University of Southern Queensland

UNDERGRADUATE NURSING STUDENTS' SATISFACTION AND SELF-CONFIDENCE WHEN ACCESSING AND USING ELECTRONIC MEDICAL RECORDS (EMR) IN THE CLINICAL ENVIRONMENT AFTER EMR EDUCATION IN THE NURSING LABORATORY

A Thesis submitted by

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ABSTRACT

Electronic medical records (EMR) have been implemented into the clinical healthcare environment to help develop effective clinical thinking, enhance patient documentation, and improve safe patient-focussed care. As Australian healthcare facilities strive towards the digital ages, the academic environment lags in the implementation of EMR into curricula due to cost, knowledge, and software support. Delays to the implementation of EMR into the academic curricula can lead to undergraduate nursing students being ill prepared to document patient data using EMR on clinical placement, impacting satisfaction and self-confidence accessing and using EMR. A retrospective, quasi experimental, single blind, post-test two group (intervention [EMR and paper] and control [paper]) cross-sectional research design was used to address the aim, hypotheses and research questions of the research project as measured by The Modified Student Satisfaction and Self-Confidence in Patient Documentation survey. Participants from one, (four campuses), regional Australian university (N=113) completed the post-test survey and reported no significant statistical differences after receiving paper or/and EMR education on satisfaction and self-confidence when documenting patient data on clinical placement. Findings from this research project identify the importance of EMR education on undergraduate nursing student's satisfaction and self-confidence. Further research into improving EMR knowledge for undergraduate nursing students is needed.

CERTIFICATION OF THESIS

I, Georgina Sheridan declare that the Thesis entitled *Undergraduate nursing students' satisfaction and self-confidence when accessing and using electronic medical records (EMR) in the clinical environment after EMR education in the nursing laboratory* is not more than 40,000 words in length including quotes and exclusive of tables, figures, appendices, bibliography, references, and footnotes. The thesis contains no material that has been submitted previously, in whole or in part, for the award of any other academic degree or diploma. Except where otherwise indicated, this thesis is my own work.

Date: 13/11/2024

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Student and supervisors' signatures of endorsement are held at the University.

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ABBREVIATIONS

ACN ..... Australian College of Nursing
ADDIE ..... ADDIE model
ADHA ..... Australian Digital Health Agency
ANMAC ..... Australian Nursing and Midwifery Accreditation Council
ANOVA ..... Analysis of Variance
CASP .....Critical Appraisal Skills Program
COVID19 ..... Coronavirus Disease
EMR ..... Electronic Medical Records
INACSL .....…… International Nursing Association for Clinical Simulation and Learning
NHMRC ..... The National Health and Medical Research Council
NMBA ..... Nursing and Midwifery Board of Australia
NLN ..... National League for Nursing
PIS ..... Patient Information Sheet
PPH ..... Professional Practice Hub
SDG ..... Sustainable Development Goals
SPSS ..... Statistical Package for the Social Sciences
TAM ..... Technology Acceptance Model
UN ..... United Nations
WHO ..... World Health Organization

CHAPTER 1: INTRODUCTION

1.1. Introduction

In 2023 the Australian Digital Health Agency (ADHA) identified that poor patient documentation led to 18% of medical errors. Electronic medical records (EMR) have been implemented into the clinical healthcare environment as a digital replacement for traditional paper-based patient documentation to improve patient documentation, enhance critical thinking, and improve patient outcomes whilst supporting a collaborative approach to patient care (Chung & Cho, 2017; Lam et al., 2014; Stolic et al., 2022; Wisner et al., 2019). The Australian Government Digital Initiatives National Digital Health Report, along with individual state government digital health strategies such as the Digital Health Strategic Vision for Queensland 2026 (Australian Digital Health Agency [ADHA], 2023; Queensland Health, 2017) have guided the expansion of digital technology within the healthcare clinical environment. However, not all healthcare facilities in Australia have transitioned across to digital platforms such as EMR for documenting patient data.

While the number of Australian healthcare facilities that have implemented EMR continues to multiply, the academic environment continues to use traditional paper to document patient data in the nursing laboratory. By not implementing EMR in the academic environment, undergraduate nursing students' satisfaction and self-confidence documenting patient data can be impacted while attending clinical placement (Lam et al., 2014; Mollart et al., 2020). Decreased satisfaction and self-confidence accessing and using EMR to document patient data on clinical placement can lead to adverse patient outcomes (Pandya et al., 2019; Sullivan et al., 2016). Therefore, to provide "work ready" registered nurses, undergraduate nursing students need to be exposed to

EMR in the nursing laboratory (Brown Wilson et al, 2020; Choi, 2024; Eardley et al., 2018; Kowitlawakul et al., 2015; Mountain et al, 2015). EMR education within the curriculum gives undergraduate nursing students the opportunity to practice patient documentation in a safe environment, leading to improved satisfaction and self-confidence (Ahmed et al., 2023; Ng et al., 2024; Rashawn Mohamed Abd-Elhady et al., 2022; McNamara, 2014; Morrel & Ridgway, 2014).

