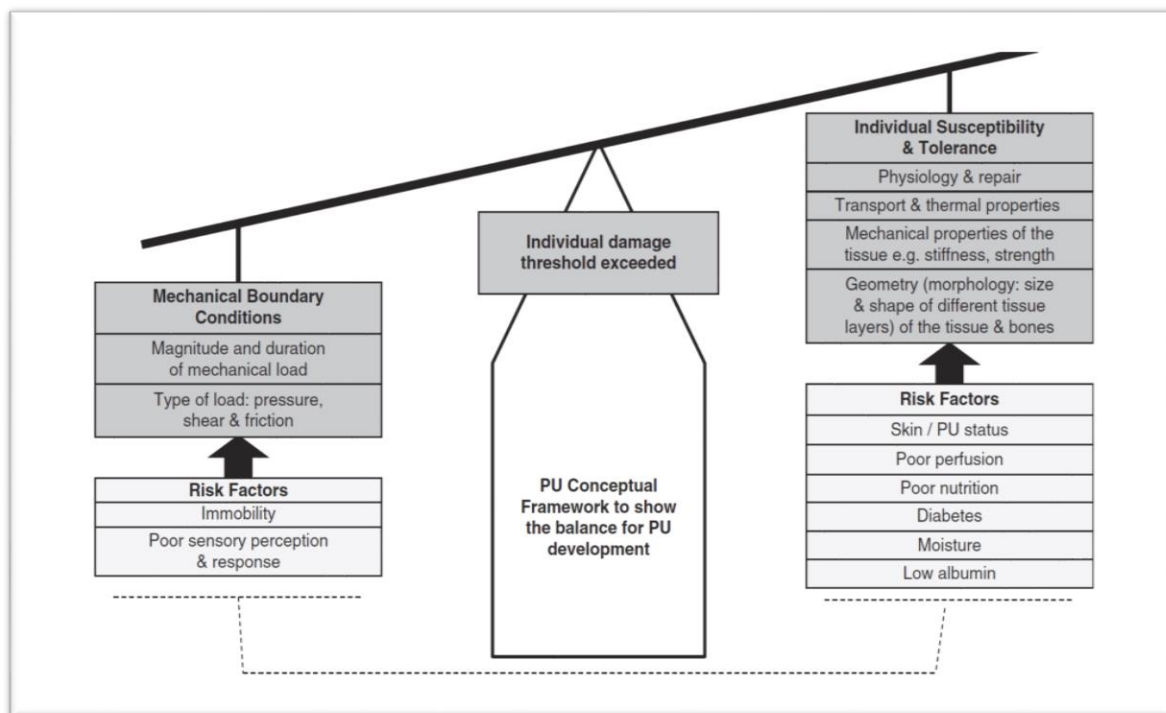
This changes the way in which pressure ulcers should be assessed and actions taken to prevent their development. The model moves from a linear one to the more dynamic approach above whereby each of the core areas has a weighting that impacts on the balance of probability for pressure ulcer development. For this study, the emphasis was on developing a TELT to improve the knowledge and understanding of healthcare staff to undertake an evidence based risk assessment to determine the individuals risk of developing pressure ulcers in any setting - hospital, home, care home. This provided the information that the participants would then use to determine the Waterlow and MUST scores as part of the overall assessment process. However, given the discussion above related to physiology and aetiology, it was of concern that staff were not fully aware of the rational for the questions posed to the patient and/or the importance of them in determining the individual's risk. Further, as stated in chapter 2 p 48 - 63 whilst assessment tools have their use and indeed are required in accordance with a number of guidelines (NICE 2015; EPUAP, NPUAP, PPPIA, 2019) professional judgement is of greater importance (Fletcher 2017) therefore, this study revealed a key issue. If staff do not truly understand what they are asking and why, their assessments are highly likely to be inaccurate. Should this finding be typical, it

may explain in part, why wound care and pressure ulcer prevention in particular remain a global challenge, high in expenditure and adversely affecting quality of life for the patient (Guest et al, 2020; Fletcher, 2017; Welsh, 2017**).**

Further study of the qualitative data sets supported the concerns regarding understanding and revealed that in both acute and community settings the nurses had knowledge gaps that had previously not been addressed. For some this may be because the focus of their initial education and training course had been different but changing demography has now altered their role and increased the need for this subject area to be delivered to all professional groups. The role of unqualified staff, who were included in this study requires separate consideration which is beyond the scope of this study. The commissioning Trusts had opened the invitation to all staff, so there were a number of mental health nurses in attendance, with one reporting:

> *"Whilst I have attended short sessions on pressure ulcers… we didn't get much information about pressure ulcers in our original training course, so I have never really understood what causes pressure ulcers and why…".*

He went on to point out that for his branch of nursing, there had been definite changes in practice and the lack of knowledge in this area affected his ability to care for patients:

> *"We have more older adults to look after in mental health services particularly those with Dementia, so we need to assess them … but we are mental health nurses so it's a new area for us in comparison with adult nurses".*

This participant demonstrated the importance of offering all nurses the opportunity to identify their own learning needs and access appropriate CPD. In the past mental health nurse training provided little education and training in respect of physical care but given the increasing numbers of older adults receiving care from mental health nurses the need to have the necessary education and training is paramount and hence this is now included in their preregistration courses (Wynne, 2020). If, as this finding suggests, this is a generic issue then tools such as the TELT developed in this study are crucial, as it is not realistic to expect Trusts to be able to release sufficient numbers of the workforce to easily address the theory and practice gap. This TELT, designed to be easily accessed by nurses, at a time that suits both themselves and the Trust scan help those with limited education and training in this field to gain the level of

knowledge and expertise they need to fulfil their role (Guy et al, 2013). The inclusion of physiology and aetiology was not a part of the commissioned activity and therefore this would be developed for a further iteration of the tool.

There were a number of challenges encountered by participants whilst they were working through the TELT. One of these was the inability to pause online activity to go back later to complete. This was not possible with the then current version of the VCC but again would feature with a new iteration of VCC Cases. Further issues emerged during action research cycle 2 and 3 these were:

How to weight a patient who has limited mobility at home or in hospital or if they don't have them at home in the case of patients in the community.

> *"It's difficult sometimes to weight a patient and it depends on their mental state if they are able to say how much they weigh to include this in the assessment".*

When asked what she would do if the patient either could not answer, or did not know their weight, her reply illustrated the problem of assessment tools designed to be used in a set of circumstances that do not fit the reality of nursing situations.

> *"I don't fill it in, or I might guess the person's weight based on my experience and use that so there is something to go on"*

This pragmatic approach had been developed to enable her to offer care to the patient but meant that the completion of the assessment was inaccurate, hence the care given might not be the optimum possible. Reflecting on these comments reinforces the earlier finding that for some staff, completing the assessment process is more of a tick box exercise. Staff know that they must carry out the assessment as part of their role. However, either because of a lack of understanding of the importance of each element, or a lack of suitable equipment have settled for partial completion. Until an assessment form that is practically possible is identified and in practice, it must be accepted that effective treatment and prevention may be limited. Given all that is known about pressure ulcer prevention, and the wealth of guidance available, together with financial incentives and penalties for healthcare providers (where there are individuals with

Category 11 to 1V pressure ulcers), the question has to be asked as to why pressure ulcer prevention measures that can be fully implemented, are not in use.

In the light of the findings from this study, it has to be argued that education and training are contributory factors to the continuance of pressure ulcers, a perspective supported by a wide range of literature (NICE, 2014, 2015; EPUAP, NPUAP, 2014; Coleman et al, 2013; Gregory, 2013; Greenwood & McGinnis, 2016; Fletcher, 2017; Schofield, 2018; Guest, 2020; Wynn, 2020). One ongoing problem that needs to be addressed, is that it that it is only recently that the pre-registration nursing curriculum (Wynn, 2020) was changed to make specific reference to pressure ulcer prevention. Thus there are a wealth of nurses who will remain in practice for many years, who have had a similar training to that described by the mental health nurse participant. In the UK there are an ever-increasing number of overseas nurses whose education and training practices may differ significantly from those in the UK. These nurses come from differing health systems and resource levels, as well are cultural differences, whereby in some countries family members provide the care traditionally given by nurses in the UK. Both these groups urgently need to be offered the opportunity to gain the knowledge that their junior colleagues will now have in their initial education and training. Until that happens and every nurse has the appropriate knowledge and expertise it is hard to see how the personal and health service burden of pressure ulcers will be permanently reduced. It will be interesting to note if there is a significant difference in the next 5 years when those undertaking the "Future Nurse" curriculum are part of the nursing workforce. However, this group will still need to be offered ongoing CPD if they are to retain all aspects of their initial education and training and, as advances are made, remain able to deliver state of the art care in pressure ulcer prevention and treatment (NHS Improvement, 2018; Adderley, 2021).

One other group who chose to attend the workshops, were Allied Health Professionals, whose curriculum has limited education and training in the prevention of pressure ulcers. However, as their role changes and they too have more contact with patients with pressure ulcers or at risk of developing them, they too need to extend their knowledge and expertise. However, as the reports from the Action Research workshops and the associated Focus Groups illustrate they are aware of their gap in expertise:

"I use the charts completed by the nurses … however… sometimes it would be easier if I could complete myself and sometimes [if] they are not up to date or … [I] can see something has changed … has not been reflected in the documentation".

When this participant was asked if she had ever talked about this to nurses or AHP colleagues about this, she replied:

"No because it's seen as the nurse's job … we had very little in our training … this is the first study workshop I've ever attended "

These participants reported similar concerns to those of their nursing colleagues, and therefore for them, the recommendation has to be, that they too, have access to continuing professional development in pressure ulcer prevention. This need for multi-disciplinary education and training is supported by the National Wound Care Strategy Programme and the associated National Care Core Capabilities Framework for England (Skills for Health, 2021) developed for use across professional boundaries where a range of disciplines are caring for individuals with wounds in any settings within or without a specialist wound care/tissue viability service.

Reflecting on the conceptual framework developed by Coleman et al (2014), see Figure 44 above, it is argued that this does not provide a complete package for today's nurses, midwives and AHPs. It is acknowledged that it incorporates the essential elements associated with pressure ulcer prevention, namely the impact of pressure and shearing forces. It also includes the associated risk factors together with what Coleman et al (2014) identify as "Individual Susceptibility and Tolerance". However, it fails to consider how the concepts within the framework can be translated, for those trying to identify a patient's risk of developing pressure ulcers; an essential step in the facilitation of the delivery of high-quality evidence-based care to individuals. Thus, it does not offer compensatory strategies for those unable to fully follow all aspects of the assessment tool, nor does it incorporate education and training, or a means for assessing competence Yet, these are core aspects of the aspirations of both the National Wound Care Strategy (2016) and the associated Skills for Health/HEE Core Capabilities Framework for England (Skills for Health, 2021) see chapter 2 p21. The

researcher would argue that there is an urgent need to provide all staff with the required education and training; a key element of the emerging new conceptual framework that will be discussed further in this chapter.

The National Wound Care Strategy (2016) was developed as a result of the continued challenges with the prevention of pressure ulcers, and the failure to realise a reduction in their incidence and prevalence in both acute and community settings (NHS England & NHS Improvement 2018; NHS National Patient Safety Strategy 2019; Guest et al 2020). It builds upon previous initiatives developed over time see chapter 2. The Programme is concerned with enhancing care for individuals with Pressure Ulcers, Lower Limb Ulcers and Surgical Wounds. It comprises three work streams. Firstly, Education and Training which includes quality improvement and research, secondly Digital, Data and Information, including evidence based wound care and thirdly, Supply and Distribution. These are all essential elements in enabling all aspects of the healthcare system to work together to improve the incidence and prevalence of wounds, promoting a consistent approach to care that will facilitate wound healing. It advocates education and training and an effective supply chain that gives access to appropriate evidenced based products to assist in the healing process. This in turn contributes to the reduction of pain and suffering for individuals with wounds, so improving their quality of life.

In the strategy to reduce pressure ulcers, a range of learning resources aimed at level 4 and above, have been developed by the NWCSP in association with Health Education England (HEE) which can be accessed through their eLearning for Health web site. For staff working in the NHS, information about accessing resources can be included in individual Electronic Staff Records. However, the onus on using them remains with the individual, although they could be used as part of a CPD approach by a health care provider. Whilst this latter proposal is commendable, and the resources are of high quality, free from product manufacturer influence, and accessible, as and when a healthcare professional may wish to undertake the study, it is not clear how an individual healthcare professional would be guided to undertake the level of study required for their role, or how the learning would be captured in terms of the individual's understanding of the theoretical content. The sessions available include "Essentials of Skin Care and Essentials of Pressure Ulcer Prevention, particularly relevant for the context of this study. Other related learning resources

concern leg ulcers, foot care, digital wound imaging and wound assessment with additional topics being added as developed as (NWCSP 2016) regularly update their webpage. However, on reviewing the webpage, it is unclear how learning should be formally used for ongoing CPD. It appears that it is left to the individual, their employer and manager to decide which elements to use, and to use them to set education and training at agreed intervals in an individual's career. This lack of guidance could be seen as a missed opportunity to set consistent, logically ordered, learning experiences, which would incrementally build the knowledge and expertise of participating practitioners.

In addition to the NWCSP, the programme commissioned Skills for Health together with HEE, to develop the Core Capabilities Framework for England (2021) that sets the core capabilities that are required to facilitate the delivery of "...*high quality, personalised wound care for adults, children and young people."* (National Wound Care Core Capabilities Framework for England 2021 p 9) The importance of this framework it that it differentiates between three levels or tiers which increase in complexity as illustrated below. The suggestion is that a practitioner may be expected to move between these tiers depending on their role, clinical setting or circumstances:

> ***Tier 1:*** *Capabilities that require a general knowledge and understanding of wound care and the skills which support the provision of that care.*
> ***Tier 2:*** *Capabilities that enable the provision of wound care independently and with a degree of critical analysis.*
> ***Tier 3:*** *Capabilities that require a high degree of autonomy and complex decision making, an ability to lead wound care practice, enabling innovative solutions to enhance people's experience and improve outcomes."*

The importance of this is that it enables individual practitioners to progress from Tier 1 to Tier 2 and ultimately to Tier 3, but to progress, they must be able to demonstrate that they have all the capabilities identified in the preceding Tier/s. However, it is important to point out that this system has been developed with the Tier needed for practice, dependent on the practitioner's role and not their job title or salary scale. Thus, it suggests that it is the responsibility of each practitioner together with their line manager to determine the Tier they require. As an example, a junior doctor with little experience in wound care would be at Tier 1 whilst a support worker caring for patients

in a Nursing Home who are at high risk of developing pressure ulcers may need to have the Tier 2 capabilities – although it is suggested within the framework that practitioners can have some Tier 1 and Tier 2 capabilities at the same time, which has the potential to cause confusion. Further, it is important to consider why the term capabilities has been used in the framework as opposed to what would normally be used the term competence. This is an interesting and innovative approach which they justify by pointing out that:

> *"**Competences** are standards of performance, focused on the outputs of work and observable performance. Competences include the ability to transfer and apply skills and knowledge to a range of situations/contexts, but they usually tend to describe practice in stable environments with familiar problems. To be competent is to consistently perform to the standards required in the workplace.*
>
> ***Capabilities** are the attributes (skills, knowledge and behaviours) which individuals bring to the workplace. This includes the ability to be competent and beyond this, to manage change, be flexible, deal with situations which may be unpredictable and continue to improve performance."*

(National Wound Care Core Capabilities Framework for England 2021 p 12)

This approach in theory, offers a route for individual development which would facilitate the implementation of personalised care for the patients in their care. However, in practice there are concerns, it could be seen by managers with limited human resources, as a mechanism for staff to be asked to undertake activities that whilst needed, would not normally be part of their role. In addition, and of equal importance is that currently, there is no formal system to ensure that healthcare professionals who take on an extended element to their practice, receive tailored ongoing education and training to ensure the currency of their capabilities. Given that the framework has been developed for any setting, and in recognition of the challenges in securing staff to work in the care home sector, where it is already recognised that CPD can be very limited the absence of formalised ongoing systems raises

sustainability and personnel issues. Further, the framework identifies only the costs of wounds to the NHS with no mention of care home associated costs, although some may be included in the figures relating to the input of NHS Staff into the provision of care in care homes. Guest et al (2020) recognise the importance of including care homes in the community costs, pointing out that:

"The annual NHS cost of wound management is estimated to be £11.3 billion and includes 54.4 million district/community nurse visits, 53.6 million healthcare assistant visits and 211.1 million practice nurse visits".

(Guest et al, 2020 p1)

The information regarding the three Tiers is very detailed, but they are new, and it is too soon to determine the impact, it any, may have on the reduction of pressure ulcers. There is an urgent need to ascertain how informed the NHS and other healthcare providers are, regarding these Tiers, their professional applicability and their human resource implications. The framework is somewhat complex as in addition to the three Tiers, there are an associated 5 domains with one concerned with education and training. Thus, the National Wound Care Strategy Programme has a lot to offer it has been in existence for some time and it remains unclear as to its impact. Even the Pressure Ulcer Core Curriculum does not appear to have significantly reduced the incidence and prevalence of pressure ulcers (Wynn, 2020; Fletcher et al, 2021) Further, it is evident from Schofield's (2018) study that there appears to be little consistency in the amount of time staff receive in terms of pressure ulcer prevention.

In the light of the available resources, recent literature, the findings from this study and the most recent government initiatives to reduce the development of pressure ulcers, the need for a new conceptual framework for pressure ulcer prevention is evident. Therefore, this study has focused on utilising the NWCSP core curriculum but has gone further by adding another dimension to what is currently available. Having reflected on the research journey further consideration was given to Coleman et al's framework and in particular their concluding statement:

"By integrating existing knowledge from epidemiological, physiological and biomechanical evidence, a theoretical causal pathway and new conceptual framework are proposed with potential implications for practice and research".

(Coleman et al 2014, p.2223)

As a result, it was decided to adopt this framework as the foundation that would underpin the new framework emerging from this study. The rationale for this decision was that it has a strong evidence base, drawing on and updating previous research as incorporated within the Prevention and Treatment of Pressure Ulcers Clinical Practice Guidelines (NPUAP, EPUAP, 2009, 2014). It is acknowledged, as identified by the authors, that there are limitations with the framework (Coleman et al, 2014) but it does offers a very comprehensive approach to pressure ulcer prevention. The visual image of scales balancing risk, identifying how thresholds become exceeded, facilitates understanding of the way in which the confounding factors are interlinked in practice. Using this approach provides a good foundation on which to build the knowledge, expertise and competence needed for nurses and allied healthcare professionals to provide effective care that reduces the risk of pressure ulcer incidence and ultimately prevalence.

Figure 62: Coleman et als (2014) Conceptual Framework
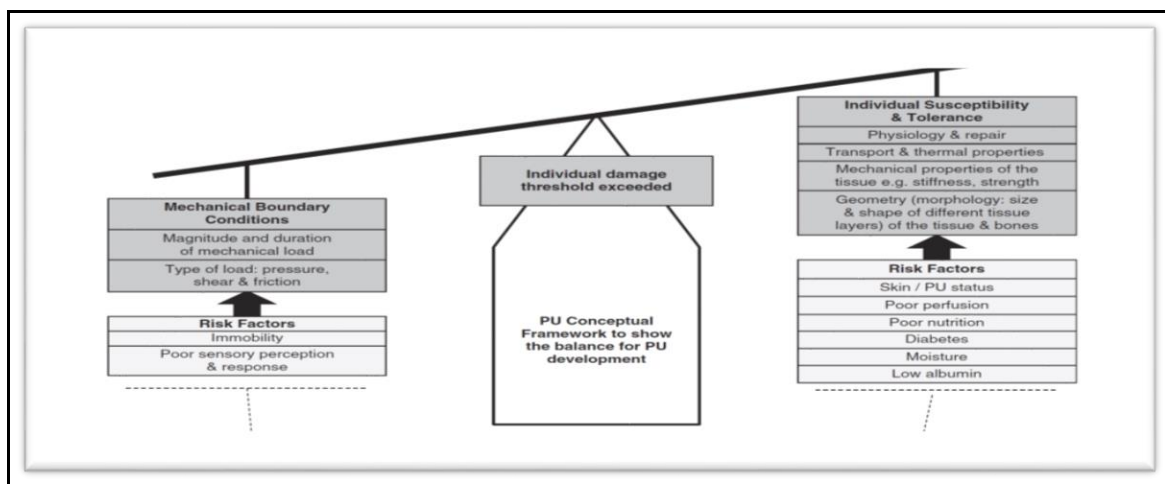
However, to provide a conceptual framework that can be understood, learned, retained and used it is suggested that the above framework above with all its knowledge and guidance is retained with the addition of three additional components:

11.3   Risk Assessment

How to assess an individual in regard to the risk factors identified by Coleman et al (2014) see above under the headings "Mechanical Boundary Conditions" and "Individual Susceptibility & Tolerance. Whilst it would be ideal to identify and utilise an agreed, evidence- based tool, across all healthcare providers, wherever and in whichever setting they are providing care, is currently not feasible. The reality is, that across the UK and beyond, there are a variety of tools in use. With each individual care provider continuing to use their own tools and documentation. Assessment tools are based on the implementation of evidence based research in practice, and therefore supports professional judgement, aiding clinical decision making. Given the Tier 2 requirements (Skills for Health, 2021) it could be argued that the introduction of this system, has now placed the onus on health care support workers to develop the knowledge and skills to be able to make professional judgements. If this does become the case, then tools that help and support the development of clinical decision making in practice, will need to be available in a format that suits the different levels of education and training. The possibility of changes in role and function needed to be considered when developing the conceptual framework.