The aim of the research project was to evaluate if undergraduate nursing student's satisfaction and self-confidence increased when accessing and using EMR on clinical placement after receiving EMR education in the nursing laboratory. By preparing and providing the ability to practice clinical skills including patient documentation in the nursing laboratory, undergraduate nursing students may have higher satisfaction and self-confidence. Therefore, the intention is to better prepare for clinical placement, thus improving their opportunity to gain a graduate position (Eardley et al., 2018; Kardong-Edgren, 2021; Mollart et al., 2021). However, if an undergraduate nursing student is not given the opportunity to practice using EMR in the nursing laboratory and is allocated clinical placement in a healthcare facility where EMR has been implemented they may experience lower satisfaction and self-confidence accessing and using EMR while on clinical placement (Chung & Cho, 2017; Lucas, 2010), impacting their ability to provide safe patient care (Peacock et al., 2022).

1.2. Overview of the research project

A retrospective quasi experimental, single blind, post-test two group (intervention [EMR and paper] and control group [paper]) cross-sectional research project underpinned by the ADDIE model and the National League for

Nursing (NLN)/Jeffries Simulation Framework Theory was used to achieve the aim of the research project. The survey instrument used was The Modified Student Satisfaction and Self-Confidence in Patient Documentation Survey which was modified from the NLN Student Satisfaction and Self-Confidence in Learning. The NLN was modified by exchanging the term simulated to EMR education in the relevant questions.

The research project consisted of two cohorts of undergraduate nursing students from an Australian regional university, which comprises of four campuses. To prepare undergraduate nursing students for clinical placement EMR was introduced into a second year second semester nursing laboratory course in February 2021 by an academic staff member. The cohort of students who experienced the academic EMR and traditional paper-based patient documentation prior to clinical placement became the intervention group. Undergraduate nursing students who attended the specific nursing laboratory course prior to the introduction of the academic EMR and received traditional paper only patient documentation prior to clinical placement became the control group. By allocating a control and intervention group the researcher was able to compare the satisfaction and self-confidence results of those who received EMR education and traditional paper-based education (intervention group) and those who had only received paper-based documentation education (control group). To address the scientific hypothesis and research questions data from the survey was collected and analysed post intervention only.

1.3. Background

The Australian Government's National Digital Health Report (2023) along with, Digital Health Strategic Vision for Queensland 2026 (Queensland Health, 2017) aims to improve patient outcomes by providing quality healthcare services.

They stem from the Deloitte/National ~~e~~-Health Strategy Report (2008) and the United Nations (UN) Sustainable Development Goals (2021). Part of providing quality healthcare services includes the ability to provide a timely, safe approach to patient care. The Nurses and Midwives Board of Australia (NMBA) Standards of Practice (NMBA, 2016), NMBA Code of Conduct (NMBA, 2018), along with the Australian Nursing and Midwifery Accreditation Council (ANMAC) (ANMAC, 2019) and Australian College of Nursing (ACN) (ACN, 2017) support the application of digital technology to document patient data as safe clinical practice in both the clinical and academic environments.

The number of healthcare facilities that implement EMR to document patient data continues to grow. However, not all healthcare facilities provide undergraduate nursing students with the opportunity to document patient data through EMR or provide appropriate training on EMR education prior to accessing it (Irwin et al., 2024; Stanceski et al., 2023). To master a skill such as patient documentation, undergraduate nursing students need to have continual practice. When students do not have continual exposure to EMR while on clinical placement, it then falls on the academic environment to provide undergraduate nursing students with the continuity to improve and maintain clinical skills, such as patient documentation (Stanceski et al., 2023).

The ability to practice accessing and using EMR in the nursing laboratory encourages undergraduate nursing students to understand the link between quality patient documentation and safe patient outcomes thereby improving their satisfaction and self-confidence (Hong et al., 2022; Irwin et al., 2024; Mollart et al., 2023; Williams et al, 2023). This is then transferred into the clinical environment. Therefore, providing quality education to undergraduate nursing

students on EMR in the nursing laboratory could see an increase in satisfaction and self-confidence accessing and using EMR. Increased satisfaction and self-confidence on clinical placement documenting patient data leads to improved patient outcomes.

1.4. Aims

This research project aimed to evaluate the effectiveness of the academic EMR implementation into the nursing laboratory by:

1. Based on the NLN/Jeffries Simulation Framework Theory, the ADDIE model, and the NLN Student Satisfaction and Self-Confidence in Learning survey, develop an instrument to evaluate an undergraduate nursing students learning outcomes on patient documentation.
2. Evaluating an undergraduate nursing student's satisfaction accessing and using EMR to document patient data on clinical placement after education in the nursing laboratory using The Modified Student Satisfaction and Self-Confidence in Patient Documentation Survey.
3. Evaluating an undergraduate nursing student's self-confidence accessing and using EMR to document patient data on clinical placement after education in the nursing laboratory using The Modified Student Satisfaction and Self-Confidence in Patient Documentation Survey.

1.5. Scientific Hypothesis

To evaluate the effectiveness of EMR education into the nursing laboratory two hypotheses were developed.

Scientific Hypothesis 1. Levels of satisfaction in undergraduate nursing students will increase when accessing and using EMR in the clinical environment after receiving education on EMR in the nursing laboratory as measured by The

Modified Student Satisfaction and Self-Confidence in Patient Documentation Survey.

Scientific Hypothesis 2. Levels of self-confidence in undergraduate nursing students will increase when accessing and using EMR in the clinical environment after receiving education on EMR in the nursing laboratory as measured by The Modified Student Satisfaction and Self-Confidence in Patient Documentation Survey

1.6. Research questions

The following three questions were used to evaluate the above hypothesis:

1. What are the differences and or similarities in the demographic data between the intervention (students who received a combination of EMR and paper-based patient documentation in the nursing laboratory) and control group (students who received paper-based patient documentation education in the nursing laboratory)?
2. Do levels of satisfaction in undergraduate nursing students increase when accessing and using EMR in the clinical environment after receiving education on EMR in the nursing laboratory compared to students who received paper-based patient documentation education as measured by The Modified Student Satisfaction and Self-Confidence in Patient Documentation Survey?
3. Do levels of self-confidence in undergraduate nursing students increase when accessing and using EMR in the clinical environment after receiving education on EMR in the nursing laboratory compared to students who received paper-based patient documentation education as measured by The Modified Student Satisfaction and Self-Confidence in Patient Documentation Survey?

1.7. Significance of the research

Undergraduate nursing students' satisfaction and self-confidence accessing and using EMR to document patient data whilst on clinical placement can affect patient outcomes thus leading to a negative clinical experience. Previous experiencing accessing and using EMR to document patient data can enhance an undergraduate nursing student's satisfaction and self-confidence (Lam et al., 2014). Whereas, if an undergraduate nursing student has not had the opportunity to practice on EMR during clinical laboratories or had exposure to EMR on clinical placement, can have higher levels of stress when accessing and using for the first time (Stolic et al, 2022). Thus, increasing their risk of making errors thereby impacting satisfaction and self-confidence (Stolic et al., 2022). EMR enriches communication between healthcare professionals, can reduce medication errors, and helps develop critical thinking which enriches satisfaction and self-confidence (Pandy et al., 2019; Stolic et al., 2022; Sullivan et al., 2016; Wisner et al., 2019). Accurate, timely patient documentation promotes safe nursing practices that enhances early identification of deteriorating patients (Lam et al. 2014). Interpreting patient data documented in EMR heightens an undergraduate nursing students' critical thinking ability thus improving satisfaction and self-confidence (Ng et al, 2024) Improved communication promotes collaborative practices that support and promote positive patient experiences (Gesulga et al., 2017).

However, in Australia the academic environment has not kept pace with the clinical environment. There are minimal opportunities for undergraduate nursing students to practice accessing and using EMR to document patient data in a safe environment. Therefore, to provide undergraduate nursing students the best at developing satisfaction and self-confidence around documenting patient

data on clinical placement, all formats of patient documentation (traditional paper-based and EMR) need to be implemented into the nursing laboratory.

1.8. Thesis structure

This thesis contains six chapters:

Chapter 1, the Introduction chapter, contains an overview of the research project, including background, overview and aim of the project, hypothesis, and research questions, and concludes with the significance of the research project.

Chapter 2, the Literature review, discusses the background behind the development of digital technology and patient documentation globally in the healthcare environment, development of the use of digital technology to document patient data in Australia, the development of EMR in the academic environment on a global level, along with the development of academic EMR in Australia, the significance and importance of EMR in providing safe nursing practice, and the significance and importance of providing a nursing laboratory environment that is representative of industry.

Chapter 3, the Framework of the research project, provides a synopsis of the two theoretical frameworks used to support this research project, the NLN/Jeffries Simulation Framework Theory, and the ADDIE model, and how the theoretical frameworks were applied.

Chapter 4, the Methodology chapter, provides a validation, description of the methods used (including a description of the cohort of undergraduate nursing students, site, variables, instrument, and statistical design), and ethics.

Chapter 5, the Results chapter, results from The Modified Student Satisfaction and Self-confidence in Patient Documentation Survey provide findings on the hypothesis and address three research questions.

Chapter 6, the Discussion/Conclusion chapter, analyses the results of The Modified Student Satisfaction and Self-Confidence in Patient Documentation Survey in relation to previous research. It discusses the significance of the results prior to identifying the recommendations for future clinical and academic environments, future research directions, and limitations, before providing a summary of the research project.

References, a list of sources used to support the research project.

Appendix, inclusion of documents used to support the research project such as participation sheet, the Modified Student Satisfaction and Self-confidence in Patient Documentation survey.

1.9. Key terms

Electronic medical records, Modified Student Satisfaction and Self-Confidence in Patient Documentation Survey, undergraduate nursing students, satisfaction and self-confidence, nursing laboratory, clinical placement.

CHAPTER 2: LITERATURE REVIEW

2.1. Introduction

The previous chapter presented the introduction to this research project; this chapter will present the literature review and background. This research project aims to evaluate if an undergraduate nursing student's satisfaction and self-confidence accessing and using electronic medical records (EMR) on clinical placement improved after accessing and EMR education in the nursing laboratory. This literature review chapter discusses digital technology, EMR, and the policies implemented by international and national agencies in relation to digital literacy and technology. Expansion on specific Australian organisations and their policies relating to digital technology and nursing will also be identified. A review of the significance of EMR and digital technology within the healthcare setting will be discussed, before using current literature to investigate undergraduate nursing students' experiences accessing and using EMR in the academic and clinical environments. The importance of education and learning styles will also be included in the chapter discussion.