Coleman et al (2014) clearly demonstrates the relationship between the "Mechanical Boundary Conditions" and the "Individual Susceptibility and Tolerance". These with their associated risk factors emphasise the importance of understanding the underlying physiology and aetiology associated with pressure ulcer development, and therefore, pressure ulcer prevention. The balance between Mechanical Boundary Conditions and the Individual Susceptibility and Tolerance together with the dotted lines that reflect that risk factors can cross both areas are reminders of the dynamic nature of the balance of risk factors. However, it is argued that knowing of the balance and being aware of the individual factors does not in itself reduce the risk. By adding Risk Assessment as part of the central balance of the scales, reflects the importance of formal assessment being carried out across both areas and their associated risk factors. Therefore, the first step in the development of this new conceptual framework was the addition of risk assessment to Coleman et al's (2014) model.

Figure 63: The first step in the development of the conceptual framework
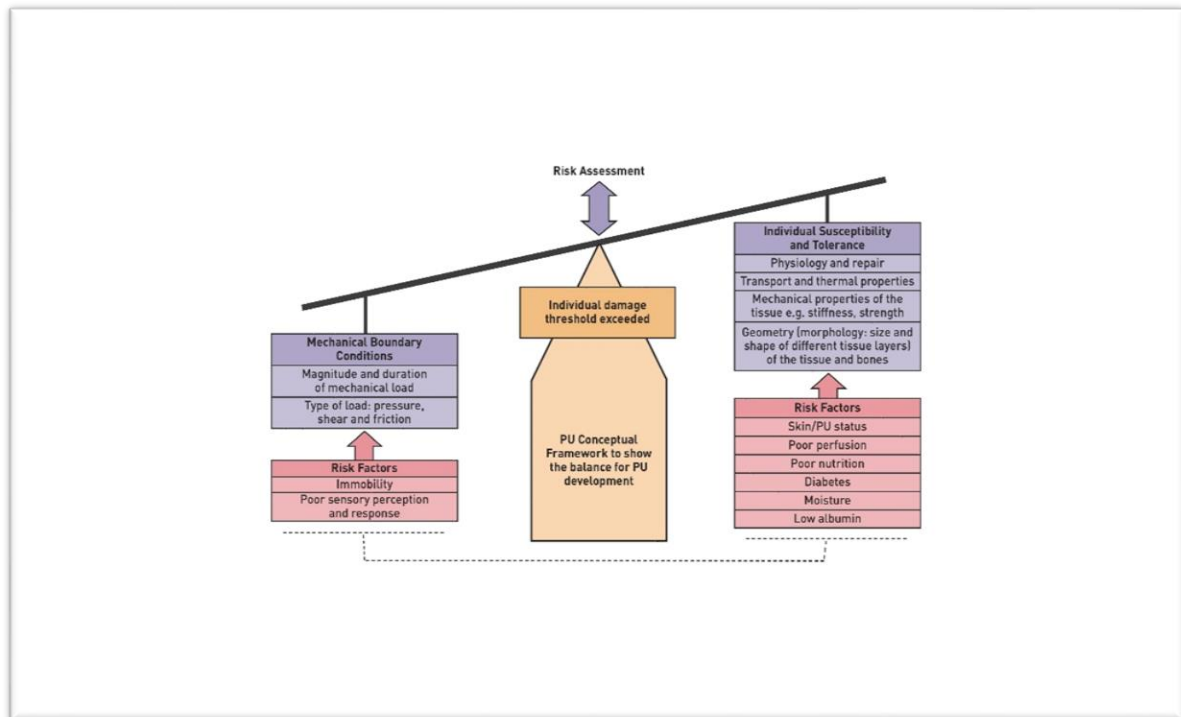
However, knowledge of risk assessment alone, whilst essential, cannot in itself reduce the risk of pressure ulcer development, and can be seen as holding the point of balance. To illustrate this, it has been added as an arrow which while in itself is not affecting the actual balance of the scale with their levels of potential risk, reflects the crucial point that unless risk assessment is accurately and uniformly applied across both sides of the scale, it can upset the overall balance, as while it may reduce some risks, it could increase other areas of risk.

11.4   Education and Training

Looking at the adapted conceptual framework, it is therefore evident that an additional element needs to be added to maintain the 'level' of balance across the scales and thereby prevent the individual from exceeding the individual threshold and developing a pressure ulcer or extending one already present. This additional element has to be education and training, because it is essential that staff are educated and trained to use risk assessment tools effectively and appropriately to plan, and then deliver the best available care for the patient (Fletcher, 2021). Data collected and analysed within this study supported the findings of Schofield (2018) that there is significant variance

in the time given to health care professionals for CPD in the area of pressure ulcer prevention. As a result of this Figure 64 below now incorporates education and training as a key component providing a balance across all aspects of pressure ulcer prevention.

Figure 64: The second step in the development of the conceptual framework
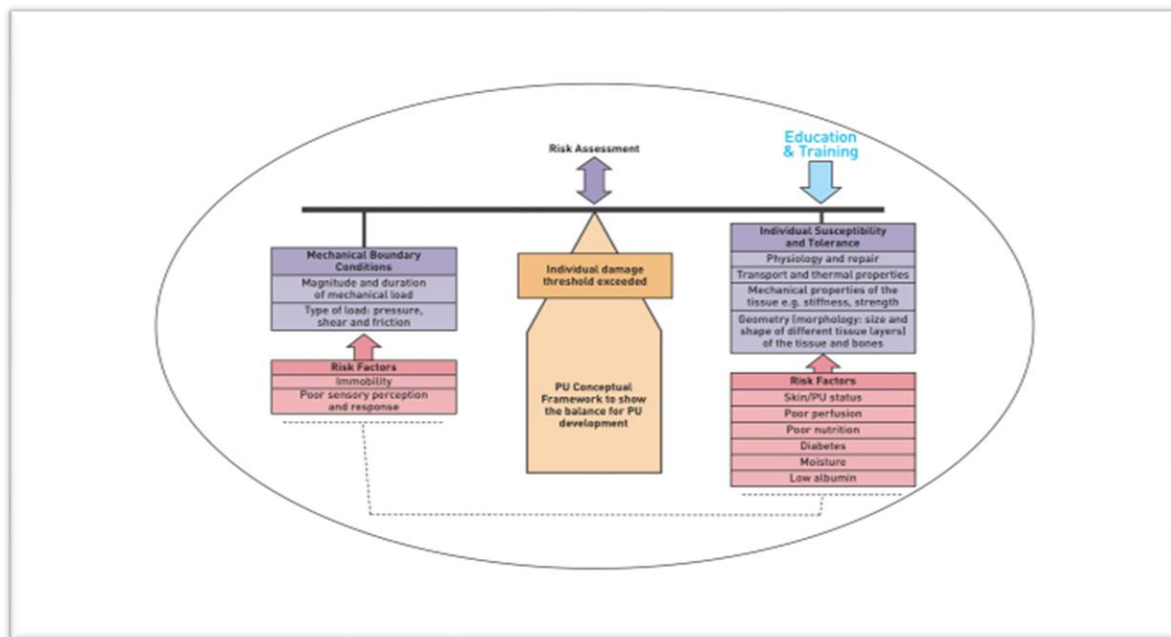
As Guest et al (2020) points out, there is a need to ensure that staff, be they qualified or unqualified are given the opportunity to undertake education and training to address both the gaps in their existing knowledge, whatever the cause, and teaches them the mechanisms needed to enable them to effectively utilise risk assessment measures. It is also essential that any education and training leads to staff understanding the physiology and aetiology associated with pressure ulcer development, the rationale behind each aspect of a risk assessment and the importance of completing all elements. Adults are more motivated to learn and retain information that they see as relevant (Knowles et al 2015). Therefore, learning needs to be in a format that is appropriately linked to practice, enabling participants to see the relevance of each element of the programme, and the totality of their education and training. Hence the Technology Enhanced Learning Tool (TELT) developed in this study offers an appropriate strategy for adult learners and has the added advantage that they can learn at their own pace (Knowles et al 2015). Taking account of the Tier's identified

within the National Wound Care Core Capabilities for England (Skills for Health, 2021) and the identification of gaps in both knowledge and practice learning needs to be incremental, reflecting the needs of both qualified and unqualified staff. The TELT with its two scenarios that recognise the difference between qualified and non-qualified health care professionals is an ideal means to provide healthcare staff with the required education and training, in a logical sequence. Since the impact of Covid 19 and the rapid technological advances that have followed it, the TELT has been changed and enhanced. The programme now has the facility to enable participants to stop and start at will, and/or to go back to earlier work if they need to refresh their knowledge i.e., they can now pick up their learning at the point at which they stopped. The final change that is important for this incremental learning is that they can reflect on and change the ranking order of their answers, as they progress through the programme and extend their knowledge and understanding of the challenges associated with pressure ulcer prevention. This flexible approach does not necessitate lengthy journeys or long intense sessions but enables participants to gain the necessary knowledge skills and attitudes to assess an individual's risk of developing pressure ulcers and/or the presence of a pressure ulcer/s, and then to develop an appropriate plan of care. In considering the nature of the learning required and taking account of the National Wound Care Strategy Programme requirements, it is argued that a carefully constructed series of online learning as discussed in earlier chapters to cover all the required areas would be the ideal approach.

However, given the practical elements of pressure ulcer prevention it is proposed that a blended learning approach would be the optimum way forward with online provision for the majority of the learning, and face-to-face clinical sessions offered for the more practical elements of the learning (Vaona et al 2018) This would provide the opportunity to practice or further develop clinical competence / capabilities under the supervision of a facilitator and/or clinical lecturer. For some individuals, as the action research cycles showed, the chance to meet face to face is appealing as it enables discussions with fellow participants as well as the teaching team. This enables participants to share challenges and concerns and to learn from one another thereby facilitating interprofessional learning. It has to be acknowledged that as technology continues to develop the expectation would be that there will be increased

opportunities to provide online simulation with the use of virtual reality which could replace any need for face-to-face sessions.

Although the addition of education and training does demonstrate a way to balance the scales (Figure 64), this is at the point at which individuals complete training. However, this does not necessarily lead to sustained improvements in practice. As chapters 2,3,4 illustrate there are wide variations in the amount of time individuals are given for undertaking pressure ulcer education and training, and the frequency of such training (Schofield 2018; Guest et al, 2020,). In consequence and to safeguard patients a further dimension was deemed necessary, a mechanism to ensure that practitioners retain the competence and capabilities.

11.5   Frequency and testing the Currency of Clinical Competence/Capabilities

Education and training can offer the requisite knowledge and expertise, and, in the case of nurses, the NMC Standards (2018) require nurses to keep up to date, complete CPD and revalidate to demonstrate their practice is current. Pressure ulcer practice clearly fits within this remit, with the need to check and assess clinical competence / capabilities.. Therefore, the final additional dimension to the conceptual framework needs to be an agreed frequency for testing the currency of clinical competence/capabilities, reflecting the evidence identified in chapters 2, 3 and 4 regarding the variations in the amount of time practitioners are afforded to develop their knowledge, skills and attitudes. Further, whilst the NWCSP (2016) and the associated National Wound Care Core Capabilities Framework (Skills for Health, 2021) provide a range of guidance, they fail to provide (or even suggest) a specific requirement for the frequency and duration of time for Continuing Professional Development of practitioners. Yet, this is essential for the maintenance, and where possible extension of currency of a practitioner's knowledge if they are to provide contemporary evidence-based care, while at the same time providing support and supervision for more junior staff, irrespective of their job role. It could also be used to assist individuals to progress throughout the Tiers identified within the National Wound Care Core Capabilities Framework (Skills for Health, 2021). Therefore, Figure 65 has the addition of an encompassing circle through which measures are included to monitor and assess clinical competence.

Figure 65: The final step in the development of the conceptual framework
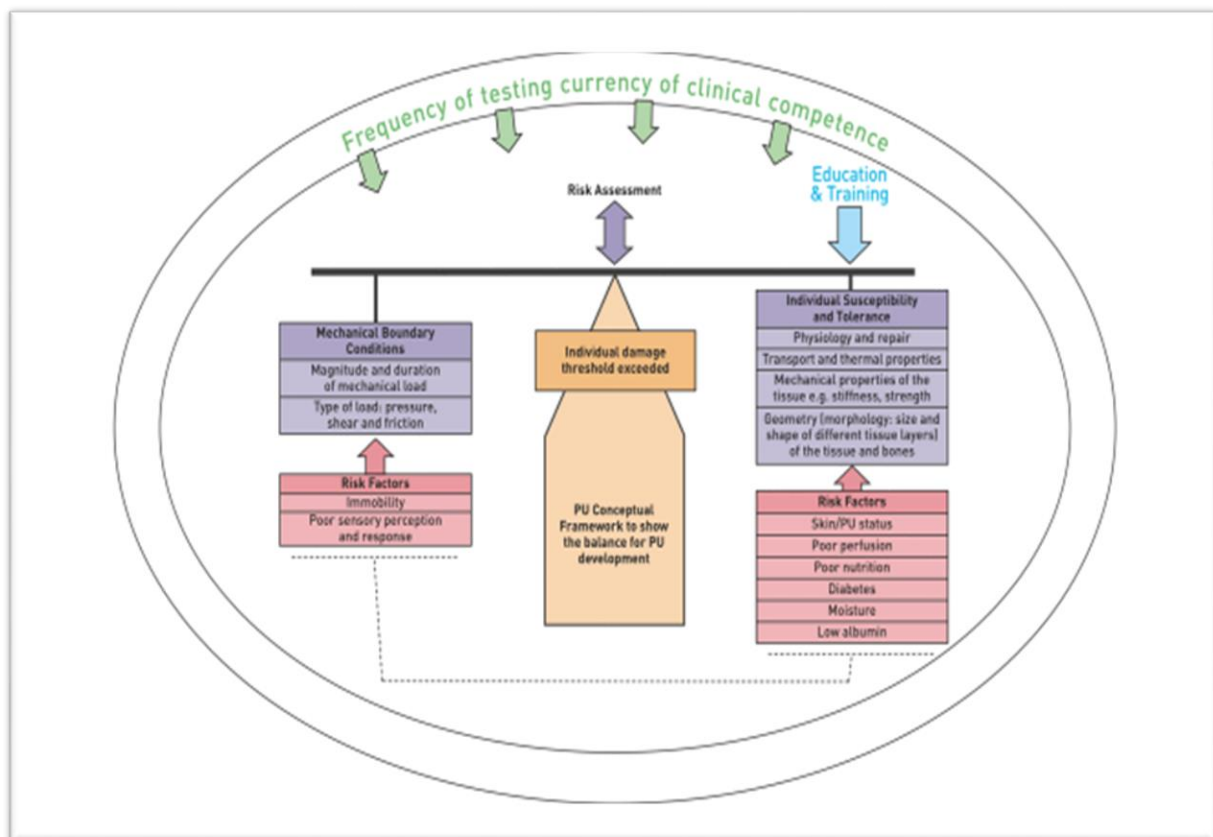
11.6 Summary

In summary, all the components of the framework are essential for the safety of patients and the protection of staff. Currently there is no requirement for CPD at specified intervals nor is there any requirement for staff to evidence their competency levels. Competence suggests a performance level whereby practitioners are required to demonstrate knowledge, skills and attitude regarding pressure ulcer prevention. Thus, while reflective of the Core Capabilities Framework, it differs, as the use of competencies was chosen for this new conceptual framework. Although the Core Capabilities Framework suggests that capabilities encompass competencies, it does not provide any guidance regarding the currency of the capabilities at the different tier levels or what is required to move through the tiers. The exception to this is in respect of Advanced Clinical Practitioners (ACP'S), who require master's Level Education. However, ACP's still require CPD to maintain the currency of their competence, and to facilitate their role with junior staff. In the absence of generic guidance, the choice

has been made to use competences that are discussed and cited at all levels from NMC through to junior healthcare workers just starting their careers.

This newly devised conceptual framework has further enhanced the rich and detailed work of Coleman et al (2014). They had developed their framework over a period of years, modifying and adapting their work through the addition of new evidence. The framework is based on a wealth of expertise, but they themselves have publicly stated that it has limitations that need to be addressed. It is argued here that the basis of the framework is sound, and that the additional three elements addresses their concerns and offers a practical and effective way forward, which in combination with the revised TELT offers a model to advance practice in pressure ulcer prevention and care.

Chapter 12   Reflections, Conclusions and Recommendations

12.1   Introduction

For clarity, this chapter begins by reflecting on the study overall, starting by discussing some of the issues of positionality, including the reasons for undertaking the study, and some personal insights. It then moves on to consider the aims of the research, and the strengths and limitations of the study. It finishes with a summary of conclusions and recommendations, including the identification of the need for further research. This study was undertaken in response to a request from an NHS Trusts to develop an online education tool to assist them in enhancing the knowledge, understanding, skills and attitudes of nurses and allied healthcare professionals caring for individuals at risk of developing pressure ulcers, and more specifically the Risk Assessment process. Their overall aim was to reduce the incidence and prevalence of pressure ulcers across their health economy, in part, by providing the TELT developed for this study. Further, this would contribute to the evidence provided by the Trusts to the Clinical Commissioning Group towards the fulfilment of a CQUIN payment which would provide additional finances to the Trusts that could be used to further improve the care of individuals at risk of developing pressure ulcers.

It is internationally accepted that the incidence and prevalence of pressure ulcers has been an ongoing challenge for the NHS and healthcare providers for decades resulting in a reduced quality of life for patients and their carers and an ever increasing financial load for the NHS running into billions of pounds annually (Guest et al, 2020). This is despite the wealth of research, national and international guidelines, government and local initiatives all aimed at reducing the development of pressure ulcers. Even the introduction of monetary incentives – CQUIN payments introduced over 20 years ago 'Darzi Review' (DH, 2008) has not made a significant difference to the problem. They can have a profound effect on patients and their carers, adversely affecting their quality of life, leaving carers having to witness the pain and suffering of their loved ones. While at the same time health care providers have to bear the ever increasing financial burden associated with pressure ulcers.

12.2   Reflections on Positionality

Prior to the request for this project, I had successfully completed all of the taught content of a Professional Doctorate, which had had a strong focus on research theory and methods, and I had successfully completed most of the data collection and had commenced on the associated thesis with the completion of three chapters and 6 transcribed interviews. However, due to promotion and change of workplace, I was unable to progress the study to completion. Nevertheless, this provided a good baseline for this study as I had a better understanding of research methods and the type of data they would yield. Without this background, I would not have had the level of understanding of paradigms to be able to identify and utilise pragmatism. Further, this knowledge together with my professional background - as identified in Chapter 1, gave me the confidence to utillse critical action research, talking on the role of the facilitator guiding and leading on all activities within the study. It also enabled me to recognise when there was a need to change and adapt processes as the study progresses and therefore, to address the study aims. However, I had to be aware that in my new role I was in a senior management position and throughout the study I used a reflexive journal together with memos to review and check that I was staying in the role of researcher and facilitator and not the role of manager. I had hoped that the taught component I had completed could have been transferred to my new university, however, this was not possible at the time. In hindsight, completing the thesis as part of a Professional Doctorate could have been an appropriate way forward. However, the university credited me with the Postgraduate Research element of the PhD and overall I feel that completing a traditional PhD was the right route for me as I now have a much deeper understanding of the strengths and limitations of research. Also it has reinforced the importance of healthcare professionals being able to access research evidence and implement it in practice to improve patient outcomes.