2.2. Definition of electronic medical records

Digital health encompasses a range of informatic technologies including electronic communication and information (World Health Organization [WHO], 2021). The Australian Government (2022) describe electronic health records as health information stored on a safe digital platform that can be easily accessed by relevant healthcare professionals involved in a specific patients' health journey.

Integrated electronic medical records implemented within the clinical hospital environment is one strategy used to assist with the diagnosis,

prevention, monitoring, and treatment of patients (Topol, 2019). Terminology such as integrated electronic medical records (iEMR) and electronic medical administration records (eMAR) are used to describe patient data documentation using digital technology. For consistency throughout this research project, all forms of digital patient documentation will be identified as electronic medical records (EMR).

2.3. Definition of digital literacy

Coined by Paul Gilster in 1997 digital literacy is the ability to understand, evaluate, and integrate information in different formats available through a computer (Pangrazio et al., 2020; Pool, 1997). Norman & Skinner's (2006) concept of eHealth literacy is "The key is to reach a level of fluency at which one can achieve working knowledge of the particular language (or skill), enough to function at a level conducive to achieving health goals" (p.8). Norman and Skinner (2006) also acknowledge "Knowledge, information, and media forms are context-specific, and context dictates what skills and skill levels are required to access health resources" (p. 8). Similarly, the British Computer Society (2014) defines digital literacy as skills and knowledge that allow a person to "be able to make use of technologies to participate in and contribute to modern social, cultural, political and economic life" (para.2). Seidel et al. (2023) takes digital literacy one step further by identifying the importance personal health literacy has on a person's ability to find and understand relevant health information and the ability to use that information to evaluate outcomes.

2.4. Background

In 2008, the Australian Government's National e-Health Strategy report (Strategic Framework for the National Coordination of e-Health) identified the

use of information technology within the healthcare setting to improve patient outcomes, interdisciplinary healthcare professional's ability to share information, and improve connection to a range of demographic areas (Australian Digital Health Agency [ADHA], 2023). To ensure digital technology complemented, enhanced, and strengthened current healthcare systems, six key areas were identified: effective, accessible, coordinated, preventions, efficient, and sustainable (ADHA, 2023). To become more accessible; particularly to Australia's rural and remote communities; and sustainable, healthcare services are required to become more e-health enabled, which includes the implementation of EMR (Lam et al., 2014). The renamed National Digital Health Report (2023) continues to identify barriers to implementing digital technology that impacts patient outcomes, including the sharing of health information between multidisciplinary health teams.

Using the Australian Governments National e-Health Strategic Report as its basis, Queensland Government commissioned the Digital Health Strategic Vision for Queensland 2026 (Queensland Health, 2017). This report identifies the Queensland Government's vision and goals for digital technology within the healthcare environment (Queensland Health, 2017). Queensland Government's vision for clinicians includes providing quality healthcare supported by enhanced clinical decisions, ongoing improvement to healthcare services, and improved access to patient information (Queensland Health, 2017). EMR supports ease of access to patient information, provides contemporary technology that improves patient care provided in a timely manner, and improves multidisciplinary care that puts the patient first (Queensland Government, 2017).

Updating the Digital Health Strategic Vision for Queensland 2026 report, the Queensland Government released the latest version for Queensland health called HEALTHQ32 (Queensland Health, 2023). The document continues to develop and expand Queensland Health's digital footprint by supporting and expanding on work developed in previous reports. In line with global trends that support resilient health systems, HEALTHQ23 identifies the continuing importance of empowering the workforce in their ability to navigate technology to provide real-time data that improves decision making and planning aimed at improving patient outcomes (Queensland Health, 2023).

WHO (2021) acknowledges not all countries, nor all people are equal in the advancement of technology and/or infrastructure which adds to the inequality around the delivery of healthcare. According to WHO (2021) digital health technology can assist in improving standards and accessibility to healthcare, as well as health promotion on a global level. The WHO's Global Strategy on Digital Health 2020-2025 aims to improve equality in healthcare: promote global collaboration and sharing of knowledge; implement national digital health strategies; governance at a global, regional, and national level in relation to digital health; and digital health to promote people centred health systems (WHO, 2021).

The National Nursing and Midwifery Digital Health Capability Framework (Australian Government, 2020) was developed to implement WHO's digital goals, the Australian Government's National e-Health Strategies, and to reduce the impact digital technology can have on healthcare professionals and the Australian healthcare system (Risling, 2017). The Nursing and Midwifery Digital Health Capability Framework (Australian Government, 2020) recognises nurses

and midwives are critical in the capture of patient data in a timely, accurate and complete manner.