Looking back at the research journey this study involved, this confirmed that this was the correct route the correct route for me. I have been able to maintain my clinical links and expertise, and the WHPDU have been incredibly supportive. My knowledge of pressure ulcer risk assessment, prevention, and treatment has expanded exponentially. I have also gained great insight into the challenges of research cross cutting both health and education systems, and I am already planning additional work

in this field. I have delivered sessions on Pressure ulcer risk assessment – see Appendix 7 to audiences of qualified and unqualified healthcare professionals from both hospital and community settings. This supports BCU's portfolio of postgraduate study in tissue viability.

The study arose as a direct result of the Trusts identifying a clinical problem that needed to be addressed, as a surgical nurse, educator and researcher I was seen as a credible link between the university and the commissioning Trusts. However, this required me to set the ground rules related to the research as whilst it needed to meet the Trusts neds, it was essential that it was set within an education context to support the development of sustainable CPD and career development. From the outset, the university saw this as a PhD study and t was accepted by the Trusts as such, however, when ethics approval was sought, as this was an education study specifically for Trust staff and without "real" patients, the study was deemed to be a service evaluation overseen by the governance department. This decision was in keeping with the approach to research ethics approval at the time and therefore was not a surprise to the me.

Completing the study has also made me appreciate the reality of working full time and studying at the same time especially at managerial level where taking planned study leave was challenging, to say the least. Time after time, study leave was not possible as a result of competing priorities resulting in delays in completion. I now more fully appreciate the importance of supporting staff to ensure they take the required study leave and the need for flexibility at different stages of the study.

12.3 Consideration of the aims and objective of the research

Having completed the study and revisited the aims and objective, I believe they were appropriate given the requirements of both the Trusts and academic study. As indicated below and from the results obtained the study aims and objective were achieved.

12.3.1   Study aim 1

- To develop a conceptual framework and model for stakeholders to use to maintain and extend the expertise of their qualified and unqualified healthcare professionals, particularly nursing staff, in the assessment of individuals to determine their risk of developing pressure ulcers.

A conceptual framework was developed see 12.4 below. At the start of the study, a search of current evidence revealed a range of different approaches to pressure ulcer risk assessment. However, there was no global consensus and although Coleman et al (2014) had developed a model that was specifically designed for this area of practice, they recognised the conceptual framework need further research. Therefore, given the strong evidence base used to underpin their framework the decision was made to build on Coleman et al's (2014) work and create a new conceptual framework.

12.3.2   Study aim 2

- To make recommendations for education and training policies for policy planners, health and social care providers and education institutions for post registration education and training in the field of pressure ulcer prevention and care.

This aim could only be addressed once the conceptual framework had been developed extending the framework to include education and training and the need for a structured and sustained approach to continuing professional development which fits within the life-long learning approach advocated by the various professional, regulatory and statutory bodies in the field of healthcare. The main reflections are include in section 12.4 below.

12.3.3 Objective

To develop and evaluate an online Technology Enhanced Learning package to:

- Explore the perceptions of qualified and unqualified staff who have completed the technology enhanced learning package, to assess how it has impacted their knowledge and understanding of pressure ulcers and on their practice.

- Identify student engagement in the online learning package and the barriers/enhancers to its completion.

The decision to develop an online learning tool was the correct one as most participants were happy as the principle of online meant that they could access the learning at work or at home at a time to suit their work/home circumstances and undertake the learning at their own pace. However, others felt that their home circumstances did not facilitate this, some didn't have the resources or were competing with other members of the family for computer access as well as the associated internet usage costs. In addition, some participants felt that "managers" liked the use of online learning as, for some, it meant the individual completing the learning in their own time as opposed to during working hours. Overall, the choice of developing VCC case for the online learning tool was the correct one, despite the challenges that soon became apparent. Participants enjoyed the fact that there was an actual person at the centre of the online learning, and they enjoyed the interactivity it offered. However, the issues that arose in using the tool caused frustration amongst the participants some of which were overcome as a result of changes implemented between the research cycles. As has been acknowledged the VCC has developed significantly and moving forward all of the identified issues with the VCC have been resolved.

These aims and objective were achieved through the implementation of the critical action research cycles as reflected on below.

12.4 Reflection on the Choice of Method

Reflecting on the study, the choice of mixed methods was appropriate, as the nature of the data needed with its "strong ontological dimension" (see page 91) necessitated the use of more than one method. This led to considering the "philosophical assumptions" (see page 92) underpinning the research, Pragmatism, the most common approach utilised in mixed method studies, was the correct choice and the results supported the belief that "the actions people take cannot be detached from past events/experiences or from the views derived from those events/ experiences" (page 93). This approach supported the collection of both qualitative and quantitative data sets, essential to address the aims and outcomes of the study.

The choice of critical action research as the chosen method proved to be appropriate, with the rationale for its choice at the outset affirmed as the study progressed. The emphasis of the research was on change, through educating and training the workforce and the setting for the research activity was a healthcare education environment with a strong focus on learning and teaching and human behaviour. The action research cycles, and the associated use of research workshops worked well and enabled enhancements to take place with each cycle resulting in the final pilot cycle. Having chosen the method, it was essential to ensure the data collection methods chosen aligned with the principles of critical action research and the requirements of each individual method used for this purpose namely Survey, Research Workshops and Focus Groups.

The survey was used to gather mainly quantitative information, with some supporting qualitative data that provided insight into the questions asked and an overall comment at the end of the survey and yielded a wealth of important data. The research workshops encompassed the collection of both qualitative and quantitative data including the completion of the survey, the online Technology Enhanced Learning Tool (TELT) and the focus groups with me in the role of observer as participant. The decision to adopt an observer as participant role in the data collection process worked well as the research participants accepted me in the observer role and the findings and feedback indicate there was no negative impact on the data collected. The role enabled me to see and hear first-hand the actions and interactions as the activities

progressed, particularly during the research workshops, thus further enhancing each critical action research cycle.

Consideration of the various approaches for analysing qualitative data determined framework analysis to be the method of choice given that it "…is not bound by a particular epistemological position, which allows for more flexibility in the process of analysis which enables researchers to categorise and code the data in line with the study aims" (page 107). This structured approach and the two stages of analysis carried out, worked well with the cycles within critical action research. The iterative process enabled me to review and refine the data to determine the key themes identified which led to the development on the conceptual framework, the overall findings of the study and the subsequent recommendations for a range of stakeholders.

12.5   Developing the Conceptual Framework

Reflecting on the first aim, it has been addressed through the development of a new conceptual framework which drew on, and built upon, the work of others, namely Oomens (1985) then focusing on Coleman et al, (2014) and included consideration of the International 'Prevention and Treatment of Pressure Ulcers: Clinical Practice Guideline' (NPUAP, EPUAP, PPPIA, 2014). Colman's et al (2014 p2231/2) framework which demonstrates the relationship between the physiological and biomechanical determinants of pressure ulcer development, identifying patient risk factors, with the aim of increasing understanding and ultimately influencing risk assessment and practice. This was the starting point for building the new framework that emerged from this study. Whilst the researcher fully supports Coleman et al's framework it omitted to include the importance of education which the researcher felt was an essential component in pressure ulcer prevention.

 The study was in a key area of health care that was important for both education and practice, hence there was considerable encouragement and support for the project. As earlier chapters have shown, there is a widely recognised global health and financial burden associated with pressure ulcer prevention and wound care that despite international efforts and medical and nursing advances in treatment shows

no sign of declining. Currently estimated to be in the region of £11 billion, it is essential that innovative strategies, and new modalities for education, training and practice, are designed to reduce both the incidence and prevalence (Guest et al, 2020). Thus, the decision to develop a conceptual framework was welcomed, as this would offer long term sustainability, contributing to the national and international body of knowledge in pressure ulcer prevention and care, in a way that the development of the requested TELT alone could not.

However, it was only once the work started that the enormity of the challenge dawned. The project involved two distinct but overlapping components and it was only by following both at the same time that the aims could be addressed. The conceptual framework was dependent on detailed research and study into the theories and treatment strategies being used in prevention and care. However, it also needed to review how framework and models can be linked with and integrated into education and clinical practice. At the same time, work had started with the Tissue Viability Specialist Nurse, the nurse consultant and the VCC team, to develop the online education and training package, tailored to meet the needs of the commissioning Trusts, and taking the VCC into a new and much more specialised field. It seemed that every piece of research or theoretical model had to be simultaneously considered from two very different perspectives, while adding to the challenge to maintain the 'day job'.

The method chosen for the study was, action research and this worked well. The cyclic approach meant that every stage in the project from planning through to analysis of data was reviewed and reflected upon and refined where necessary. As the TELT developed, so did the design of the conceptual framework. The decision to use Colman et al's (2014) framework which was arrived at after months and months of research, made the achievement of the first aim possible. However, the limitation and constraints of the conceptual framework and model fully discussed by Coleman et al (2014), started the chain of thought and activities that led to the design of the conceptual framework in this study. Each element of their model was studied in depth, which, when the outcomes of these processes were put together led to the recognition that with additions and modification, a new conceptual framework that recognised the tremendous work they had done but took things to a new level was possible.

Care was taken to consider exactly how things needed to change, and to identify the three new dimensions to be added to create the new knowledge that constitutes a conceptual framework. Coleman's framework needed to be developed further to encompass the required education and training that nurses and other allied healthcare professionals require to bring about the much needed reduction in the incidence and prevalence of pressure ulcers. There were two parts to this, the need to find a way to increase understanding of and ability to carry out clinical risk assessments that encompassed the whole patient. For this, the TELT was the ideal practical tool, but where it sat in the conceptual framework had to be devised. The nature, role and position of education and training in the whole process also had to be decided. However, even when these two issue had been resolved, this still left the issue of the maintenance of competence.

Thus, the additional element regarding competency testing, which did not feature highly in the literature reviewed was deemed to be the final essential element of the new conceptual framework. Only with this added would there be a mechanism   to ensure that staff caring for patients at risk of developing pressure ulcers not only have the required education and training but that there is an agreed time frame for both the updating of knowledge and skills and competency testing.

Reaching this point in the study, it was possible to address the second aim, as it would only be through recommendations for policy and practice being accepted that long term sustainable change would occur. The conceptual framework developed in this study, has contributed to the debate regarding the delivery of care. It utilises previously recognised strategies, which have identified the factors that impact on the development of pressure ulcers but has gone further to identify how these can be used to change the dynamics and reduce pressure ulcer incidence. The need to maintain competence should be standard across all care providers. However, this means that acute hospital Trusts, community Trusts, mental health and learning disability Trusts/services, maternity and neonatal care, the care home sector and general practice all need to sign up to the challenge. Scotland and Wales are nearer to this than England as they have standardised approaches, however, as indicated previously, in England all those listed above can choose their own ways to implement national policy and document the process of care. It is argued that the approach suggested is practical and cost effective, and can be used in a range of contexts, thus

the next step for this study has to be wider dissemination. The TELT encompasses metrics that can be used to assess individual progress, but also to develop and monitor the time frames needed to standardise checking the currency of the practitioner competence. Thus, the second aim of the study has already been partially met as recommendations have been made to the commissioning Trusts, and these include recommendations for full implementation and use of the TELT, now that the issues identified in Chapter 10 have been resolved and the TELT can be re launched. The results obtained can then be disseminated and discussions held with the National Wound Care Strategy Leads to inform national policy.

It is accepted that caring for individuals in the community can be challenging in that individuals may have pressure ulcers that are not know to either GP's or community nurses. This study clearly identified that despite a plethora of literature and initiatives to reduce the incidence and prevalence of pressure ulcers over many years, there has been no real significant impact. So, patients and their carers continue to suffer and the ever increasing financial burden for healthcare providers continues to rise. Therefore, it is suggested that a nationally agreed protocol is required to ensure that, in addition to the education and training that is now delivered in some pre-qualifying healthcare professional education courses, particularly for nurses, that there is an agreed requirement for the continuing professional development required, subject to role and further, that there is an agreement with regards to the frequency of competency testing so providers can be assured that this is indeed taking place. This together with the work being undertaken to improve the collection of data a more accurate picture of the real numbers of individual's at risk will reveal the full impact on the NHS in terms of staff and resources required.

The researcher has seen a whole range of education provision that is available face-to face and online, sometimes free of charge and some of very high quality. However, it is not clear who is accessing this provision, how is it captured by their employers and if or how it demonstrates continued competence in the delivery of high quality care in pressure ulcer prevention. Given that that the financial burden of wounds including pressure ulcers costs the NHS billions of pounds it is argued that if there was more time and resource dedicated to education and competency testing this could have a significant impact. When considering other aspects of care and the associated

mandatory training that Trusts are required to measure on e.g., safeguarding, moving and handling, basic life support it begs the question of whether now is the time to incorporate pressure ulcer prevention in this training. It has to be acknowledged that this is included in many Trusts but not across the country with resultant variations in the quality of patient care.

12.6   The Challenges Associated with the TELT

The main issue with the development and function of the TELT emerged during Action Research Cycle 2 when students could login to the tool without difficulty but could not open all of the available resources, especially those out with the NHS Trusts own policies and procedures. For example, the NICE Guidelines could not be accessed and nor could supporting articles and as a result staff became quite frustrated. In addition, whilst they were able to access most of the resources relating to assessing the patient, it was not possible to display for example the Waterlow Scale to complete the form online to determine the score. This was the same for the MUST score. When resources were found and decisions made, the participants might have made the correct number of decisions, but they were not in the correct order which meant that they couldn't be recorded as successfully completing the TELT. This led to debate amongst the group regarding the rationale for the rank ordering of decisions particularly for those individuals providing care in a patients home. It was interesting to see how animated they were when discussing issues where they were confident.

The issues with the programme have been previously discussed but gave a clear example of how, even where a tool has very useful components, where there are glitches that affect the learning process, not only do participants feel disenfranchised, it may as some reported, "*put them off*" trying again. However, despite these issues, the enhancers associated with the TELT led to positive feedback from students, both qualified and unqualified, regarding the VCC Scenario's. There are good learning outputs, for those planning simulations, all of the participants liked the design that placed a patient as central to their study. They also liked the interactivity as opposed to working through PowerPoint presentations which had, in the main, been their experience up to that point. Searching for the resources helped them to access information they may not have done previously e.g., the Trusts' Infection Control Policy

encouraging them explore further. They enjoyed working through the scenario at the outset, but once the barriers identified above emerged they became somewhat frustrated but felt if these were fixed the TELT would be a good way to learn.

Having identified the issues, the researcher had to try to find ways to resolve them. Discussions took place with the OSIME RDG, the Tissue Viability Specialist Nurse and the commissioning Trust's Nurse Consultant to agree a way forward. It was decided to remove the requirement to have a rank order to the decisions but that it would not be possible to enable the forms to be completed online or to enable the student to go back into the tool and start where they left off as the VCC technology was not at the stage sufficiently to facilitate this requirement. In terms of the version of internet explorer within the Trusts' – discussion took place with the IT team – the main team were based in South Africa and kept providing reassurance that there was no reason why the TELT should not be working effectively and this was confirmed at the start of action research cycle 2.

To see how issues could be addressed within the existing programme another action research cycle was completed, but this time participants were provided with copies of the Risk Assessment Tools that they could complete in hard copy and the requirement to make all of the decisions in rank order had been removed. Fortuitously, the session was held in a Community Hospital in the same building as the hospitals IT team, so having sought advice they suggested downloading Google Chrome which was conducted and this did facilitate access. However, unlike the previous action research cycle the participants tended to discuss the tool rather than working through it themselves. This was felt by some in attendance to be distracting, however everyone worked through the tool. They were able to find the resources and make decisions, and it seemed the issues that emerged in the previous cycle that could be resolved had been resolved. However, the issue of noise needed to be addressed and as a result, a further action research cycle – 4 was planned. This was to be the Pilot of the refined TELT with the addition of headphones to encourage students to work through the tool individually, and to avoid disturbing others, facilitating better engagement with the learning process. This cycle was a success and students recognised and accepted the limitations with the current version of the TELT but felt it was an appealing way of learning that could be done in allocated session and/or at home to recap and refresh their learning. The plan, with the agreement of the commissioning Trusts' was to pause

any more sessions to enable the changes to the Technology to be made to then "roll out" the TELT across the health economy. The VCC was being upgraded and this would enable the issues identified with stopping and restarting to be resolved and thus enabling the completion of the Risk Assessment Documentation online.

However, although this seemed a reasonable pause in the study, external events occurred that permanently altered the situation. The emergence of Covid-19, and its development into a global pandemic had a massive impact on the NHS and other healthcare providers which meant that the pause was somewhat longer than planned. Pressure ulcer education and training was not seen as a key priority, and it was agreed that it was not possible to offer the TELT as had been planned. Services were at full stretch, with ongoing shortages of staff, with the re-deployment of staff occurring often at short notice. In addition, funds were reallocated to support the Covid-19 effort and overall the Trusts' decided to maintain the pause on activities until the pandemic was under control. This was disappointing as the tool would have been ideal to use to provide the required education and training for all staff caring for patients at risk of developing pressure ulcers.

It is also important to note there was an unexpected change in technology as a result of the need to move to virtual contacts, meetings and education, resulting in major advances in communication and flexibility which has had a permanent and positive impact which would be of significance to this programme. When it does resume it will be so much more effective, user-friendly and engaging, and it can used as the core learning tool to support the reduction in pressure ulcer incidence.

12.7   Strengths and Limitations of the Study

The study has a number of strengths, it facilitated development of an evidence based TELT accessible to large numbers of healthcare staff across a large geographic location. The tool is bespoke to the commissioning organisation, which is helpful to staff, especially those new to the Trusts' as the TELT incorporates the Trusts' own policies, procedures and Risk Assessment Tools. This would be particularly beneficial for the increasing numbers of healthcare staff from overseas joining the NHS Workforce. The tool can remain current with new policies being updated as required.

It provides a starting point for the Trusts' to adopt a similar approach to the wider learning and teaching for their workforce. The impact of Covid 19 could be seen as a strength in that it has resulted in technological advances that wouldn't have been realised for many years.

In terms of the limitations, as indicated above many of those which were frustrating and disappointing at the time have now been resolved – namely those issues related to the continued pausing of the study with the emergence of Covid 19, the technology of the TELT itself and the Trusts' version of Internet Explorer both of which have now been resolved. Further, the commission was for a tool to consider the assessment of patients at risk of developing pressure ulcers, however, for some participants it was evident that they lacked the fundamental underpinning knowledge of the structure and function of the skin and the aetiology of pressure ulcer to fully appreciate the significance of all components of the assessment process. As a resource for students to access prior to undertaking the TELT, and in the final version this would be included as part of the overall TELT package could be downloaded and retained.

Reflecting on the TELT and the processes involved in its development, there are a number of considerations worthy of discussion. Firstly, why was the issue of the internet browser not picked up as part of the peer review process or during the discussions with the key stakeholders. Whilst this had been checked out in reality it was never going to be an option. Without the input from the local IT team this would have been an ongoing issue that would have impacted significantly on the continuation of the study. Further the researcher questions the use of the Tissue Viability Link Nurses, for the peer review process. Whilst this made sense at the time, in retrospect a more representative group may have more readily identified some of the issues that emerged in cycles 2 and 3.

It was not a surprise that the participants did not value the league tables and awards available despite the results of the peer review process. In hindsight having reviewed the literature on adult learning the researcher did not challenge this notion until raised by the participants. The rewards were part of the VCC as identified in Chapter 7 used mainly with undergraduate students whose experience of gamification is likely to differ significantly from the participants who took part in this study. Then too, in hindsight, holding a research workshop in the lead up to Christmas may not be the best time to

do so, given the potential distraction with planning for the festivities. The lack of consideration of the need for headphones was a shortfall by the researcher, however having said this it was only an issue for one of the four action research cycles.

12.8 Summary

In summary, reflecting on the research journey, as a nurse the opportunity to develop a new conceptual framework and evidenced based TELT which contributes to the body of knowledge on pressure ulcer prevention, was a privilege. It was a complex project, with challenges and outputs not even considered at the start, however, the comprehensive approach used has resulted in a framework that builds upon previous in-depth, research based strategies, to offer an innovative approach that encompasses the core issues identified as being essential if the incidence and prevalence of pressure ulcers are to be reduced. To be able to increase understanding of pressure ulcer prevention has been challenging but very rewarding given its potential to positively impact on the quality of life of patients and carers. In addition, in researching the literature, the addition of competency testing, as a permanent component of the new conceptual framework, makes this work unique.

The choice for simulation and interactivity for the learning tool, brought unexpected challenges, but resolving them has led to a deeper understanding of the needs of adult learners, and the importance of education experiences been seen as positive. The disappointment when they saw themselves as 'failing' to complete the programme, and their need for positive re-enforcement has led to the suggestion that blended learning may have benefits for this group. The interactivity did lead to them being willing to try to use the programme, and it is to be anticipated that with the revised TELT participants will engage more readily in the learning. This in turn will enable them to share their learning through role modelling and to support more junior staff. Additionally, it will facilitate the continual professional development they require for revalidation purposes (NMC, 2016) whilst supporting their employers in striving to reduce the incidence and prevalence of pressure ulcers.

Further, the opportunity to use a similar, less bespoke tool, to reach the care home sector and low income countries to provide them with the fundamental education and

training required so desperately needed is a potential development from this study. It is apparent that in most countries smart phones are readily available and therefore developing CPD type activity across a range of topics using phones is another "spin off" from this study. Having experienced first-hand the pain and suffering of patients and their carers in countries bereft of structured CPD such tools could make a real difference at minimal cost.

In undertaking this study, I found that it was possible to access a wealth of online learning materials related to the prevention of pressure ulcers, many of which are accessible free of charge. Prior to the study I had no notion that they were available. However, while some are high quality, and reflective of National Guidance (NHS Improvement, 2018), others aren't. It is therefore suggested that as an educator, part of the preparation for teaching should be to check sites, identifying those of value and then sharing these with learners. Further, to compile lists of those that offer little to the debate, being poorly constructed, reflecting PowerPoint presentations that would normally be delivered face to face but without the opportunity to seek clarity or engage in debate. Further there is also the question of how employers record education activities and how it relates to the users continuing competence. Further, how do employers know that a member of their staff has accessed the education and if so if they have understood it.

The decision to pause the study whilst disappointing was understandable and justified given the circumstances described above and in chapter 10. At the time it was very disappointing and unfortunate that the emergence of Covid 19 did not allow the study to progress further. However, the increasing emphasis on digital solutions for care provision, including education and training will, once the Trusts' are in a position to move forward, enable the revised, innovative and engaging TELT developed for this study to be offered to the healthcare workforce from the commissioning Trusts. In addition, over the last months, developments have begun to take place and the notion to develop a new app based provision linked to the TELT being explored. This will help sustain the education gained during the initial programme, not only for the assessment of an individual at risk of developing pressure ulcers, but as an aide memoire. The intention is to use the TELT resources to develop further resources that can be accessed while in the clinical setting will include the structure and function of the skin, aetiology, assessment, care and management, all in bite sized chunks and ultimately

accessible more widely, to a national and international audience. However, it requires expertise to "get it right" so the role of education technologists is to take creative ideas from academics and/or clinicians and turn them into engaging learning tools cannot be underestimated. As NHS Trusts and Higher Education institutions we need to work together to develop learning tools to meet the CPD needs of the workforce. The technological advances as a result of the global pandemic has paved the way for a different approach to care delivery with positive benefits for the education and training of the workforce as the NHS has had to rapidly enhance its digital infrastructure to meet ever increasing demands.

The study clearly identified that education in pressure ulcer prevention, as demonstrated in the literature and in the findings of this study lacks a consistent approach. Some staff have had a half day of study, others a full day with some being supported to study a whole academic module. This lack of a consistent approach, if rectified in the same way as mandatory training could assist in the facilitation of high quality evidenced based care. At present there is no national consistency, in England in the choice and use of Risk Assessment Tools with Waterlow and MUST the most popular. However, the Waterlow Scale has been in use for many years and whilst there has been modifications to the tool is it the most appropriate one to use? Further would it be better for staff if the Must Nutritional assessment was included in an overall assessment tool A new evidence based Risk Assessment Tool – PURPOSE T has been developed and initial findings are positive in terms of its reliability and useability – this could be the tool of choice across England.

Further, whilst the TELT developed for this study focussed on risk assessment, a nationally agreed tool could consider all aspects of pressure ulcer prevention and management giving a consistent approach nationally and linked to the Electronic Staff record so when staff move their pressure ulcer education is clear for their new employer. By having this consistent approach, it could go some way to improving the data from NHS Trusts regarding pressure ulcer incidence and prevalence.

12.9 Recommendations

Having concluded the study, it is necessary to make recommendations arising from these conclusions. These relate to the following areas, Policy Planning, NHS Trusts healthcare providers, the commissioning NHS Trusts' Researchers and Higher Education Institutions.

12.9.1 Policy Planning

- To develop standardised evidence based policies and procedures across England to reinforce the delivery of high quality patient care to reduce the incidence and prevalence of pressure ulcers.

- To develop and agree a national, multidisciplinary, consistent approach to the education and training of staff in the prevention of pressure ulcers.

- To agree a framework for the competency testing of staff, to be adopted across all NHS Trusts and other healthcare providers e.g., Primary Care, Care Homes

12.9.2 NHS Trusts

- To support the multidisciplinary team to undertake the approved national education and training in pressure ulcer prevention.

- Support members of the multidisciplinary team to undertake the required competency testing in the provision of care to prevent pressure ulcer development.

- To undertake annual audits of the number, grade, profession and status – qualified/unqualified of staff who have undertaken the nationally approved education and training.

12.9.3   The Commissioning Trusts'

- To facilitate the "roll out" of TELT across the health economy.

- To design and implement a series of Quality Improvement projects of the TELT and its impact on the incidence of pressure ulcers across the health economy.

- To consider the role of allied health care professional in the prevention of pressure ulcers.

- To support the education and training of allied health care professions in the prevention and management of pressure ulcers.

12.9.4   Research

- Undertake research on the VCC across interdisciplinary groups to determine its usability, accessibility, engagement and impact in term of academic performance.

12.9.5   Higher Education Institutions

- To work collaboratively with NHS Trust provider and other healthcare organisations to develop mutually beneficial bite sized chunks of education using a TEL approach.

Reference List

ACT Academy (2018) *Online Library of Quality, Service Improvement and Redesign Tools: Patient Information.* NHS Improvement

Aburn, G.E., Gott, M., Hoare, K. (2021) Experiences of an insider researcher – interviewing your own colleagues. *Nurse Researcher*. doi: 10.7748/nr. 2021. e1794

Adderley, U. (2019) The National Wound Care Strategy programme: a progress Report. *Wound Care Today* 15(1):10

Adderley, U. (2021) National Wound Care Strategy Programme: lesson in the use of technology. **Wounds UK;** 17(1):16-16, 2021

Adderley, U., Evans, K., Coleman, S. (2017) Reducing unwanted variation in chronic wound care. *Wounds UK* 13(4) pp 22-27

Adom, D., Hussein, E.K., & Agyem, J.A. (2018) Theoretical and Conceptual Framework: Mandatory Ingredients of a Quality Research. *International journal of scientific research*, 7

Agam, L., Gefen, A. (2007) Pressure ulcers and deep tissue injury: a bioengineering perspective. *Journal of Wound Care*, *16*(8), pp.336-342

Akintoye, A. (2015) Developing theoretical and conceptual frameworks. In *EDMIC research workshop.* Ile-Ife: Faculty of Environmental Design and Management, Obafemi Awolowo University, Ile-Ife, Nigeria

Aliakbari, F., Parvin, N., Heidari, M., Haghani, F. (2015) Learning theories application in nursing education. *Journal of education and health promotion*, *4*

Anfara, V.A., Merz, N.T. (2014) *Theoretical frameworks in qualitative research*. London.

Andrew, H. (2012) The Fundamentals of Skin Care. *British Journal of Healthcare Assistants*. June 2012, Vol 06 No 06

Anthony, D., Papanikolaou, P., Parboteeah, S., Saleh, M. (2010) Do risk assessment scales for pressure ulcers work? *J Tissue Viability* 19(4): 132–6

Arifin, SRMA., Cheyne K., Maxwell K., Pien, L. S. (2019) Framework analysis: A worked example from a midwifery research. Enferm Clin. 2019;**29(S2)**:739---746 /doi.org/10.1016/j.enfcli.2019.04.112

Baharestani, M.M., Ratliff, C.R. (2007) Pressure ulcers in neonates and children: an NPUAP white paper. *Advances in skin & wound care*, *20*(4), pp.208-220

Balzer, K., Kremer, L., Junghans, A. et al (2014) What patient characteristics guide nurses' clinical judgement on pressure ulcer risk? A mixed method study. *International Journal of Nursing Studies.* 51, 5, 703-716. doi: 10.1016/j.ijnurstu.2013.09.005

Banks, M.D., Graves, N., Bauer, J.D., Ash, S. (2013) Cost effectiveness of nutrition support in the prevention of pressure ulcer in hospitals. *Eur. J. Clin. Nutr* 67 42-46

Banks, M.D., Bauer, J., Graves, N., Ash, S. (2010) Malnutrition and pressure ulcer risk in adults in Australian health care facilities. *Nutrition* 26, 896–901

Bansal, C., Scott, R., Stewart, D., Cockerell, C.J. (2005) Decubitus ulcers: a review of the literature. *International Journal of Dermatology*, *44*(10), pp.805-810

BAPEN. Introducing MUST. 2016. http://tinyurl.com/jyrwgwc (accessed May 2020)

Baran, E., Uygun, E., Altan, T., Bahcekapili, T., Cilsalar, H. (2014) Investigating technological pedagogical content knowledge (TPACK) in action: workshop design cases. *EdMedia Proceedings* pp. 1536-1541

Barker, L.A., Gout, B.S., Crowe, T.C. (2011) Hospital malnutrition: prevalence, identification and impact on patients and the healthcare system. *International Journal of Environmental Research and Public Health* 8, 514–52

Beauchamp, T. L., Childress, J.F. (2019) *Principles of Biomedical Ethics* 8th Ed. Oxford University Press, Oxford, UK

Becker, T.A.C., Teixeira, C.R.D.S., Zanetti, M.L., Pace, A.E., Almeida, F.A., Torquato, M.T.D.C.G. (2017) Effects of supportive telephone counselling in the metabolic control of elderly people with diabetes mellitus. *Revista brasileira de enfermagem*, *70*, pp.704-710

Beldon, P. (2008) Pressure Ulcers: The need for Patient Information. *Wounds Essential*s, Volume 3, pp. 97-99

Bell, F., Fernie, G.R., Barbenel, J.C., 1974. Pressure sores: their cause and prevention. *Nursing Times*, *70*(20), pp.740-745

Benner, P., Sutphen, M., Leonard, V. and Day, L. (2009) *Educating nurses: A call for radical transformation.* (Vol. 15). John Wiley & Sons, London

Bennett, L., Lee, B.Y. (1985) Pressure versus shear in pressure sore causation. *Chronic ulcers of the skin.* New York: McGraw-Hill Book Co, pp.39-56

Benoit, R., Mion, L. (2012) Risk factors for pressure ulcer development in critically Ill patients: a conceptual model to guide research. *Research in Nursing & Health* 35(4), 340–362

Bennetts, C., Elliston, E., Maconachie, M. (2012) Continuing professional development for public health. An andragogical approach. *Public Health*, 126, pp. 541-545

Bergsteiner, H., Avery, G.C. (2014) The twin-cycle experiential learning model: reconceptualising Kolb's theory. *Studies in Continuing Education*, *36*(3), pp.257-274

Bergstrom, N., Braden, B. (1992) A prospective study of pressure sore risk among institutionalized elderly. *Journal of the American Geriatrics Society.* 40: 8, 747-758

Blackburn, J., Ousey, K. (2018) Pressure ulcer definitions and core curricula—how does this affect wound care and the older patient? *British Journal of Community Nursing*, *23*(Sup12), pp. S6-S12

Bokolo, A. (Jnr) (2021) Implications of telehealth and digital care solutions during COVID-19 pandemic: a qualitative literature review. *Informatics for Health and Social Care*

Boniol, M., McIsaac, M., Xu, L., Wuliji, T., Diallo, K., Campbell, J. (2019) *Gender equity in the health workforce: analysis of 104 countries.* Health Workforce Working Paper 1 (No. WHO/HIS/HWF/Gender/WP1/2019.1). World Health Organization

Borojeny, A., Albatineh, L., Hasanpour Dehkordl, A. N., Ghanei, A., Gheshlagh, R. (2020) The incidence of pressure ulcers and its associations in different wards of the hospital: A systematic review and meta-analysis. *Int J Prev Med* 11:171

Boud, D., Keogh, R., Walker, D. (1985) *Reflection Turning Experience into Learning.* Kogan Page, London

Braden, B., Bergstrom, N. (1987) A conceptual schema for the study of the etiology of pressure sores. *Rehabilitation Nursing* 12 (1), 8–16

Briggs, M., Collinson, M., Wilson, L., Rivers, C. McGinnis, E., Dealey, C., Brown, J., Coleman, S., Stubbs, N., Stevenson, R., Nelson A., Nixon, J. (2013) The prevalence of pain at pressure ulcers and pressure ulcers in hospitalised patients*. BMC Nursing* 12:19

Brooke, B. (2014) Positionality: Reflecting on the Research Process. The Qualitative Report, 19 (33).1-9

Brookfield, S., 1986. *Understanding and facilitating adult learning: A comprehensive analysis of principles and effective practices*. McGraw-Hill Education (UK)

Bryman, A. (2008) *Social Research Methods* (3rd edn), Oxford University Press

Bryman, A. (2012) *Social Research Methods* (4th edn), Oxford University Press

Bryman, A. (2016) *Social Research Methods* (5th edn), Oxford University Press

Buchan, J., Gershlick, B., Charlesworth, A., Seccombe, I. (2019) *Falling short: the NHS workforce challenge*. Health Foundation: London

Chamanga, E. (2016) Addressing pressure ulcer issues. Independent Nurse 11: 28–31

Campbell, D. (1975) Degrees of Freedom and the Case Study, *Comparative Political Studies*. Volume 8, Number 2, 178-193

Carr., W., Kemmis. S. (2003) *Becoming Critical: Education Knowledge and Action Research.* Routledge

Carter, P. (2016) Operational productivity and performance in English NHS acute hospitals: Unwarranted variations. An independent report for the Department of Health by Lord Carter of Coles
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_ data/file/499229/Operational_productivity_A.pdf (accessed 25 October 2021)

Charmaz, K. (2014) *Constructing Grounded Theory: A Practical Guide Through Qualitative Analysis*. 3rd Edition. London: Sage Publications

Charmaz, K. (2015**)** Teaching Theory Construction With Initial Grounded Theory Tools: A Reflection on Lessons and Learning. *Qualitative Health Research*, 2015-12, Vol.25 (12), p.1610-1622

Charmaz, K., Thornberg, R. (2021) The Pursuit of Quality *Qualitative research in psychology.* VOL. 18, NO. 3, 305–327

Ciesielska, M., Boström, K. W., Öhlander, M. (2018) Observation Methods. In   Ciesielska, M., Jemielniak, D. (eds.), Qualitative Methodologies in Organization Studies. Springer, New York https://doi.org/10.1007/978-3-319-65442-3_2

Coffield, F., Moseley, D., Hall, E., Ecclestone, K., Coffield, F., Moseley, D., Hall, E., Ecclestone, K. (2004) Learning styles and pedagogy in post-16 learning: A systematic and critical review

Coleman, S., Gorecki, C., Nelson, E. A., Close, S., J., Defloor, T., Halfens, R., Farrin, A., Brown, J., Schoonhoven, L., Nixon, J. (2013). Patient risk factors for pressure ulcer development: systematic review. *Int J Nurs Stud* 50(7):974–1003

Coleman, S., Nixon, J., Keen, J., Wilson, L., McGinnis, E., Dealey, C., Stubbs, N., Farrin A., Dowding, D., A., Schols, J.M.G A., Cuddigan, J., Berlowitz, D., Jude, E., Vowden, P., Schoonhoven, L., Bader, D.L., Gefen, A., Oomens, C. W. J., Nelson, E. A. (2014) A new pressure ulcer conceptual framework. *Journal of Advanced Nursing* 70(10), 2222–2234

Coleman, S., Nixon, J., Keen, J., Wilson, L., McGinnis, E., Dealey, C., Stubbs, N., Muir, D., Farrin A., Dowding, D. A., Schols, J. M.G.A., Cuddigan, J., Berlowitz, D., Jude, E., Vowden, P., Bader, D.L., Gefen, A., Cess, W.J., Oomens, C., W. J., Schoonhoven, L., Nelson, E. A. (2014). Developing a pressure ulcer risk factor minimum data set and risk assessment framework. *Journal of Advanced Nursing*, 70, 2339–2352

Coleman, S., Nixon, J., Keen, J., Muir, D., Wilson, L., McGinnis., E., Stubbs, N., Dealey, C., Nelson, E.A. (2016). Using cognitive pre-testing methods in the development of a new evidenced-based pressure ulcer risk assessment instrument. *BMC Research Methodology*, 16, 1–13

Coleman, S., Smith, I.L., McGinnis, E., Keen, J., Muir, D., Wilson, L., Stubbs, N., Dealey, C., Brown, S., Nelson, E. A., & Nixon, J. (2018) Clinical Evaluation of a new pressure ulcer risk assessment instrument, the Pressure Ulcer Risk Primary or Secondary Evaluation Tool (PURPOSE T). *J Adv Nurs.* 74: 407 – 424

Collard, S.S., Scammell, J., Tee, S. (2020) Closing the gap on nurse retention: A scoping review of implications for undergraduate education. *Nurse education today*, *84*, p.104253

Collier, J. (1945) *Social research/an international quarterly of social sciences*. New York: Graduate fac.

Corbin. J., Strauss, A. (2009) *Basics of Qualitative Research* 3rd Edn, London: Sage

Cornwell, J.M., Manfredo, P.A., (1994) Kolb's learning style theory revisited. *Educational and Psychological Measurement*, *54*(2), pp.317-327

Crawford, M. (2020) Ecological Systems Theory: Exploring the Development of the Theoretical Framework as Conceived by Bronfenbrenner. *J Pub* Health Issue Pract 4(2):170 https://doi.org/10.33790/jphip1100170

Cresswell, J.W. (2007) *Qualitative Enquiry and Research Design: Choosing among Five Approaches*. London: Sage

Cresswell, J.W., Cresswell, J. (2020) *Conducting, and Evaluating Quantitative and Qualitative Research.* London: Sage

Cresswell, J.W., Piano Clark, V.L. (2008) *Designing and Conducting Mixed Methods Research*, London: Sage

Creswell, J., Poth, C. (2017) *Qualitative Inquiry and Research Design: Choosing among Five Approaches*. London: Sage

Daniel, R.K., Terzis, J.K, Cunningham, D.M. (1976) Sensory skin flaps for coverage of pressure sores in paraplegic patients. A Preliminary Report. *Plastic and Reconstructive Surgery*, *58*(3), pp.317-328

Darzi, A. (2008) *High quality care for all.* Department of Health. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/ file/228836/7432.pdf

Davda, L.S., Gallagher, J.E., Radford, D.R. (2018) Migration motives and integration of international human resources of health in the United Kingdom: systematic review and meta-synthesis of qualitative studies using framework analysis. Human Resources for Health: 1-13 Doi.org/10.1186/s12960-018-0293-9

Dealey, C., Posnett, J., Walker, A. (2004) The cost of pressure ulcers in the united Kingdom. *Age and Ageing* 2004; **33:** 230–235

Defloor, T. (1999) The risk of pressure sores: a conceptual scheme. *Journal of Clinical Nursing* 8(2), 206–216

Delmore, B., Lebovits, S., Suggs, B., et al (2015) Risk factors associated with heel pressure ulcers in hospitalized patients. *J Wound Ostomy Continence Nurs* 42(3): 242–8

Denzin, K., Lincoln, Y. S. (eds) (2018) *The Sage Handbook of Qualitative Research*. Los Angeles: Sage

Department of Health (1992) *Health of the Nation*. London: DH

Department of Health (1998) *A First Class Service – Quality in the new NHS*. London: DH

Department of Health (2003) *Toolkit for Producing Patient Information.* London: DH

Department of Health (2008) *High Quality Care for all: NHS Next Stage Review*. London: DH

Department of Health (2009) *Commissioning for Quality Improvement*. London: DH

Department of Health (2010a) *High Impact Actions for Nursing and Midwifery*. NHS Institute of Innovation and Improvement. London: DH

Department of Health (2010b) *The NHS Quality, Innovation, Productivity and Prevention challenge: An introduction for clinicians*. www.dh.gov.uk/quality and productivity. Accessed 17.2.2020

Department of Health (2011) *The Operating Framework for the NHS in England 2012–13*. DH: London

Department of Health (2012a) *Health and Social Care Act*. DH: London

Department of Health (2012b) *The Functions of Clinical Commissioning Groups*. DH: London

Department of Health (2012c). Delivering the NHS Safety Thermometer CQUIN 2012/13: A Preliminary Guide to Measuring 'Harm Free' Care**.** DH: London http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_134331.