The Nurses and Midwives Board of Australia (NMBA) regulates the practice of nurses and midwives in Australia through professional codes and guidelines (NMBA, 2016). The NMBA Standards of Practice for Registered Nurses 1.4, supports the need for nurses to comply with legislation, regulations, policies, guidelines and other standards or requirements relevant to the context of practice (NMBA, 2016). The NMBA Code of Conduct for Nurses principle 2 relates to person-centred practice, specifically relates to a nurse's ability to provide safe and quality care, and evidence-based decision making (NMBA, 2018). These guidelines support WHO's and the Australian Government's development of digital technology, including the use of EMR within the clinical environment to improve critical thinking and patient care.

Australian Nursing and Midwifery Accreditation Council (ANMAC) (2019) supports the NMBA Standards of Practice and NMBA Code of Conduct when providing accreditation for Bachelor of Nursing programs within the higher education environment. In preparing undergraduate nursing students for the clinical environment, ANMAC has implemented academic guidelines supporting the implementation of digital technology including EMR. These standards include Standard 2 - Governance: 2.2/b – "promoting high-quality teaching and learning experiences for students to enable graduate competence" (ANMAC, 2019, p.15); and Standard 3 - Program of study: 3.4 – "teaching and learning reflects contemporary practices in nursing, health, and education, and responds to emerging trends based on research, technology, and other forms of evidence" (ANMAC, 2019, p.16).

As identified through differences in the attitudes of nurses between pre and post implementation of digital technology and enhanced patient outcomes due to improved critical thinking when accessing digital information, Australian College of Nursing (ACN) have acknowledged the need for digitally literate nurses (ACN, 2017). Supporting undergraduate nursing students transition to the clinical environment ACN has endorsed informatic education within the academic curricula (ACN, 2017).

This section has demonstrated through the identification of multiple global, government, and health practitioner regulators the importance digital technology such as EMR has within the healthcare environment. Preparing undergraduate nursing students for the contemporary healthcare environment in part is the responsibility of the academic environment. By providing the opportunity to access and use EMR along with other contemporary nursing practices within a supportive learning environment will support satisfaction and self-confidence access and using EMR in the clinical environment.

2.5. Significance

EMR is a digital system aimed at enhancing patient documentation, leading to reduced medication-related errors, improving communication, enhanced critical thinking and supportive patient care (Stolic et al., 2022; Wisner et al., 2019). By replacing traditional paper-based patient documentation, EMR improves accessibility to interdisciplinary documentation, provides guidelines and protocols, supports medication knowledge, provides alerts, and identifies clinical tasks (Chung & Cho, 2017). At the time of the Australian Government's first National e-Health Strategy report, the sharing of patient information was identified as a major cause of errors leading to adverse patient outcomes

(ADHA, 2023). It was estimated 18% of medical errors were related to ineffective patient data (ADHA, 2023). In the 2023 Australia's National Digital Health Strategy Report the ADHA identify cost hospitals $1.2 billion due to patients being admitted to adverse drug events. However, the ADHA also recognises that the implementation of EMR can contribute to reduction of time in hospital by up to 20% (ADHA, 2023).

A lack of communication between nursing staff during handover can lead to adverse patient outcomes and increased patient risk as identified by Pandya et al. (2019). The implementation of EMR has been seen to improve quality patient outcomes, support interdisciplinary decision making, decreased medication errors, and reduced adverse patient outcomes (Pandya et al., 2019; Sullivan et al., 2016). In addition, having immediate access to patient information can promote positive patient outcomes as EMR's purpose is to collect and store digital data on a patient's personal healthcare journey (Gesulga et al., 2017).

The importance of accurate, timely patient documentation on qualified nursing professionals and clinical outcomes is well documented (Lam et al., 2014). Previous information technology knowledge and experience, and self-confidence have been identified as impacting an undergraduate nursing students' ability to access and use EMR in the clinical environment (Lam et al., 2014). Whereas education and exposure to EMR can improve a nursing student's self-efficacy, therefore, increasing self-confidence, critical thinking, and importantly influencing positive clinical outcomes (Lam et al., 2014). The stress and lack of experience of undergraduate nursing students in the clinical environment is also identified in research conducted by Stolic et al. (2022) as a contributing factor for increased risk of errors that can impact safe patient care.

Identifying the effectiveness of EMR education in the simulated laboratory environment on an undergraduate nursing students' ability to access and use EMR in the clinical environment and an undergraduate nursing student's perceived satisfaction and self-confidence may support their transition to the clinical environment. Employers consider all undergraduate nursing student's attributes including their digital literacy, when allocating graduate nursing positions in a competitive environment (Lam et al., 2014). In the preparation of undergraduate nursing students for the clinical environment, educators and the academic curricula needs to reflect current information technology practices and advancements including EMR.