Department of Health (2010d) *Using the Commissioning for Quality and Innovation (CQUIN) Payment framework. DH:* London

Department of Health (2013) NHS Outcomes framework 2014/15. Available from: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/256456/NHS_outcomes.pdf. Date last accessed 9/7/19

Department of Health and Social Care (2018) *Safeguarding Adults Protocol: Pressure Ulcers and the Interface with a Safeguarding Enquiry*. The Stationary Office: London

de Wert, L. A., Bader, D.L., Oomens, C.W.J. (2015) A new method to evaluate the effects of shear on the skin. *Wound Repair and Regeneration*. 23, 6

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

Dewey, J. (1916) *Democracy and Education.* Free Press: New York

Dixon-Woods, M., Cavers, D., Agarwal, S. et al. (2006) Conducting a critical interpretive synthesis of the literature on access to health care by vulnerable groups. BMC Med Res Methodology 2006;6(35).

Downie, F., Perrin, A.M., Kiernan, M. (2013.) Implementing a pressure ulcer prevention bundle into practice. *British Journal of Nursing*, *22*(Sup10), pp. S4-S8

Drew, P., Posnett, J., Rusling, L. (2007). The cost of wound care for a local population in England. *Int Wound Journal* 4 (2):149 -155

Dunn. T., Kennedy, M. (2019) Technology Enhanced Learning in higher education: motivations, engagement and academic achievement. *Computers & Education* 137 104-113

Durrant, L. J. (2019) Health literacy in pressure injury: findings from a mixed-methods study of community-based patients and carers. *Nursing and Health Sciences;* 21: 1, 37-43.

Eisenhardt, K. M. (1989) Building Theories from Case Study Research. *Academy of Management Review*. 4:4

Erikson, E.H. (1959) *Identity and the Life Cycle*. International Universities Press: New York.

Erikson, E.H. (1964) *Insight and Responsibility*. Norton: New York

European Pressure Ulcer Advisory Panel and National Pressure Ulcer Advisory Panel (2009) *Treatment of pressure ulcers: Quick reference guide*. Washington DC, NPUAP http://www.epuap.org/guidelines/Final_Quick_Prevention.pdf

European Pressure Ulcer Advisory Panel (2014) *Prevention and Treatment of Pressure Ulcers: a quick reference guide*. Available from: http://npuap.org/page/2014Guidelines Date last accessed 2/12/2020

European Pressure Ulcer Advisory Panel, National Pressure Injury Advisory Panel and Alliance, P.P.P.I., (2019).. *Prevention and Treatment of Pressure Ulcers/injuries: Clinical Practice Guideline: The International Guideline 2019*. EPUAP, NPIAP, PPPIA

Fallon, M. (2016) Writing up quantitative research in the social and behavioral sciences. In *Writing up Quantitative Research in the Social and Behavioral Sciences*. Brill

Feilzer, M. Y. (2010) Doing mixed methods research pragmatically: Implications for the rediscovery of pragmatism as a research paradigm. *Journal of Mixed Methods Research*, 4(1), 6–16

Ferguson, M., Banks, M., Baurer, J., Isenring, E., Vivanti, A., Capra, S. (2010) Nutrition Screening Practices in Australian healthcare facilities: a decade later. *Nutr. Diet*, 67, 213-218

Fikes, T., Arcuria, P., Morgan, W., Pugliese, L. (2018). *ASU online performance gap analysis.* Retrieved September 23, 2018, from Arizona State University website

Fletcher, J., et al (2017) Are we overcomplicating pressure ulcer risk assessment? *Wounds UK;* 13: 4;14-20

Fletcher, J. (2017) Reposition patients effectively to prevent pressure ulcers. *Wounds International.* 8, 1, 7-9

Fletcher, J. (2019) Pressure ulcer education 3: skin assessment and care. *Nursing Times* [online]; 115: 12, 26-29

Fletcher, J. (2020) Pressure ulcer education 5: keeping patients moving. *Nursing Times* [online]; 116: 2, 28-30

Fletcher, J. (2020) Pressure ulcer education 4: selection and use of support surfaces. *Nursing Times* [online]; 116: 1, 41-43

Fletcher, J. (2021) Has anything changed? *Wounds UK*; 17, No 4, 6-8

Fletcher, J., Jacklin, A., Adderley, U. (2021) A brief History of Pressure Ulcer Measurement: The last 20 years. *Wounds UK* Vol 17 No. 2 14 – 19

Fowler, F. J. (2013) *Survey Research Methods 5ᵗʰ ed*. Center for Survey Research, University of Massachusetts Boston: USA

Francis, K. (2019) Damage control: Differentiating incontinence-associated dermatitis from pressure injury. *Nursing 2020 Critical Care*, *14*(6), pp.28-35

Francis, R. (2013) *Report of the Mid Staffordshire NHS Foundation Trust Public Inquiry*. The Stationery Office: London

Fredericks, J.A., Blumenfeld, P.C., Paris, A.H. (2004) School engagement: Potential of the concept, state of the evidence. *Review of Educational Research,* 74, 59–109

Fremmelevholm, A., Soegaard, K., (2019) Pressure ulcer prevention in hospitals: a successful nurse-led clinical quality improvement intervention. *British Journal of Nursing*, *28*(6), pp. S6-S11

Frykberg, R., Banks, J (2015) Challenges in the treatment of chronic wounds. *Advances in Wound Care*. Vol 4, Issue 9

Gage, N.L. (1972) *Teacher Effectiveness and Teacher Education*. Pacific books, Palo Alto, CA

Gale, N., Heath, G., Cameron, E., Rashid, S., Redwood, S. (2013) Using the framework method for the analysis of qualitative data in multi-disciplinary health research. *BMC Med Res Methodology*. 13(1):117

Gannon, R., Fowles, J., Gerrard, C., Scott, B. (2021) Prevalence of Skin Injuries in Covid – 19 patients in a specialist UK respiratory Intensive Care Unit. *Wounds UK* Vol 17 No 4

Gefen, A. (2007) The biomechanics of sitting-acquired pressure ulcers in patients with spinal cord injury or lesions. *International Wound Journal*, *4*(3), pp.222-231

Gefen, A. (2008b) How much time does it take to get a pressure ulcer? Integrated evidence from human, animal, and in vitro studies. *Ostomy Wound Management*, *54*(10), pp.26-28

Gefen, A. (2008a) The Compression Intensity Index: a practical anatomical estimate of the biomechanical risk for a deep tissue injury. *Technology and Health Care*, *16*(2), pp.141-149

Gefen, A. (2009) Reswick and Rogers pressure-time curve for pressure ulcer risk. Part 2. *Nursing Standard (through 2013)*, *23*(46), p.40

Glaser, B.G., Strauss, A.L., 2017. *Discovery of grounded theory: Strategies for qualitative research*. Routledge

Gomm, R. (2008) *Social Research Methodology: A critical introduction*. Bloomsbury Publishing: London

Gorecki, C., Brown, J.M., Nelson, E.A. Briggs, M., Schoonhoven, L., Dealey, C., Defloor, T., Nixon, J. (2009) Impact of Pressure Ulcers on Quality of Life in Older Patients: A systematic Review. *Journal of American Geriatrics Society* Vol 57, Issue 7, pp. 1175-1183

Gorecki, C., Nixon, J., Madill, A., Firth, J. and Brown, J.M. (2012) What influences the impact of pressure ulcers on health-related quality of life? A qualitative patient-focused exploration of contributory factors. *Journal of Tissue Viability*, *21*(1), pp.3-12

Grant, C., Osanloo., A. (2014) Understanding, Selecting, and Integrating a Theoretical Framework in Dissertation Research: Creating the Blueprint for 'House'. *Administrative Issues Journal: Connecting Education, Practice and Research*, Pp. 12-22 DOI: 10.5929/2014.4.2.9

Gravetter, F. J., Wallnau, L. B. (2013). *Statistics for the Behavioral Sciences*, 9th ed. Wadsworth Cengage Learning: Canada

Gray, T.A., Rhodes, S., Atkinson, R. A., Rothwell., K., Wilson, P., Dumville, C., Cullum, N., A. (2018) Opportunities for better value wound care: a multiservice, cross-sectional survey of complex wounds and their care in a UK community population. *BMJ Open*. 2018. PMID: 29572395; PMCID: PMC5875675

Green, J., Thorogood, N. (2004) *Qualitative Research Methods*.

Greenbank, P. (2013) The role of values in educational research: the case for reflexivity. *British Educational Research Journal* Volume 29, Issue 6 p. 791-801

Greener, M. (2019) Why the NHS needs to radically rethink Chronic Wound Care. *Independent Nurse*. (10): 12-15

Greenwood, C., McGinnis, E. (2016) A Retrospective analysis of the findings of pressure ulcer investigations in an acute trust in the UK. *Journal of Tissue Viability* 25 (2) 91-97

Grace, A.P. (1996) "Striking a critical pose: Andragogy-Missing Links, Missing Values." *International Journal of Lifelong Education*,15,pp. 382-392

Gregory, A. (2013) NHS: 700 victims of bed sores through hospital neglect £16m in pay-outs. *Mirror* https://tinyurl.comy2r7jvb7 accessed 1st November 2020

Groth, K.E. (1942) Klinische Beobachtungen und experimentelle studien ber die Entstehung des Dekubitus. *Acta Chirurgica Scandinavica*. 87, (supp 76). In National Pressure Ulcer Advisory Panel, European Pressure Ulcer Advisory Panel and Pan Pacific Pressure Injury Alliance. *Prevention and Treatment of Pressure Ulcers: Clinical Practice Guideline.* Emily Haesler (Ed). Cambridge Media: Osborne Park, Western Australia; 2014

Guba, E.G., Lincoln, Y.S. (2005). "Paradigmatic controversies, contradictions, and emerging influences" (p. 200). In N. K. Denzin & Y. S. Lincoln (Eds.), *The Sage Handbook of Qualitative Research* (3rd ed.), pp. 191-215. Thousand Oaks, CA: Sage

Guba, E.G., Lincoln, Y.S. (1994) Competing paradigms in qualitative research. *Handbook of qualitative research*, *2* (163-194), p.105

Guest, J, F., Fuller, G. W., Vowden, P. (2020) Cohort study evaluating the burden of wounds to the UK's National Health Service in 2017/2018: update from 2012/2013. *BMJ Open* 2020;10 e045253. doi:10.1136/ bmjopen-2020-045253

Guri-Rosenblit, S. (2009) *Digital Technologies in Higher Education: Sweeping expectations and actual effects*, Nova Science: New York

Guri-Rosenblit, S., Gros, B. (2011). E-learning: Confusing terminology, research gaps and inherent challenges. *Journal of Distance Education*, 25 (1)

Guy, H., Downie, F., McIntyre, F., Peters, J (2013) Pressure ulcer prevention: making a difference across a health authority*? British Journal of Nursing* 22(12Suppl): pp S4 – S13

Haesler, E., Rice, J. (2020) Wound management in communities with Limited Resources: the mission and achievements of the World Alliance for Wounds and Lymphoedema Care*. Wounds International*, 11 (2) pp18-21

Hart, C, (2005) *Doing a literature search: A guide for the Social Sciences*. London: Sage

Health and Care Professions Council (2018a) *Standards of conduct, performance and ethics.* https://www.hcpc-uk.org/registrants/cpd/standards   Accessed 8th November 2020

Health and Care Professions Council (2018a) *What are our standards for Continuing Professional Development*? https://www.hcpc-uk.org/publications/standards/ Accessed 8th November 2020

Healthcare Improvement Scotland (2011) Patient safety: **SSKIN care bundle.** Available from: http://www.healthcareimprovementscotland.org/our_work/patient_safety/tissue_viabil ity/sskin_care_bundle.aspx Date last accessed 9/7/20

Health Care Improvement Scotland (2013) http://www.healthcareimprovementscotland.org/our_work/patient_safety/tissue_viabil ity/sskin_care_bundle.aspx. Accessed 28th January 2020

Health Care Improvement Scotland (2016) *Prevention and management of Pressure Ulcers*.http://www.healthcareimproventscotland.org/our_work/patient_safety/tisue_vi ability_resources/pressure_ulcer_standards.aspx accessed 10th June 2020
HEA (2019). *Technology enhanced learning.* Retrieved from https://www.heacademy.ac.uk/individuals/strategic-priorities/technology-enhanced-learning#section-2

Health Education England, NHS England & Skills for Health. (2018) *National Wound Care Strategy Core Capabilities for England*. Skills for Health: England

Hegney, D. G., Francis, K. (2015) Action research: changing nursing practice. *Nurs Stand.* 2015 Jun 3;29(40):36-41

Higher Education Funding Council (2009) *Higher Education Funding Council Annual report and accounts 2009-10.* The National Stationary Office: London

Higher Education Funding Council for England (2009) *Enhancing learning and teaching through the use of technology: A revised approach to HEFCE's strategy for e-learning.* Bristol: Higher Education Council for England. Accessed 28th January 2019 http://www.hefce.ac.uk/pubs/hefce/2009/09_12/09_12.pdf

Huy Hoang, N. (2012) *The development of a conceptual framework and model for Information, Education and Communication (IEC) to reduce antibiotic misuse among the Vietnamese population in Nam Dinh province* (Doctoral dissertation, Birmingham City University)

Holloway, I., Wheeler, S. (2013) *Qualitative Research in Nursing & Healthcare*. Wiley & Sons: Oxford

Holmes, G.D. (2020) Researcher Positionality – A Consideration of Its Influence and Place in Qualitative Research – A New Researcher Guide. *International Journal of Education*, Vol.8, No. 4, 1-10

Hoogendoorn, I., Reenalda, J., Koopman, B.F., Rietman, J.S. (2017. The effect of pressure and shear on tissue viability of human skin in relation to the development of pressure ulcers: a systematic review. *Journal of Tissue Viability*, 26(3), pp.157-171

Hope, M. (2014) *Help nurses care – A view from the front line on the 'Stop the Pressure' campaign*. Available from: https://www.england.nhs.uk/blog/stop-the-pressure/. Date last accessed 9/7/19

Hopkins, A., Dealey, C., Bale, S., Defloor, T., Worboys, F. (2006) Patient stories of living with a pressure ulcer. *Journal of Advanced Nursing* Nov; 56(4):345-53

Hultin, L., Gunningberg, L., Coleman, S., Karlsson, A. C. (2022) Pressure ulcer risk assessment – registered nurses experiences of using PURPOSE T: A focus group study. *J Clin Nurs*. 31: 231 – 239

International Federation of Red Cross (IFRC), (2013) *Planning & Evaluation Department*. Geneva

Illeris, K. (2017) Transformative learning as change and development of identity. In *Transformative learning meets bildung* (pp. 179-190). Brill Sense

Illeris, K, (2017) Peter Jarvis and the understanding of adult learning. *International Journal of Lifelong Education*, 36(1-2), pp.35-44

Imenda, S., (2014) Is There a Conceptual Difference Between Conceptual and Theoretical Frameworks? *Journal of Social Science*, 38(2):185-195

Jackson, D., Sarki, A.M., Betteridge, R., Brooke, J. (2019) Medical device-related pressure ulcers: a systematic review and meta-analysis. *International Journal of Nursing Studies, 92*, pp.109-120

Jarvis, P. (2008) *Adult Education and Lifelong learning - Theory and Practice*: Rouledge: Falmer

Jarvis, P., Watts, M. (2012) *The Routledge international handbook of learning* (p. 15). Routledge: London

Johansen, E., Moore, Z., van Etten, M., Strapp, H. (2014) Pressure ulcer risk assessment and prevention: What difference does a risk scale make? A comparison between Norway and Ireland. *J Wound Care* 23(7) 369–78

Johnson, N., Davies, D. (2000) Continuing professional development. In: Carter Y, ed. Medical Education and Training. From Theory to Delivery. Oxford, UK: Oxford University Press; 2009:157–170

Jones, J.E., Baran, M.L., Steuber, J.A. (2019) Effective Teaching Strategies to Connect With the Adult Learners' Worldview. In *Outcome-Based Strategies for Adult Learning,* pp. 84-92. IGI Global

Jung, C. (1969) *The Nature of the Psyche.* Trans. by R.E C. Hull. Bollingen Series XX, Vol. 8. Princeton University Press: Princeton, N.J.

Kahu, K. (2013) Framing student engagement in higher education. *Studies in Higher Education, 38*(5), 758–773

Kaushik, V., Walsh, C. A. (2019). Pragmatism as a Research Paradigm and Its Implications for Social Work Research. *Social Sciences*, 8, 1-17. https://doi.org/10.3390/socsci8090255

Kenedi, R.M., Cowden, J.M. Eds. (1973) *Bedsore Biomechanics* 1st Ed: the Macmillan Press, 1976. 301-310

Kennedy, M., Dunn, T.J. (2018) Improving the use of technology enhanced learning environments in higher education in the UK: A qualitative visualization of students' views. *Contemporary Educational Technology*, *9*(1), pp.76-89

Keys, A., Brozek, J., Henschel, A., Michelsen, O., Taylor, H.L. (1950) *The Biology of Human Starvation*. University of Minnesota Press: Minneapolis, MN

Kirkwood, A., Price, L. (2013) Missing: Evidence of a scholarly approach to teaching and learning with technology in higher education. *Teaching in Higher Education, 18*, 327–337

Kirkwood, A., Price, L. (2014) Technology-enhanced learning and teaching in higher education: what is 'enhanced' and how do we know? A critical literature review. *Learning, Media and Technology*, 39 (1) pp. 6-36

Knapp, A. (1833) *Platon's Erziehungslehire als Padaogik fur die Einzenlnen und als Staatspadogogik*, Leipzig, Minden

Knowles, M. (1968) "Andragogy not pedagogy" *Adult Leadership*, Vol.16 No. 10, pp 350-352

Knowles, M.S. (1970) *The Modern Practice of Adult Education: Andragogy versus Pedagogy*. Association Press: New York.

Knowles, M. (1980) *The Modern Practice of Adult Education.* Follett Publishing: Chicago, IL

Knowles, M.S. (1988) *The Adult Learner: a neglected species*. Houston TX: Gulf Publishing

Knowles, M.S. (1989) The Making of an Adult Educator. Jossey-Bass, San Francisco.

Knowles, M. (1990) *The Adult Learner: a neglected species*, Houston: Gulf Publishing

Knowles, M., Holton, E., III, Swanson, R. (1998). *The adult learner* (5th ed.). Houston, TX: Gulf Publishing.

Knowles, M, Holton, I.E.R., Swanson, R. (2015) 8th ed *The Adult Learner* Routledge: Abingdon: Oxon

Kolb, D.A. (1984) *Experiential learning: Experience as the source of learning and development.* Prentice-Hall, Englewood Cliffs: NJ

Kosiak, M. (1959) Eitology and pathology of ischemic ulcers. *Archives of Physical Medicine and Rehabilitation* 40 (02), 62 – 69

Kottner, J., Gefen, A., Lahmann, N. (2011) Weight and pressure ulcer occurrence: a secondary data analysis. *International Journal of Nursing Studies. 48*(11), pp.1339-1348.

Larouche, J., Sheoran, S., Maruyama, K., Martino, M.M. (2018) Immune regulation of skin wound healing: mechanisms and novel therapeutic targets. *Advances in Wound Care*, *7*(7), 209-231

Larsen, B., Holstein, P., Lassen, N.A. 1979. On the pathogenesis of bedsores. *Scandinavian Journal of Plastic and Reconstructive Surgery*, *13*(2), pp.347-350

Lawton, S. (2019) Skin 1: anatomy, physiology and function. *Nursing Times;* 115: 12, 30-33

Leavy, P. (2017). *Research design: quantitative, qualitative, mixed methods, arts-based, and community-based participatory research approaches.* Guilford Press: New York

Lechner, A., Lahmann, N., Neumann, K., Blume-Peytavi, U., Kottner, J. (2017) Dry skin and pressure ulcer risk: A multi-center cross-sectional prevalence study in German hospitals and nursing homes. *International Journal of Nursing Studies*, *73*, pp.63-69

Lecko, C. (2018) Assessing nutritional status to reduce risk of pressure ulcers. *Nursing Times;* 114: 6, 44-46

Lewin, K. (1946) Action Research and Minority Problems *Journal of Social Issues* Volume 2, Issue 4 p. 34-46

Lian, Y. (2016) Barrier products in the treatment of incontinence-associated dermatitis. *Nurs Stand*, *30*(47), pp.59-69

Lim, S.L., Ong, K.C.B., Chan, Y.H., Loke, W.C., Ferguson, M., Daniels, L. (2012) Malnutrition and its impact on cost of hospitalization, length of stay, readmission and 3-year mortality. *Clin. Nutr.* 31, 345–350

Lindeman, E (1926) *The Meaning of Ault Education.* New Republic: Incorporated

LoBiondo – Wood, G., Haber, J. (2002) *Nursing Research: Methods, Critical Appraisal and Utilisation.* Mosby: London

Lonie, J.M., Desai, K.R. (2015) Using transformative learning theory to develop metacognitive and self-reflective skills in pharmacy students: a primer for pharmacy educators. *Currents in Pharmacy Teaching and Learning*, *7*(5), pp.669-675

Lowe, J.S., Holton III, E.F. (2005) A theory of effective computer-based instruction for adults. *Human Resource Development Review*, *4*(2), pp.159-188

Luse, A., Mennecke, B., Townsend, A. (2012). Selecting a Research Topic: A Framework for Doctoral Students*. International Journal of Doctoral Studies*, 7, 143-152. 16

Lyman M (2019) The Remarkable Life of the Skin: *An Intimate Journey Across our Surface.* Bantam Press: London

Mahoney, K., Kembery, K. (2020) *TVN2gether Virtual Stop the Pressure* 2020 Episode 3: [S] Surface. www.youtube.com/watch?v=FaT1KA9hXWQ (Last accessed: 1ST November 2021)

Manfra, Mc., M. (2019) Action Research and Systematic, Intentional Change in Teaching Practice. *Review of Research in Education*, Vol 43, Issue 1 pp 163-196

Mann, K., Gordon, J., MacLeod, A, (2009) Reflection and reflective practice in health professions education: a systematic review. *Advances in Health Sciences Education*, *14*, pp.595-621

Mamede, S., van Gog, T., Moura, A.S., de Faria, R.M., Peixoto, J.M., Rikers, R.M., Schmidt, H.G. (2012) Reflection as a strategy to foster medical students' acquisition of diagnostic competence. *Medical education*, *46*(5), pp.464-472

Maslow A. (1968) Some educational implications of the humanistic psychologies. *Harv Educ Rev*; 38:685–696

Maxwell, J. A. (2013) *Qualitative Research Design: An Interactive Approach* (3ed ed.). Thousand Oaks, CA: Sage

Merriam, S.B., Brockett, R.G. (2007). *The profession and practice of adult education: An introduction*. San Francisco: John Wiley & Sons, inc

Merriam, S. B., Caffarella, R. S., Baumgartner, L. (2007) Learning in adulthood: A comprehensive guide (3rd ed.). San Francisco: Jossey-Bass

Merriam, S. B., Tisdell, E. J. (2016). *Qualitative Research: A Guide to Design and Implementation* (4th ed.). San Francisco, CA: Jossey Bass

Mezirow, J. (1978). Perspective transformation. *Adult Education Quarterly*, 28, 100-110

Mezirow, J. (1981) "A critical theory of adult learning and education". *Adult Education*, Vol. 32 No 1, pp 3 – 24

Mezirow, J. (1991) *Transformative Dimensions of Adult Learning.* Jossey-Bass: San Francisco

Mezirow, J. (1997). Transformative learning: Theory to practice. *New Directions for Adult and Continuing Education*, (74), 5-12

Miles, M. B., Huberman, A. M., Saldaña, J. (2014). *Qualitative data analysis: A methods sourcebook* (3rd ed.). Thousand Oaks, CA: SAGE Publications

Moore, Z.E.H., Cowman, S. (2014) Risk assessment tools for the prevention of pressure ulcers. *Cochrane Database Syst Rev* (2):CD006471. doi: 10.1002/14651858.CD006471.pub3

Moore, Z.E.H., Patton, D. (2019) Risk assessment tools used for the prevention of pressure ulcers. *Cochrane Database of Systematic Reviews;* 1: CD006471

Moreno, J.L. (1953) How Kurt Lewin's "Research Center for Group Dynamics" *Sociometry*, Vol. 16, No. 1, pp. 101-104

Morgan, D.L. (1997) *Focus Groups as Qualitative Research.* 2nd Edn. Sage: London

Morgan, D., L. (2014) Pragmatism as a Paradigm for Social Research. *Qualitative Inquiry*, Vol. 20(8) 1045–1053

Mukhalalati, B. (2016) *Examining the disconnect between learning theories and educational practices in the PharmD programme at Qatar University: a case study*. https://core.ac.uk/download/pdf/84915028.pdf. Up-dated 2016

Mukhalalati, B.A., Taylor, A. (2019) Adult learning theories in context: a quick guide for healthcare professional educators. *J Med Educ Curric Dev* V 6: 1 – 10

Nachmias, C V., Nachmias, D. (1992) *Research Methods in the Social Sciences*, Volume 1. USA: St. Martin's Press

National Audit Office. (2020) *Digital Transformation in the NHS.* National Audit Office: London

Newman, I., Covrig, D.M. (2013) Building consistency between title, problem statement, purpose, & research questions to improve the quality of research plans and reports. *New Horizons in Adult Education and Human Resource Development*, *25*(1), pp.70-79

NHS Digital (2018) *The future of healthcare: our vision for digital, data and technology in health and care*. Department of Health and Social Care. London

NHS England Safety Thermometer. (2014) *Patient Harms and Harm Free Care. December 2012-December 2013, official statistics*.
Available from: https://digital.nhs.uk/data-and-information/publications/statistical/nhs-safety-thermometer-report/nhs-safety-thermometer-report-december-2012-to-december-2013 Date last accessed 9/7/19

NHS England (2014) *Five Year Forward View*. https://tinyurl.com/oxq92je *(Accessed 4th November 2021)*

NHS England. (2016) *NHS Safety Thermometer Report January 2016 to January 2017*. NHS Digital: London
NHS England & Improvement. (2019a) *NHS Long Term Plan*.
https://tinyurlcom/y65q8n6f (accessed 4th November 2021)

NHS England & Improvement, (2019b) *The NHS patient safety strategy. Safer culture, safer systems, safer patients*. NHS: London

NHS Improvement (2018a) *Pressure ulcers: revised definition and measurement. Summary and recommendations*. Bit.ly/PressureUlcersNewDef

NHS Improvement, (2018b). Plan. *Do, Study, Act (PDSA) Cycles and the Model for Improvement. improvement. nhs. uk/resources/pdsa-cycles*

NHS Improvement. (2019) *Implementing the pressure ulcer framework in local reporting systems and reporting to the NRLS.* NHS

NHS Midlands and East. (2012) *Pressure ulcers.* www.stopthepressure.com, (Accessed 15th February 2020)

NHS Wales (2010) *1000 Lives Plus. Pressure Ulcer Safety Cross.* tinyurl.com/safety-cross

NHS Wales. (2013) *Pressure Ulcer Prevention - SKIN Bundle.*
Available from: http://www.wales.nhs.uk/sitesplus/863/page/65480 Date last accessed 9/7/19

National Institute of Adult Continuing Education (2009) *Readibility: How to Produce Clear Written Materials for a Range of Readers.* NIACE

National Institute for Health and Clinical Excellence. (2005) *Pressure Ulcers - prevention and treatment,* NICE: London

National Institute for Health and Care Excellence. (2014a) *Costing Statement: Pressure Ulcers Implementing the NICE guideline on pressure ulcers (CG179).* Available at: https://www.nice.org.uk/ guidance/cg179/resources/costing-statement-248688109 (accessed 04.08.2016)

National Institute for Health and Care Excellence. (2014b) *Pressure Ulcer prevention: the prevention and management of pressure ulcers in primary and secondary care. Clinical Guideline 179,* NICE: London

National Institute for Health and Care Excellence. (2015) *Pressure ulcer. Quality Standard (QS89),* NICE: London

National Institute for Health and Care Excellence. (2019) *Mepilex Border Heel and Sacrum dressings for preventing pressure ulcers*. https://www.nice.org.uk/guidance/mtg40. Accessed 11 Jan 2019

National Patient Safety Agency (2010a) *NHS to adopt zero tolerance approach to pressure ulcers*. www.npsa.nhs.uk/ corporate/news/nhs-to-adopt-zero-tolerance-approachto-pressure-ulcers/ (accessed 6 June 2021)

National Patient Safety Agency (2010b) *Serious Incident Reporting and Learning Framework (SIRL) National framework for reporting and learning from serious incidents requiring investigation*, www.nrls.npsa.nhs.uk/report-a-patient-safety-incident/patient-safety-direct/serious-incident-reporting-and-learning-framework-sirl/ (accessed 6th January 2021)

National Pressure Ulcer Advisory Panel, European Pressure Ulcer Advisory Panel and Pan Pacific Pressure Injury Alliance. *Prevention and Treatment of Pressure Ulcers: Clinical Practice Guideline.* In Emily Haesler (Ed). (2014) Cambridge Media: Osborne Park, Western Australia

Newman, I., Covrig, D.M. (2013) Building consistency between title, problem statement, purpose, & research questions to improve the quality of research plans and reports. *New Horizons in Adult Education and Human Resource Development*, *25*(1), pp.70-79

Newport, L., Roberts, D. (2021) Developing online training in wound care. *British Journal of Nursing*, *30* (12), pp. S37-S38

Newton, H. (2010) Reducing pressure ulcer incidence: CQUIN payment framework in practice. *Wounds UK* 6 (3) 38–46

Nielsen, K. A. (2009) Aktionsforskningens videnskabsteori. In L. Fuglesang (Ed.), Videnskabsteori i samfundsvidenskaberne (pp. 517–547). Frederiksberg, Denmark: Roskilde Universitetsforlag

Nieswiadomy, R.M. (2012) *Foundations of Nursing Research*. Boston: Pearson

Nixon, J., Smith, I.L., Brown, S., et al (2019) Pressure relieving support surfaces for pressure ulcer prevention (PRESSURE 2): clinical and health economic results of a randomised controlled trial. *E Clinical Medicine*. 14, 42-52

Nixon, J., Nelson, E.A., Rutherford, C., Coleman, S., Muir, D., Keen, J., McCabe, C., Dealey, C., Briggs, M., Brown, S., Collinson, M., Hulme, C.T., Meads, D.M., McGinnis, E., Patterson, M., Czoski-Murray, C., Pinkney, L., Smith, I.L., Stevenson, R., Stubbs, N, Wilson, L., Brown, J.M. (2015) Pressure UlceR Programme Of reSEarch (PURPOSE): using mixed methods (systematic reviews, prospective cohort, case study, consensus and psychometrics) to identify patient and organisational risk, develop a risk assessment tool and patient-reported outcome Quality of Life and Health Utility measures. Southampton (UK): *NIHR Journals Library*; 2015 Sep. PMID: 26447265

Norman, K., Pichard, C., Lochs, H., Pirlich, M. (2008) Prognostic impact of disease-related malnutrition. *Clinical Nutrition*, *27*(1), pp.5-15

Nottingham Healthcare NHS Foundation Trust. (2014) *React to Red* https://www.reactto.co.uk/resources/react-to-red/ (accessed 1st November 2021)

Notter, J., Holsbrink, G., Wynne N. (2014) Eindrapport van de ontwikkeling van een interactieve en virtuele afdeling voor de opleiding van Verpleegkundigen Birmingham City University and Saxion University of Applied Sciences

NPUAP/EPUAP. (2009) *Prevention and Treatment of Pressure Ulcers: Clinical Practice Guideline.* National Pressure Ulcer Advisory Panel. Washington: DC

Nursing and Midwifery Council. (2015) *The Code – Professional Standards of Practice and Behaviour.* NMC: London

Nursing and Midwifery Council. (2016) *Revalidation.* NMC: London

Nursing and Midwifery Council. (2018) *The Code – Professional Standards of Practice and Behaviour*. NMC: London

Nursing and Midwifery Council. (2019), *Future Nurse; Standards of Proficiency for Registered Nurses*. https://www.nmc.org.uk/globalassets/sitedocuments/standardsof-proficiency/nurses/future-nurse-proficiencies.pdf

Nursing and Midwifery Council. (2023) *Standards for pre-registration nursing programmes*. NMC: London

Nyamajiyah, H., Fletcher, J., Jacklin, Dunn, K.W., Adderley, U. (2021) A brief introduction to national secondary care data sets and their use in capturing and reporting pressure ulcer occurrence *Wounds UK* 17(3): 16–9

Öberg, J., Hernwall, P. (2016) Participatory design with teachers: designing the workshops. Designs for Learning, *Proceedings of the 5th International Conference on Designs for Learning*. Aalborg: Aalborg University Press, p. 269- 282

Odena, O. (2013) Using software to tell a trustworthy, convincing and useful story. *International Journal of Social Research Methodology*, *16*(5), pp.355-372

Oermann, M.H. (2015) Technology and teaching innovations in nursing education: Engaging the student. *Nurse Educator*, 40(2),55–56

O'Leary, Z. (2004) *The Essential Guide to doing Research*. London: Sage

Oomens, C.W.J., 1985. A mixture approach to the mechanics of skin and subcutis: a contribution to pressure sore research. *PhD Thesis 4 Research NOT Tu/e/Graduation NOT Tu/e*, University of Twente. Technische Hogeschool Twente

Ousey, K. (2014) Identifying and categorising skin damage. *Wounds UK*, Vol. 10 (S1), 20-25

Ozuah, P. O. (2005) First, there was pedagogy and then came andragogy. *Journal of Biology & Medicine*. 21(2), 83-87.

Page, B., Robinson, S. (2008) *Skin Integrity; the basics of skincare. A framework for study reflection.* http://thewoundcentre.com/a/ wp-content/uploads/2010/07/Skin-Integrity-Framework-for-studyreflection.pdf (accessed 20th July 2021)

Palaganas, E.C., Sanchez, M.C., Molintas, M.V.P., Caricativo, R.D. (2017) *Reflexivity in qualitative research*: A Journey of Learning. *The Qualitative Report*, 22(2), 426-438.

Palmer, B., Leone, C., Appleby, J. (2021) *Recruitment of nurses from overseas*. The Nuffield Trust. London

Pancorbo-Hidalgo, P.L. (2006) Risk assessment scales for pressure ulcer prevention: a systematic review. *Journal of Advanced Nursing;* 54: 1, 94-110

Parkinson, S., Eatough, V., Holmes, J., Stapley, E., Midgley N. (2016) Framework analysis: a worked example of a study exploring young people's experiences of depression., *Qualitative Research in Psychology*, 13:2, 109-129, DOI:10.1080/14780887.2015.1119228

Patton, M.Q. (2002) *Qualitative evaluation and research methods* (3rd edn). Newbury Park, CA: Sage publications, London

Patton, M.Q. (2014) *Qualitative research & evaluation methods: Integrating theory and practice*. Sage publications, London

Richardson, A., Peart, J., Wright, S.E., Mccullagh, I.J. (2017) Reducing the incidence of pressure ulcers in critical care units. *International Journal for Quality in Health Care.* Vol. 29, No. 3 (June 2017), pp. 433-439

Pham, L. (2018) *A Review of key paradigms: positivism, interpretivism and critical inquiry*. DOI: 10.13140/RG.2.2.13995.54569

Phillips, C.J., Humphries, I., Fletcher, J., Harding, K., Chamberlain, G., Macey, S. (2016) Estimating the costs associated with the management of patients with chronic wounds using linked routine data. *International Wound Journal*, 16(6): pp. 1193-1197

Plath, D. (2013) Evidence-based practice. In M. Gray and S.A. Webb (Ed) *Social work theories and methods* pp. 229 – 249. Sage publications Ltd, London

Polit, D.F., Beck, C.T. (2004) *Nursing Research Principles and Methods*, Lippincott, Williams & Wilkins: Philadelphia

Polit, D.F. and Beck, C.T. (2008) *Nursing research: Generating and assessing evidence for nursing practice*. Lippincott Williams & Wilkins.

Posnett, J., Franks, P. (2007) *The cost of skin breakdown and ulceration in the UK. In Skin Breakdown - The silent epidemic*. Smith & Nephew Foundation

Posnett, J., Gottrup, F., Lundgren, H., Saal, G. (2009) The resource impact of wounds on health care providers in Europe. *J Wound Care* 18(4): 154–61

Posthauer, M.E., Banks, M., Dorner, B., et al. (2015) The role of nutrition for pressure ulcer management: National Pressure Ulcer Advisory Panel, European Pressure Ulcer Advisory Panel, and Pan Pacific Pressure Injury Alliance white paper. *Advances in Skin and Wound Care*. 28, 4, 175-188

Power, M., Brewster, L., Parry, G., et al. (2016) Multimethod study of a large scale programme to improve patient safety using a harm free care approach. *BMJ Open* 2016;6: e011886. http://dx.doi.org/10.1136/ bmjopen-2016-011886

Pratt, D. D. (1993) Andragogy after twenty-five years. *New Directions for Adult and Continuing Education*, 57, 15 -23

PUAP/NPIAP/PPPIA, European Pressure Ulcer Advisory Panel, National Pressure Injury Advisory Panel and Pan Pacific Pressure Injury Alliance. (2019) *Prevention and treatment of pressure ulcers/injuries: clinical practice guideline*. In: Heasler, E., ed. *The International Guideline*. EPUAP/NPIAP/PPPIA; 2019

Rachel, J.R. (2002) Andragogy detectives: a critique of the present, and a proposal for the future, *Adult Education Quarterly* 52: pp. 210 – 270

Ravitch, S.M., Carl, N.M. (2016) Validity: Process, strategies, and considerations. *Qualitative research: Bridging the conceptual, theoretical, and methodological*, pp.185-214.

Ravitch, S. M., Carl, N. M. (2019). *Qualitative research: Bridging the conceptual, theoretical, and methodological* (2nd ed.). Sage Publications

Ravitch, S.M., Riggan, M. (2017) Reason & rigor: How theoretical frameworks guide. *The Qualitative Report*, *21*(9), p.1708

Reddy, N. P., Krouskop, T. A. et al. (1975) Biomechanics of a lymphatic vessel. Blood Vessels 12(5): 261–78

Reeves, S., Fletcher, S., McLoughlin, C., Yim, A., Patel, K.D. (2017) Interprofessional online learning for primary healthcare: findings from a scoping review. *BMJ open*, *7*(8), p.e016872

Regoniel, P. (2020) *What is a Conceptual Framework? Expounded Definition and Five Purposes* [Blog Post]. In Research-based Articles**.** Retrieved from https://simplyeducate.me/2020/11/05/what-is-a-conceptual-framework/ accessed 5th December 2021

Reichel, S. (1958) Shearing force as a factor in decubitus ulcers in paraplegics. *Journal of the American Medical Association*. 166 (7), 762-763

Reswick, J.B., Rogers, J.E. (1976) Experience at Rancho Los Amigos Hospital with devices and techniques that prevent pressure ulcers. In: Kenedi, R.M., Cowden, J.M. Eds. *Bedsore Biomechanics* 1st Ed: the Macmillan Press, 1976. 301-310

Ribeiro, F., Fidalgo, F., Silva, A., Metrôlho, J., Santos, O., Dionisio, R. (2021) Literature Review of Machine-Learning Algorithms for Pressure Ulcer Prevention: Challenges and Opportunities*. Informatics*. 8.76 https://doi.org/10.3390/informatics8040076

Richards, M. (2016) Care Quality Commission: *State of care in acute NHS hospitals*. Available: http://www.cqc.org.uk/sites/default/files/20170302b_stateofhospitals_web.pdf Date last accessed May 2021

Richards, T., Coulter, A., Wicks, P. (2015) Time to deliver patient centred care. *BMJ* 350:h530 htpps//doi.org/10.11356/bmj.h530

Richardson, A., Peart, J., S.E., Mccullagh, I.J. (2017) Reducing the incidence of pressure ulcers in critical care units. *International Journal for Quality in Health Care.* Vol. 29, No. 3 (June 2017), pp. 433-439

Riyami, T. (2015) Main Approaches to Educational Research. *International Journal of Innovation and Research in Educational Sciences* Volume 2, Issue 5, ISSN (Online): 2349–5219

Roberts, S., Chaboyer, W., Leveritt, M., Banks, M., Desbrow, B. (2014) Nutritional Intakes of patients at risk of pressure ulcers in the clinical setting *Nutrition*, *30*(7-8), pp.841-846

Roberts, S., Chaboyer, W., Desbrow, B. (2015) Nutrition care-related practices and factors affecting nutritional intakes in hospital patients at risk of pressure ulcers. *Journal of Human Nutrition and Dietetics*, *28*(4), pp.357-365

Robineau, S., Nicolas, B., Mathieu, L., Duruflé, A., Leblong, E., Fraudet, B., Gélis, A., Gallien, P. (2019) Assessing the impact of a patient education programme on pressure ulcer prevention in patients with spinal cord injuries. *Journal of Tissue Viability*, *28*(4), pp.167-172

Robson, C., McCartan, K. (2016) *Real World Research* (4th ed.) Wiley

Rogers, C. (1951) "*Student Centred Teaching" Client Centred Therapy: It's Current Practices, implications& Theory*. New York: Houghton Mifflin Co., NY

Rogers, C. (1969) *Freedom to Learn*. Columbus, OH: Charles E. Merrill Publishing Co.