2.6. Academic

Aiming to satisfy the requirements of the accreditation standards, provide work prepared graduate nurses, and increasing nursing students' ability to access digital technology; technology such as EMR education needs to be implemented into the academia curricula (Brown Wilson et al, 2020; Eardley et al., 2018; Hong et al., 2022; Lucas, 2010; Mollart et al., 2023; Mountain et al, 2015; Ng et al., 2024; Irwin et al., 2024; Nickitas et al., 2010; Williams et al., 2021). There is a range of digital literacy seen among undergraduate nursing student's dependant on how they use digital technology. Undergraduate nursing students can access and use their personal digital devices for social media and communication along with digital programs such as Microsoft® and PowerPoint® (Harerimana et al., 2022; Lokmic-Tomkins et al., 2022). However, their ability to translate their digital knowledge in a professional context can be limited thus impacting satisfaction and self-confidence (Brown et al., 2020; Lokmic-Tomkins et al., 2022). The purpose of embedding EMR education within

a nursing laboratory is to provide undergraduate nursing students to opportunity to experience patient data entry such as vital observations, medication administration and progress notes (Bowling, 2016, Kardong-Edgren, 2021; Ng et al., 2024). Thereby, improving vital digital literacy skills and critical thinking required for the clinical environment (Elliot et al., 2018; Harerimana et al., 2022).

Simulation allows undergraduate nursing students the ability to link theory with clinical experiences while developing clinical reasoning skills. Simulation has been defined by Gaba (2004) as “techniques, not a technology, to replace or amplify real experiences with guided experiences, often immersive in nature, which evoke or replicate substantial aspects of the real world” (p. i2). Repeated simulation activities provided in the nursing laboratory allow undergraduate nursing students the ability to enhance their individual self-confidence (Al Gharibi & Arulappan, 2020). Improved satisfaction and self-confidence develop motivation and builds self-esteem, further enhancing and developing skills and knowledge required for the clinical environment (Al Khasawneh et al., 2021).

Researchers understanding of simulation and how it can improve student outcomes continues to be identified as demonstrated in literature reviews by Alanazi et al. (2017) and Al Gharibi & Arulappan (2020). Outcomes from Alanazi’s et al. (2017) systematic review of 30 quantitative and qualitative studies supports the use of simulation via methods such as the use of manikins and digital programs. Significantly Alanazi et al. (2017) identified that the ability by educators to manipulate simulation activities can be seen to improve specific knowledge and skills thus improving satisfaction and self-confidence. Alanazi’s et al. (2017) outcomes are supported in a later integrative review by Al Gharibi & Arulappan (2020), who explored the impact repeated simulation experiences

had on self-confidence, critical thinking, and competence of nurses and nursing students. After reviewing n=11 studies, Al Gharibi & Arulappan (2020) identified the importance of being regularly exposed to critical experiences in a simulated environment and its impact on self-confidence and satisfaction. However, the direct correlation between the exposure in the simulated environment on self-confidence and satisfaction in the clinical environment requires further examination (Al Gharibi & Arulappan, 2020).

Research conducted by Alfes (2011), Cummings & Connelly (2016), Ellis et al. (2020), and Lubbers & Rossman (2016) explored whether there is a direct link between simulation activities and improved self-confidence in undergraduate nursing students. Early research explored if simulation in the academic environment improve satisfaction and self-confidence. Alfes (2011) evaluated levels of self-confidence, satisfaction in learning, and explored the link between satisfaction and self-confidence to determine the effectiveness of simulation in an academic paediatric environment. Using a single convenience sample of n=63 first-year undergraduate nursing students Alfes identified limited difference in satisfaction but found a positive link between self-confidence and satisfaction (Alfes, 2011). Furthermore, Alfes (2011) identified an increase in self-confidence following the simulated activity.

Cummings & Connelly (2016) explored the effect simulation has on self-confidence on one group of junior and senior nursing students at one university. A total of n=54 students (n=34 junior and n=20 senior) participated in the voluntary survey where the two levels of undergraduate nursing students' results were compared. The authors identified that as self-confidence levels increased the participants involvement in the simulation EMR activities improved, therefore

experiencing a more active learning environment (Cummings & Connelly, 2016). Furthermore, Cummings & Connelly's (2016) research supports the suggestion that the ideal simulation can increase self-confidence thus improving critical thinking skills. However, limitations to the research project included the lack of follow up post attendance of the simulated nursing laboratory. No further exploration on whether the undergraduate nursing students improved self-confidence and skill around digital literacy gained in the nursing laboratory transitioned to the clinical environment was identified. Nor was there any further exploration or discussion on whether there is a decay in knowledge affecting an undergraduate nursing student's ability to access and use EMR in the clinical environment. The results from the survey were limited to the respondents who participated in the simulated laboratory at one university.

In response to the diminishing availability of clinical placements, Lubbers & Rossman (2016) investigated whether simulation could replace clinical hours in a paediatric community placement. Findings form the fifty-four participants indicated improved self-confidence in the nursing process when supported by a safe, simulated learning environment (Lubbers & Rossman, 2016).

While the forementioned research projects conclude self-confidence levels can improve post simulation in the nursing laboratory, all involve single cohorts of students at one university. However, what the research does not explore is whether satisfaction and self-confidence gained through simulation activities is transferred to the clinical environment and whether satisfaction and self-confidence levels decay over time between the nursing laboratory class and clinical placement.