Samuriwo, R., Dowding, D. (2014) Nurses' pressure ulcer related judgements and decisions in clinical practice: A systematic review. International *Journal of Nursing Studies* 51(12): 1667–85

Sandoz, H., Obe, J.F., Jacklin, A. (2021) A new national Pressure Ulcer Surveillance system using The Model Hospital System: Phase. *Wounds UK, 17*(4), pp.14-21.

Sapford, R. (2007) *Survey research* (2nd edn) London: Sage: London
Sato, T., Haegele, J. A. (2017). Graduate students' practicum experiences instructing students with severe and profound disabilities in physical education. *European Physical Education Review*, *23*(2), 196–211. https://doi-org.bcu.idm.oclc.org/10.1177/1356336X16642717

Saye, J. W., Brush, T. (2007) Using technology-enhanced learning environments to support problem-based historical inquiry in secondary school classrooms. *Theory & Research in Social Education, 35*(2), 196–230

Schofield, A. (2018) In *Pressure Ulcer Core Curriculum*. NHS Improvement. London

Schön, D.A. (1987) *Educating the reflective practitioner: Toward a new design for teaching and learning in the professions*. Jossey-Bass: NY
Schunk, D.H., Journell, W., Alford, A., Watson, J., Belter, M. (2018) Self-regulated learning in the social studies classroom. *Connecting self-regulated learning and performance with instruction across high school content areas*, pp.89-124

Searle, C. (2004) *Qualitative Research Practice*, London: Sage

Sharp, C. A., Schulz, Moore., J. S., McLaws, M. L. (2019) Two-hourly repositioning for prevention of pressure ulcers in the elderly: patient safety or elder abuse*? Journal of Bioethical Enquiry*. 16, 1, 17-34

Silverman, D. (2005) *Qualitative Research: Theory, Research and Practice. Sage:* London

Silverman, D. (2020) *Interpreting Qualitative Data*, 6th edn. Sage: London

Skills for Health (2021) *National Wound Care - Core Capabilities Framework for England*. Skills for Health, England

Skinner, B.F. (1968) Teaching Science in High School—What Is Wrong? Scientists have not brought the methods of science to bear on the improvement of instruction. *Science, 159*(3816), pp.704-710

Smith, I.L., Nixon, J., Brown, S., Wilson, L., Coleman, S. (2016) Pressure Ulcer and wounds reporting in NHS hospitals in England part 1: audit of monitoring systems. *Journal of Tissue Viability*, 25 (2016), pp. 3-15

Spilsbury, K., Nelson, A., Cullum, N., Iglesias, C., Nixon, J., Mason, S. (2007) Pressure Ulcers and their Treatment and Effaces on Quality of Life: Hospital Inpatient Perspectives. *Journal of Advanced Nursing* Vol 57, Issue 5 pp. 495-504

Stake, R., E. (1995) *The Art of Case Study Research*. Thousand Oaks, CA: Sage

Stephenson, J. (2019) NHS pressure ulcer bill for pressure ulcer sores 53% in three years. *Nursing Times* https://tinyurl.com/y448hbsw accessed 5th November 2021

Stephenson, J., Ousey, K., Blackburn, J., Javid, F. (2021) Using past performance to improve future clinical outcomes in pressure ulcer prevention. *Journal of Wound Care, 30*(6), pp.440-447

Strauss, A., Corbin, J. (1998) *Basics of qualitative research: Grounded theory procedures and techniques*. 2nd ed. Thousand Oaks, CA: Sage.

Taylor, D.C., Hamdy, H. (2013) Adult learning theories: implications for learning and teaching in medical education: AMEE Guide No. 83. *Medical Teacher*, *35*(11), pp. e 1561- e1572

Thomson, S. B. (2011) Qualitative Research: Validity. *JOAAG*, Vol. 6. No 1

Thornberg, R., Charmaz, K. (2014) Grounded theory and theoretical coding. In *The SAGE handbook of qualitative analysis*, ed. U. Flick, 153–69. London

Thorndike, E.L. (1928) *Adult Learning*. Macmillan; New York

Torre, D.M., Daley, B., Stark-Schweitzer, T., Siddartha, S., Petkova, J., Ziebert, M. (2007) A qualitative evaluation of medical student learning with concept maps. *Medical Teacher*, *29*(9-10), pp.949-955

Townsend, Andrew. (2013) *Action Research: The Challenges of Changing and Researching Practice*. McGraw-Hill Education, UK

Tingle, J. (1997) Pressure sores: counting the legal cost of nursing neglect. *British Journal of Nursing* 1997; 6: 757–8

Tough, A. (1979) *The Adult's Learning Projects*. Ontario Institute for Studies in Education: Toronto

Universities and Colleges Application System (UCAS) (2020) *UCAS Undergraduate sector-level data resources 2020*. UCAS: England

Universities and Colleges Information Systems Association (2016). *2016 Survey of technology-enhanced learning for higher education in the UK.* Oxford: University of Oxford

Vanderwee, K., Clark, M., Dealey, C., et al. (2007) Pressure ulcer prevalence in Europe: a pilot study. *Journal of Eval Clin Pract* 13(2): 227–35

van Manen, M.A., 2014. On ethical (in) decisions experienced by parents of infants in neonatal intensive care. *Qualitative Health Research*, *24*(2), pp.279-287

Vaona, A., Banzi, R., Kwag, K.H., et al. (2018) *E-learning for health professionals*. Cochr. Database Syst. Rev. 1, Cd011736. doi: 10.1002/14651858.CD011736.pub2

Verdon, A., Jeffrey, C. (2020) *TVN2gether Virtual Stop the Pressure 2020* Episode 4: [K] *Keep Moving*. www.youtube.com/watch?v=CZWXgGLIlIY (Last accessed: 4th November 2021)

Vivanti, A., Ward, N., Haines, T. (2011) Nutritional status and associations with falls, balance, mobility and functionality during hospital admissions. *J. Nutr. Health Aging* 15, 388-391

Vygotsky, L.S. (1978) *Mind in Society: the Development of Higher Psychological Processes*. Cambridge, MA: Harvard University Press

Wahyuni, D., 2012. The research design maze: Understanding paradigms, cases, methods and methodologies. *Journal of applied management accounting research*, *10*(1), pp.69-80

Ward, D.J., Furber, C., Tierney, S., Swallow, V. (2013) 'Using framework analysis in nursing research: a worked example', *Journal of Advanced Nursing*, vol. 69, no. 11, pp. 2423–31

Watson, G (1960) "What do we know about learning?" *Teachers College Record*, pp. 253-257

Webb, R. (2018) Development of National Wound Care Strategy: debating the issues. *Journal of Wound Care*. 2018:27(6): 403 – 403

Welsh, L. (2017) What is the existing evidence supporting the efficacy of compression bandage systems containing both elastic and inelastic components A Systematic Review. *Journal of Clinical Nursing*. Volume 26, Issue 9-10 Pages: 1145-1437

Whitlock. J., Rowlands, S., Ellis, G., Evans, A. (2011) Using the SKIN Bundle to prevent pressure ulcers. *Nursing Times* 107(35): 20–23

Wighton, K. (2012) Exposed: How patients are dying needlessly from bedsores and the hospitals where you're most at risk. *Mail Online* 3 February 2012 https://tinyurl.com/y5uow-4kl Accessed 1st November 2020

Williamson, G.R., Bellman, L., Webster, J. (2012) *Research in Nursing and Healthcare*. London: Sage Publications

Wohlleben, F.J., (1777) *De gangraena generatim et in specie de illa quae est partium externarum a decubitu* (Doctoral dissertation, Thesis, Vieanna). In
National Pressure Ulcer Advisory Panel, European Pressure Ulcer Advisory Panel and Pan Pacific Pressure Injury Alliance. *Prevention and Treatment of Pressure Ulcers: Clinical Practice Guideline.* In Emily Haesler (Ed). Cambridge Media: Osborne Park, Western Australia; 2014

Woo, K.Y., Beeckman, D., Chakravarthy, D. (2017) Management of moisture-associated skin damage: a scoping review. *Advances in Skin & Wound Care*, *30*(11), p.494

Wright, D., Morgan, L. (2012) *An Independent Evaluation of Frameworks for Professional Development in Pharmacy*. Norwich, UK: University of East Anglia

Wynn, M. (2020) Patient Expectations of pressure ulcer prevention in the NHS, healthcare demands and national policy: a critical commentary. *British Journal of Nursing* Vol 29, N pp S26 – S31

Yardley, S., Teunissen, P.W., Dornan, T. (2012) Experiential learning: transforming theory into practice. *Medical teacher*, *34*(2), pp.161-164
Yin, R. K. (2013) *Case Study Research: Design and Methods*. Sage: London

Young, C. (2021) Using the 'aSSKINg' model in pressure ulcer prevention and care planning. *Nurs Stand*. 2021 Feb 3;36(2):61-66

Young, C., Fletcher, J. (2019) Pressure ulcer education 2: assessing patients' risk of pressure ulcers. *Nursing Times* [online]; 115: 11, 20-22
Young, T., (2017) Back to basics: understanding the aetiology of pressure ulcers. *Wounds UK*, *13*(3).

Yurdakul, I.K., Odabasi, H.F., Kilicer, K., Coklar, A.N., Birinci, G., Kurt, A.A. (2012) The development, validity and reliability of TPACK-deep: a technological pedagogical content knowledge scale. Computers and Education. 58 (3) pp. 964-977

Your Turn. (2013) *Campaigning to prevent pressure sores*. www.your-turn.org.uk accessed February 4th, 2014

Zmeyou, S I. (1998) Andragogy origins, developments and trends, *International Review of Education*, 44: pp. 103 – 108

5 Million Lives Campaign (2008*) Getting Started Kit: Prevent Pressure Ulcers How-to guide*. Cambridge, MA Institute for Healthcare Improvement. NHS

Appendix 1: NHS Trust - Ethics Approval Letter

Worcester Health and Care
NHS
NHS Trust

J. Stephen-Haynes, Consultant Nurse
Worcester Health & Care NHS Trust
Unit 2. Kings Court Business Park,
Charles Hastings Way Worcester
WR5 1JR.

15th April 2016

To Louise Toner

Associate Dean
Faculty of health, Education and Life Sciences
Birmingham City University
Edgbaston B15 3TN

Dear Louise Toner

Re: Title: The Development of a Conceptual Framework and an accompanying Technology Enhanced Learning Tool to reduce the incidence of Pressure Ulcers: a New Model for Practice.

Thank you for submitting your request for approval to undertake the above project. The Trust has reviewed all the documentation that you submitted and have decided that overall the project should be seen as a service evaluation. The whole focus is on training and developing a model for practice that can be used to support CPD to increase knowledge and understanding of pressure ulcer prevention.

There is no planned contact with patients, or with the clinical setting, as your only contact will be with staff who participate. Therefore your request regarding ethics approval has been transferred to us in the research and development office as we provide oversight and governance for all such projects. In consequence, your proposal has not been submitted to our full ethics committee, but to our sub-committee, whose role is to monitor and evaluate all project plans and development across the Trusts and to liaise with the main ethics committee, keeping them informed of the progress of all accepted projects and activities.

Having thoroughly checked the project plan and proposed activities, we can see no ethical issues or role conflicts that would prevent the project being carried out within our Trusts. Therefore, I am delighted to be able to inform you that you may go ahead and commence this service evaluation. We will require six monthly updates in progress and an annual written report, followed by a full report on completion.

Yours sincerely,

Jackie Stephen-Haynes

Consultant Nurse in Tissue Viability

Research and Development Office

Appendix 2: Survey Questions, November 2015

BIRMINGHAM CITY
University

PRESSURE ULCER SURVEY

1. Where do you work and in which clinical area?

    Organisation: Area:

    Worcestershire Acute Hospitals NHS Trust   [   ]

    Worcestershire Healthcare Partnership Trust
            Mental Health   [   ]
            Community

    In a Care Home   [   ]

2. Are you:

    A Registered Nurse   [   ]   Field _____

    An Allied Health Care Professional   [   ]   Profession _____

    A Midwife   [   ]

    A Healthcare Support Worker   [   ]

    Other   [   ]

    If other please specify what job you do?

3. Are you:

    Male   [   ]
    Female

4. What age are you?

    16 - 20   [   ]   36 – 40   [   ]   51 – 55   [   ]
    21 – 25   41 – 45   56 – 60
    26 – 30   45 – 50   61 – 65
    31 – 35   [   ]

5. Have you undertaken any studies related to pressure ulcer prevention?

    If yes, was it:

    A few hours   [   ]
    A half day
    An accredited course
    Other

    If other, please specify:

6. Do you use a pressure ulcer risk assessment tool to assess patient's risk of developing
    pressure ulcers?

    Yes always   [   ]
    Yes sometimes
    Not usually
    No

    If yes, what tool do you use?

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7. Do you feel competent in using the tool

Yes
No

If no, please state why

8. Do you use a nutritional assessment tool if a patient is deemed to be at risk of developing pressure ulcers

Yes always
Yes sometimes
No

If yes what tool do you use?

9. Do you feel competent in using the tool?

Yes
No

If no, why not?

10. Do you use a pressure ulcer grading tool?

Yes
No

If yes, please specify which one

11. Have you ever undertaken any online education?

Yes
No

If yes did you enjoy this type of learning?

Yes
No

If no, please specify why not

12. In your opinion what needs to happen to prevent pressure ulcers? Please explain your answer.

Thank you for completing this questionnaire, however if this is your second or more attempt to complete this survey, I would be very grateful if you could answer the following questions:

13. Have you previously undertaken this Virtual Case?

   Yes
   No

14. Did you manage to successfully complete the case previously?

   Yes
   No

   If no, please specify why not

15. Did you manage to successfully complete the case on this occasion?

   Yes
   No

   If no, please specify why not

   If yes, please state why you were able to complete this time

16. Do you feel online learning using a virtual case was helpful to facilitate your learning?

   Yes
   No

   If no, please specify why not

   If yes can you state how/why it did this?

17. Would you recommend undertaking this online learning to colleagues?

   Yes
   No

   If yes did you enjoy this type of learning?

   Yes
   No

   If no, please specify why not

   If yes, please state why

Appendix 3: NMC Code of Conduct

Nursing & Midwifery Council

The Code

Professional standards of practice and behaviour for nurses, midwives and nursing associates

prioritise people

practise effectively

preserve safety

promote professionalism and trust

Appendix 4: Participant Information Sheet

BIRMINGHAM CITY
University

PARTICIPANT INFORMATION SHEET

Title of study

The Development of a Technology Enhanced Learning Tool to Reduce the Incidence of Pressure Ulcers: A New Model for Practice

Invitation to take part

You are being invited to take part in a research study. However, before you decide, it is important for you to understand why the research is being undertake and what it will involve. Please take time to read the following information carefully and discuss it with others if you wish. If there is anything you are not clear about or if you would like more information, please contact me, my details are at the end of this information sheet. It is important for you to know that this information sheet and a consent form will be sent to you by your line manager when they invite you to take part in a Research workshop. Take time to decide if you wish to take part in the study.

Background to the Study

Pressure ulcer prevention has for decades been a cause of pain and suffering for patients reducing their quality of life and is an ever increasing financial burden for the NHS and other healthcare providers. Despite the numerous government initiatives, and research the challenge remains today. Worcestershire Health and Care Trust is leading this initiative together with Worcestershire Acute Hospitals NHS Trust.

What is the purpose of the study?

To develop a Technology Enhanced Learning Tool (TELT) to be offered to qualified and unqualified healthcare professional staff across the Worcestershire health economy. The aim is to determine if by improving the education and training of staff through the TELT what impact this might have on the incidence of pressure ulcers across Worcestershire.

Why have I been asked to take part.

Because you are a qualified/unqualified health care professional employed by the Worcestershire Health and Care Trust or Worcestershire Acute Hospitals NHS Trust caring for individuals at risk of developing pressure ulcers. Education and training is a fundamental component in reducing the incidence of pressure ulcers and hence you have been asked to access the TELT developed for this study.

Do I have to take part?

It is up to you whether you take part in the study or not. You can still undertake the TELT, but you will not have to complete the associated survey or focus group activity that is part of this research study.

What are the possible benefits of taking part in this research?

There will be a direct benefit to you as you will have undertaking education and training regarding pressure ulcer prevention that you can use to improve your knowledge and skills in assessing patients at risk of developing pressure ulcers. In addition, you can use this professional development for revalidation purposes where this is a requirement.

Will my taking part in this study be kept confidential?

Any information that is collected from you via the survey will be kept strictly confidential. Participation in a focus group is a shared activity with others taking part. However, none of the information obtained by the researcher would be attributable to anyone in the focus group. All information will be kept under lock and key and accessible only by the researcher.

Contact details/who should I contact if I need more information or would wish to express any concerns?

Louise Toner
Associate Dean
Birmingham City University
Faculty of Health
Westbourne Road
Edgbaston
Birmingham B153TN.
louise.tone@bcu.ac.uk
0121 331 7083

Appendix 5: Participant Consent Form

BIRMINGHAM CITY
University

	PARTICIPANT CONSENT FORM	Please initial	
		Yes	No
1.	I confirm that I have read the Participant Information Sheet for this Study and have had the opportunity to consider the information, ask questions and have had these answered satisfactorily.		
2.	I understand that my participation is voluntary and that I am free to withdraw at any time without giving reason.		
3.	I understand that no records will be kept of my responses to the survey or my participation in focus groups or interviews as all data will be anonymised.		
4.	I agree to take part in this study.		

Signature of Participant:

Date:

Signature of Researcher:

Date:

Virtual Case Creator Quick Start Guide

Non - Registered Staff Home Assessment

Username: _____

Password: _____

Welcome

Welcome to Acute NHS Trust and Community NHS Trust pressure area assessment and care education and training package.

You may well be aware of the NHS Midlands and East ambition to eliminate all avoidable category two, three and four pressure ulcers. In moving towards meeting this key target r Acute NHS Trust and Community NHS Trust commissioned the development of a bespoke educational training package focusing on pressure area care and assessment that should form part of all registered and non-registered nursing staff's yearly mandatory update.

This training package has been developed through Birmingham City University online simulation platform known as the Virtual Case Creator (VCC).

The VCC is a web-based training platform that presents care professionals with interactive practice simulations. Using a case study-based approach VCC replicates the reality of practice situations that front line staff face daily and provides a safe and flexible opportunity for observational, problem-solving and decision-making skills development.

As outlined by the Commissioning for Quality and Innovation (CQUIN) 2013/14 guidance (p.15)[1]; it is recommended that organisations prioritise improvement in pressure ulcer prevalence as national data suggests that pressure ulcers represent the majority of harm as measured under the NHS Safety Thermometer.