2.7. Australian academic environment

Internationally, the importance of digital technology is recognised in the higher learning environment, however there is limited research around implementation of EMR in the nursing laboratory in Australia, and the impact it can have on undergraduate nursing students in the Australian context. The need to prepare undergraduate nursing students for the real word clinical experience was identified by Mollart et al. (2021). The authors designed a cross-sectional descriptive research project to explore third year nursing students' perceptions on preparedness using EMR in clinical practice when education provided in the nursing laboratory was completed using only paper-based patient documentation (Mollart et al., 2021). An invitation to participate was sent to n=530 undergraduate nursing students enrolled in the third year of the Bachelor of Nursing program with n=70 undergraduate nursing students completing the online survey (Mollart et al., 2021). A majority of the undergraduate nursing students that did respond identified they lacked confidence accessing EMR and a feeling of unpreparedness (Mollart et al., 2021). Furthermore, they perceived their self-confidence accessing and using EMR would improve if EMR was implemented into the nursing laboratory (Mollart et al., 2021). While previous research on response rates to online surveys recorded response rates above 10% (Daikeler et al., 2020), a meta-analysis conducted by Wu et al. in 2022 suggest the average response rate to online surveys is above 40%. Therefore, while Mollart et al. (2021) research reflects global research around the importance of implementing EMR into the nursing laboratory and the implication it can have on undergraduate nursing student's satisfaction and self-confidence its results are limited.

Continuing from their previous research project, a second research project from Mollart et al. (2023) explores the impact a purpose built EMR education has on first-year nursing students' confidence and skills in using electronic documentation through quasi-experimental descriptive research project. Mollart et al., (2023) implemented an academic EMR into a first-year clinical nursing course and tested it using a pre-test/post-test survey of a convenience sampling of first year undergraduate nursing students at one, three campus, Australian university in regional New South Wales. All students were provided a weblink along with instructions of use in the first two weeks of tutorials and encouraged to use the academic program on students' personal devices throughout the academic semester (Mollart et al., 2023). Undergraduate nursing students were then provided the opportunity to complete two surveys, one at the beginning of the semester and the second at the end of the semester (Mollart et al., 2023). Mollart et al. (2023) found a quarter of the 105 participants received education on EMR documentation while on clinical placement. Half of the participants identified they had accessed and used the academic EMR an average of four times throughout the course in preparation for clinical placement. However, a quarter indicated they did not access the academic EMR during the semester and went on to identify they did not receive education on EMR on commencement of clinical placement (Mollart et al., 2023).

Not only did the findings from the survey indicate increased self-confidence and knowledge in ability to document patient data using EMR increased when exposed to the academic EMR but more importantly the number of undergraduate nursing students who did not accessed or practiced using the online EMR (Mollart et al., 2023). If an academic EMR is embedded into the

nursing laboratory and nursing laboratory is compulsory then all undergraduate nursing students would have the opportunity to access and use in a safe, learning environment. Similarly, to their previous research, improved undergraduate nursing students' self-confidence is related to exposure to both traditional paper-based and EMR patient documentation previous research (Mollart et al.,2023).

Being unprepared for EMR in the clinical environment was also identified through research conducted by Peacock et al. (2022). The authors explored Australian nursing and midwifery students' perspectives of digital systems on clinical placement through a qualitative research project. They identified digital online learning programs were easy to access at home for undergraduate nursing students however, the ability for undergraduate nursing students to feel self-confident accessing and using EMR in the clinical environment was impacted by the lack of "hands on" experience in the nursing laboratory (Peacock et al, 2022). The authors also identified the lack of consistency between different types of patient documentation in the Australian clinical environment (paper-based and electronic) and the impact it had on undergraduate nursing students' retention of knowledge between clinical placement (Peacock et al., 2022). Consequently, in their discussion, Peacock et al. (2022) identifies the importance of an EMR education by concluding nursing and midwifery students reported the lack of preparation and access to physical digital documentation systems in the nursing laboratory impacted their experiences on clinical placement.

Previous discussion has identified the positive impact embedding EMR into the nursing laboratory can have on an undergraduate nursing student's

satisfaction and self-confidence however, it is important to understand how it is currently been utilised in the academic environment and the impact it can have on undergraduate nursing students' satisfaction and self-confidence. A research project conducted by Raghunathan et al. (2022) identified the utilisation of EMR education in pre-registration nurse education within Australia and New Zealand by exploring how an EMR education was being integrated into the nursing curriculum and what influenced the implementation of EMR education in the academic curricula. The research project approached n=126 accredited higher education providers of Australian and New Zealand Diploma, Bachelor, and Master of Nursing courses with a response from n=37 participants (35.2%) (Raghunathan et al., 2022). Raghunathan et al. (2022) acknowledge that responses to the research project may have been impacted by the person who completed the survey and their knowledge on the utilisation of an EMR education in their program and or the email request was not forwarded to the appropriate person such as representative from the nursing program, nursing educator or the simulation coordinator. Fourteen of the n=37 respondents indicated their facility had implemented an academic EMR into their specific program within the last six months to ten years (Raghunathan et al., 2022). To support a student's transition to digital documentation different types of academic EMRs from shared technology to faculty specific academic EMRs were identified (Raghunathan et al., 2022). Furthermore, the nursing laboratory was identified as the most common environment were an EMR education was implemented (Raghunathan et al., 2022). In comparison, higher education providers without an EMR education implemented into their specific program acknowledged a lack of funds, high costs, a lack of information technology

support, and a lack of faculty knowledge as reasons for the lack of implementation. (Raghunathan et al., 2022). In addition, a lack of technology and informatic knowledge, and lack of time to develop and teach EMR education in ever-expanding curricula were also seen as impeding the implementation of an EMR education (Raghunathan et al., 2022). While exploring the implementation of an EMR education, Raghunathan et al. (2022) identified the availability and implementation of new technology such as an EMR education would benefit from strong partnerships with healthcare providers and high education providers.