Each of the available VCC pressure area assessment and care simulation scenarios offer learners opportunities to:

- conduct a head-to-toe skin assessment.
- practice categorising, correctly recording and reporting pressure ulcer damage.
- gather relevant clinical information direct from the patient to inform risk assessment procedures.
- consolidate and extend their knowledge base using a range of evidence- based learning resources embedded throughout the simulation.

This workbook is designed to help guide you through the VCC learning opportunities. You can use this quick start as a navigational guide to help you to complete the training task. This guide is designed to be used electronically however you may wish to print a copy to use. Please feel free to adjust the colour and size of fonts to suit your own preferences.

It is estimated that this training package accounts for three hours of CPD time.

<u>P.C. Requirements</u>

To run the Virtual Case Creator from a home PC you will need the following:

- Internet connection – we recommend a broadband minimum 2MB connection.
- You also need to enable sound.
- You will need to install the latest flash player if you do not already have this. This is free to do and can be access here - http://get.adobe.com/flashplayer/
- We recommend you use one of the following web browsers;

 Internet Explorer

 Chrome

 Firefox

 Safari

<u>Creating Your Account</u>

1. The start the VCC click on the link provided on the tissue viability intranet page or alternatively go to http://comslive.health.bcu.ac.uk/vcc2/index.html

2. Click in the ' new students click here' text on the home login screen:

1. Enter the following authentication code to the code box: Wo655893000

VCC virtual**case**creator

Group Authentication code:
* required fields

* Code: [   ]

Your details:
* required fields

* Firstname: [   ]

* Lastname: [   ]

* Email: [   ]

* Username can not exceed 20 characters

* Username: [   ]

* Password: [   ]

* Confirm Password: [   ]

ⓘ Would you like to enter into the league table system?

I want to share the score in a group league table: ☐

Persona: [   ]

[signup] [cancel]

© Birmingham City University 2008

Type: Wo655893000 into the 'code' box

4. Complete all fields on the registration form marked with an *. Your user name and password can be chosen by you but please keep a note of them.

5. Enter a persona name, this should be something that you will recognise but no one else could identify you by such as your first pets' name.

6. Click sign up this will take you back to the login screen where you can enter the login details you have just created.

Performance Awards

There are 2 performance awards attached to each simulation;

The resources award shows you have accessed all the resources attached to this simulation.

The correct decisions award shows you have made all of the correct decisions.

What do I need to do in order to complete this training package?

The required benchmark achievement for this simulation is the following two performance awards

You know when you have achieved these awards when the respective icons become highlighted on the case selection screen as shown below.

When you have achieved all three awards you will be able to retrieve your certificate of achievement which you need to show your line manager as evidence of your completion of this training package. You may then add it to your professional portfolio as evidence towards your completion of your NMC required CPD hours.

Getting Started

Once you have logged in to the Virtual Case Creator you will be able to see six small images along the bottom of your screen. These represent each of the available online simulation activities.

To browse the potential case selection click on the small images. This will automatically change the large picture in the centre of the screen. You are free to select whichever case you feel is most relevant to your own practice.

To complete the registered nursing staff acute ward simulation click on each of the small images until the large image that appears labelled:

"Carole Bishop (Community NHS Trust Non -Registered Nursing –Home)"

Handover

To begin your simulation of Carole Bishop it is important to receive a handover report.

Listen carefully to the handover report about Carole you can use the video control bar to pause and rewind if necessary – this will appear by hovering your mouse over the video image.

Click and Drag

When you first enter your chosen simulation environment you can move around by left clicking and holding the button on your mouse whilst dragging your cursor left and right.

Before you begin your assessment of Carole make your way to the 'Learning Zone' by clicking on the lounge door which will glow green as you move your cursor over the area.

The 'Learning Zone' is where you will find the majority of the learning materials you need to develop or consolidate your knowledge on pressure ulcer development, assessment and care.

Accessing Resources

Anything that glows pink in a scene represents a learning resource to help refresh, consolidate and expand your knowledge in relation to pressure area care and assessment.

You will find learning resources in the following places in the learning zone:

- On the computer sitting on the desk
- By clicking on the nurse in the scene
- In the bookcase cupboard by clicking on the doors
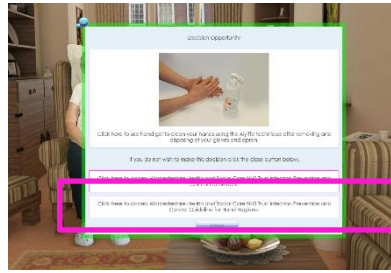
Spend some time exploring the available learning material.

There are also resources attached to decisions throughout the simulation. Any resources will have a pink outline as shown above.

Remember to achieve your all resources award you must access all of the resources in the simulation. This means that when you are making a decision and resources are involved in that decision you need to click on and explore these or they will not be counted towards achieving the resources award.

Starting Your Assessment

To go to the patient lounge area, click on the navigation icon on the bottom left of the screen;

This will take you back to the panorama image; now drag your cursor to the patients bed space, the area will turn green simply click to enter.

Making Decisions

Once in the patients patient lounge area as you move your cursor around the screen you will see that many things glow green; these represent potential decisions.

If you click on the 'more decisions' head icon – you will see a list of other potential decisions, many of which allow you to speak to the patient to gather important information to inform your assessment.

To make a decision simply click on the green 'hotspot' or click to select it from the 'more decisions' head.
To begin spend some time exploring the potential decision making opportunities available in the simulation.

Hint: The first three decisions to get you started are;

1. Introduce yourself - click the 'more decisions' head then 'introduce yourself' label
2. Initial hand washing - click the 'more decisions' head then 'initial hand washing' label
3. Comfort assessment - click the 'more decisions' head then 'comfort assessment' label

Hint: Look out for other hints along the way to help guide you.

Getting it Right

The aim of the simulation is to make all the correct decisions in the correct order. You can attempt the simulation as many times as you like.

To review the decisions you have made simply click on the review decisions icon from the activity menu;

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 You can then drag and drop decisions into your preferred order or delete decisions from the list - they will then reappear in the simulation to be available for reselection.

Hint: This is a good method to use if you wish to review information again.

Remember to get your all decisions award you need to make all the correct decisions but not necessarily in priority order. We have chosen not to require you to do this as every patient is different and if you are faced with someone complaining of discomfort in a particular area you are very likely to start off by looking at this area. There is a right order to do things in but reality doesn't always allow this.

Hint: You can use your feedback to inform your subsequent attempts.

How do I get my certificate?

1. Once you have submitted and received your feedback you can click on the portal button on the bottom of the submission pane.
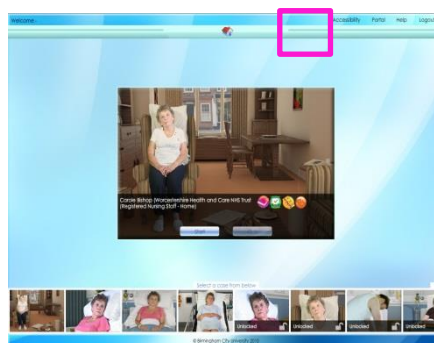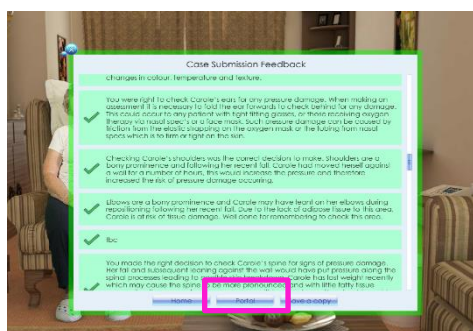
Alternatively you can use the portal link on the case selection home screen.

2. Once in the portal click on the cases tab, then select the case you have just completed. NB the case may appear in a different order on your screen.

3. Here you will be able to view your personal analytics against the personal performance meters and graphs.

4. To retrieve your certificate look to the top line for the set benchmark. If you have reached the benchmark standard a line of text will appear inviting you to click here to download your certificate. Once you have clicked the link your certificate should download and your name should appear on the certificate. Please print or save this certificate as evidence of your completion of training.

5. You can click on the league table tab to view how your performance has ranked against other nurses working within the trust – to do so look for your personal persona name which you set when you registered.

Still stuck?

If you are still struggling or need some advice please email the VCC admin team at vccadmin@bcu.ac.uk or call 0121 331 6077/ 0121 202 4530.

What does it all mean?

Quick Reference Guide

The activity menu

The activity menu is where you will find most of the VCC activity options as listed below. You can also use the meters to monitor your progress. The pink meter tells you the number of resources you have explored. The orange meter tells you the number of potential decisions there are in total and the number you have explored over a number of sittings. The green meter tells you the number of decisions you can and have made in your current sitting.

	More Decisions Clicking on the 'more decisions' icon will reveal what is termed the 'non visual' decisions associated with the simulation.
	Review Decisions The 'review decisions' icon allows you to review the decisions you have made at any point during the simulation. When reviewing your decisions you can drag and drop a decision if you wish to rearrange the order; you can also delete decision and they will then reappear in the simulation available for reselection.
	Your Notes 'Your notes' icon allows you to open a note pad to record information during the simulation. You can then save this information to your desktop. However remember if you leave the simulation without saving your notes they will be lost.

	Menu The menu icon reveals a number of activity options as listed below.
	Handover Video You can replay the handover video at any time by using this icon.
	Help The help icon opens our extensive help menu which you can scroll through to find out more about the VCC.
	Accessibility The accessibility menu allows you to adjust the VCC to suit your own learning needs. You can change the size of font, foreground and background colours.
	Volume You can adjust the volume control of the VCC using this icon but remember to make sure the sound on your PC is switched on first.
	Panorama The panorama icon takes you back to the main panorama image to allow you to navigate to other areas by clicking and dragging.
	All resources award All resources award shows you have accessed all the resources attached to this simulation.
	All Correct Decisions Award All correct decisions award show you have made all of the correct decisions.

Virtual Case Creator Quick Start Guide
Registered Nursing Staff - Acute Ward

Username: _____

Password: _____

Welcome

Welcome to NHS Trust pressure area assessment and care education and training package.

You may well be aware of the NHS Midlands and East ambition to eliminate all avoidable category two, three and four pressure ulcers. In moving towards meeting this key target Acute Trust and Community NHS Trust commissioned the development of a bespoke educational training package focusing on pressure area care and assessment that should form part of all registered and non-registered nursing staff's yearly mandatory update.

This training package has been developed through Birmingham City University online simulation platform known as the Virtual Case Creator (VCC).

The VCC is a web-based training platform that presents care professionals with interactive practice simulations. Using a case study-based approach VCC replicates the reality of practice situations that front line staff face daily and provides a safe and flexible opportunity for observational, problem-solving, and decision-making skills development.

As outlined by the Commissioning for Quality and Innovation (CQUIN) 2013/14 guidance (p.15)[1]; it is recommended that organisations prioritise improvement in pressure ulcer prevalence as national data suggests that pressure ulcers represent the majority of harm as measured under the NHS Safety Thermometer.

Each of the available VCC pressure area assessment and care simulation scenarios offer learners opportunities to:

- conduct a head-to-toe skin assessment.
- practice categorising, correctly recording and reporting pressure ulcer damage.
- gather relevant clinical information direct from the patient to inform risk assessment procedures.
- consolidate and extend their knowledge base using a range of evidence-based learning resources embedded throughout the simulation.

This workbook is designed to help guide you through the VCC learning opportunities. You can use this quick start as a navigational guide to help you to complete the training task. This guide is designed to be used electronically however you may wish to print a copy to use. Please feel free to adjust the colour and size of fonts to suit your own preferences.

It is estimated that this training package accounts for three hours of CPD time.

P.C. Requirements

To run the Virtual Case Creator from a home PC you will need the following:

- Internet connection – we recommend a broadband minimum 2MB connection
- You also need to enable sound
- You will need to install the latest flash player if you do not already have this. This is free to do and can be access here - http://get.adobe.com/flashplayer/
- We recommend you use one of the following web browsers;

 Internet Explorer

 Chrome

 Firefox

 Safari

Creating Your Account

3. The start the VCC click on the link provided on the tissue viability intranet page or alternatively go to http://comslive.health.bcu.ac.uk/vcc2/index.html

4. Click in the ' new students click here' text on the home login screen:

5. Enter the following authentication code to the code box: Wo655893000

Type: Wo655893000 into the 'code' box

4. Complete all fields on the registration form marked with an *. Your user name and password can be chosen by you but please keep a note of them.

5. Enter a persona name, this should be something that you will recognise but no one else could identify you by such as your first pets' name.

6. Click sign up this will take you back to the login screen where you can enter the login details you have just created.

Performance Awards

There are 2 performance awards attached to each simulation;

The resources award shows you have accessed all the resources attached to this simulation.

The correct decisions award shows you have made all of the correct decisions.

What do I need to do in order to complete this training package?

The required benchmark achievement for this simulation is the following two performance awards

You know when you have achieved these awards when the respective icons become highlighted on the case selection screen as shown below.

When you have achieved both awards you will be able to retrieve your certificate of achievement which you need to show your line manager as evidence of your completion of this training package. You may then add it to your professional portfolio as evidence towards your completion of your NMC required CPD hours.

Getting Started

Once you have logged in to the Virtual Case Creator you will be able to see six small images along the bottom of your screen. These represent each of the available online simulation activities.

To browse the potential case selection click on the small images. This will automatically change the large picture in the centre of the screen. You are free to select whichever case you feel is most relevant to your own practice.

To complete the registered nursing staff acute ward simulation click on each of the small images until the large image that appears labelled:

"Carole Bishop NHS Trust (Registered Nursing Staff Ward)"

<u>Handover</u>

To begin your simulation of Carole Bishop it is important to receive a handover report.

Listen carefully to the handover report about Carole you can use the video control bar to pause and rewind if necessary – this will appear by hovering your mouse over the video image.

<u>Click and Drag</u>

When you first enter your chosen simulation environment you can move around by left clicking and holding the button on your mouse whilst dragging your cursor left and right.

Before you begin your assessment of Carole make your way to the 'Learning Zone' by clicking on the nurse station which will glow green as you move your cursor over the area.

The 'Learning Zone' is where you will find the majority of the learning materials you need to develop or consolidate your knowledge on pressure ulcer development, assessment and care.

<u>Accessing Resources</u>

Anything that glows pink in a scene represents a learning resource to help refresh, consolidate and expand your knowledge in relation to pressure area care and assessment.

You will find learning resources in the following places in the learning zone:

- In the red folder on the top shelf of the book-case
- In the yellow folder on the middle shelf of the bookcase
- On the computer sitting on the desk
- By clicking on the nurse in the scene
- On the notes trolley
- On the drugs trolley

Spend some time exploring the available learning material.

There are also resources attached to decisions throughout the simulation. Any resources will have a pink outline as shown above.

Remember to achieve your all resources award you must access all of the resources in the simulation. This means that when you are making a decision and resources are involved in that decision you need to click on and explore these or these will not be counted towards achieving the resources award.

Starting Your Assessment

To go to the patient's bed space, click on the navigation icon on the bottom left of the screen;

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Making Decisions

Once in the patient's bed space as you move your cursor around the screen you will see that many things glow green; these represent potential decisions.

If you click on the 'more decisions' head icon – you will see a list of other potential decisions, many of which allow you to speak to the patient to gather important information to inform your assessment.

To make a decision simply click on the green 'hotspot' or click to select it from the 'more decisions' head.
To begin spend some time exploring the potential decision making opportunities available in the simulation.

Hint: The first three decisions to get you started are;

4. washing your hands - click the sink.
5. Introduce yourself - click the 'more decisions' head then 'introduce yourself' label.
6. Close the curtains – click on the curtains.

Hint: Look out for other hints along the way to help guide you.

Getting it Right

The aim of the simulation is to make all the correct decisions in the correct order. You can attempt the simulation as many times as you like.

To review the decisions, you have made simply click on the review decisions icon from the activity menu;

You can then drag and drop decisions into your preferred order or delete decisions from the list - they will then reappear in the simulation to be available for reselection.

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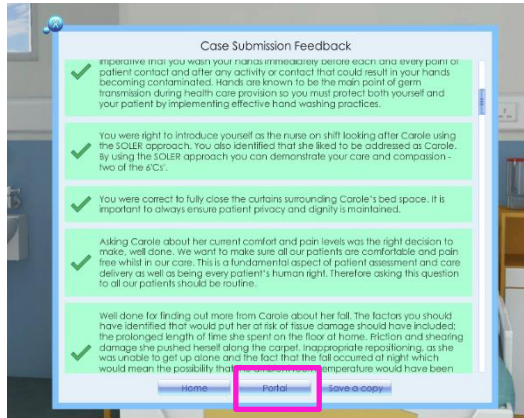
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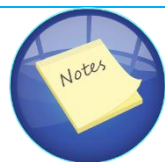
	### More Decisions Clicking on the 'more decisions' icon will reveal what is termed the 'non visual' decisions associated with the simulation.
	### Review Decisions The 'review decisions' icon allows you to review the decisions you have made at any point during the simulation. When reviewing your decisions you can drag and drop a decision if you wish to rearrange the order; you can also delete decision and they will then reappear in the simulation available for reselection.
	### Your Notes 'Your notes' icon allows you to open a note pad to record information during the simulation. You can then save this information to your desktop. However, remember if you leave the simulation without saving your notes they will be lost.

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	Panorama The panorama icon takes you back to the main panorama image to allow you to navigate to other areas by clicking and dragging.
	All resources award All resources award shows you have accessed all the resources attached to this simulation.
	All Correct Decisions Award All correct decisions award show you have made all of the correct decisions.

Appendix 8: Presentations

Wound Care Alliance UK, Skills Day 28th April 2022

Wound Care Alliance UK

Skills Day 2022

Sandy Park Conference Centre
Sandy Park Way, Exeter, EX2 7NN
Thursday 28th April 2022
9.00am – 4.30pm

Programme	
0900 - 0930	**Coffee and Registration**
0930 – 0945	<u>Introduction and Welcome</u> Jackie Stephen-Haynes, Chair WCAUK, Professor in Wound Healing, Birmingham City University James Burford - HR System Analyst Department of Health
0945 - 1030	<u>Keynote speaker</u> Juliet Price, Clinical Matron Tissue Viability, Royal Devon & Exeter Foundation Trust
1030 - 1100	**Coffee and view exhibitions**

1100 - 1200	Workshops
	  A. <u>Lower Limb Care</u>
	      Facilitated by: Jackie Stephen-Haynes, Chair WCAUK, Professor in Wound Healing, Birmingham City University
	  B. <u>Pressure Ulcers and Skin Care</u>
	      Facilitated by: Louise Toner - Professor and Associate Dean: Academic Portfolio & Marketing development, Faculty of Health, Education and Life Sciences, Birmingham City University
	  C. <u>Foot Care</u>
	      Facilitated by: Stella Harvey - Senior Lecturer in Podiatry - University of Northampton
	  D. <u>Wound Management & Assessment</u>
	      Facilitated by: Monique Maries - Tissue Viability Lead Nurse, Gloucester Acute Trust

1200 - 1300	Workshops
1300 - 1400	**Lunch and view exhibitions**
1400 - 1500	Workshops
1500 - 1600	Workshops
1600 - 1615	**Certificates and Close**

Wound Care Alliance UK

Skills Day 2022

The Jubilee Conference Centre
Nottingham NG7 2TU
Thursday 6th October 2022
8.45am – 4.30pm

Programme	
08.45 - 0930	Coffee and Registration

0930 – 0945	**Introduction and Welcome** Jackie Stephen-Haynes, Chair WCAUK, Professor in Wound Healing, Birmingham City University
0945 - 1030	**The Future of Nursing** Louise Toner - Professor and Associate Dean: Academic Portfolio & Marketing development, Faculty of Health, Education and Life Sciences, Birmingham City University
1030 - 1100	Coffee and view exhibitions
1100 - 1200	Workshops

    A.   **Lower Limb Care**
           Facilitated by: Jackie Stephen-Haynes, Chair WCAUK, Professor in Wound Healing, Birmingham City University

    B.   **Pressure Ulcers and Skin Care**
           Facilitated by: Louise Toner - Professor and Associate Dean: Academic Portfolio & Marketing development, Faculty of Health, Education and Life Sciences, Birmingham City University

    C.   **Foot Care**
           Facilitated by: Stella Harvey - Senior Lecturer in Podiatry - University of Northampton

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