Raghunathan et al. (2022) results are consistent with international research which has identified the implementation of EMR education not only develops undergraduate nursing students' digital documentation, while providing a safe, supportive learning environment, prior to clinical placement. Not implementing EMR into the nursing laboratory can lead to severe deficits and knowledge gaps in a graduate nurse's education which can impact on the transition from undergraduate to graduate (Eardley et al., 2018; Lucas, 2010; Raghunathan et al., 2022).

A second research project by Raghunathan et al., (2023) uses a qualitative approach to identify factors that impact the integration of EMR education into nursing curricula. As with the previously discussed research project, this research project specifically investigates Australia's and New Zealand's experiences. Six nursing programs from six nursing schools in higher education facilities participated in the Raghunathan et al., (2023) research project. Barriers to the implementation of an EMR education included funding (including ongoing costs), the restrictiveness of the EMR education, and

informatic support however, Raghunathan et al. (2023) also identified evaluating the effectiveness of the EMR education as a barrier. When implementing an EMR education, engaging educators with clinical EMR experience will help support and improve faculty expertise in digital documentation, which in turn will facilitate safe, learning experience for the student (Raghunathan et al. 2023). Raghunathan et al. (2023) also suggest consulting and including the faculty who are required to teach the program will aid the successful implementation of an academic EMR. Ensuring a suitable EMR education is sought, specific course objectives can be met, and student learning outcomes are met will all impact the effectiveness of the EMR education and thereby impacting an undergraduate learning experience (Raghunathan et al. 2023).

Williams et al. (2023) explored student and faculty perceptions of EMR use in undergraduate nursing education curricula through a systematic review. The systematic review used the Critical Appraisal Skills Program (CASP) tool to identify eleven studies; eight quantitative and three qualitative studies; that met the criteria for inclusion. Those eleven studies identified two groups of participants; two assess faculty perceptions of EMR and the other nine assessed undergraduate nursing students' perceptions and / or competence.

Williams et al. (2023) systematic review found undergraduate nursing students' perceptions of EMR to be positive with 98% believing they were prepared for patient documentation. While Williams et al. (2023) identified skills such as digital literacy, self-confidence and accuracy had improved, they also noted that undergraduate nursing students with lower digital literacy skills found EMR difficult to comprehend, impacting their self-confidence. Williams et al. (2023) findings on faculty identified they valued the importance EMR has in

patient documentation however, there were found multiple limitations to the implementation of EMR in the academic curricula. Areas of note included faculty training both at the implementation stage as well as ongoing, technology support, and cost of implementation (Williams et al., 2023).

The implementation of EMR in the nursing laboratory is seen as advantageous by undergraduate nursing students who understand the connection between self-confidence accessing and using EMR and safe, quality patient care (William et al., 2023). However, Williams et al. (2023) did identify that acceptance and implementation of EMR in the nursing laboratory may be hindered by educators' own self-confidence impacting their digital literacy on specific digital patient documentation platforms (Williams et al., 2023).

To improve positive patient outcomes, undergraduate nursing students need to be engaged in nursing laboratory with patient scenarios that help undergraduate nursing students practice patient documentation (Williams et al., 2023). To improve implementation outcomes faculty, along with local healthcare providers, need to collaborate with digital patient documentation providers to help develop and implement effective EMR programs into curricula (Williams et al., 2023).

Irwin et al., (2024) used an online survey to explore and compare third year undergraduate nursing students experience with EMR prior to clinical placement at two multi-campus New South Wales universities. One university was identified as a regional university with five campuses, and EMR was not provided in its curricula (Irwin et al., 2024). The second university was identified as a two-campus regional metropolitan university where undergraduate nursing students were exposed to optional EMR education in their first year of study

(Irwin et al., 2024). There were three parts to the survey. The first part included the demographic data and questions relating to education while on clinical placement, the second evaluated undergraduate nursing students' perceptions on their self-confidence and skill using traditional paper-based and EMR patient observation charts on commencement of clinical placement, and the final group of questions investigated undergraduate nursing students perspective of acquiring information on patient documentation and outcomes of an EMR education in preparing for clinical placement (Irwin et al., 2024). While this research project did not meet its sample size (calculated at 944) a total of 144 undergraduate nursing students participated in the survey (Irwin et al., 2024).

Irwin et al.'s (2023) findings indicated less than half of the respondents were provided education in EMR by the respective allocated healthcare facilities prior or during clinical placement. Commonly, the undergraduate nursing students indicated they felt ill prepared for clinical placement (Irwin et al., 2024). While the researchers found there was no significant difference between sites or ages of participants who had used EMR there was a significant difference between undergraduate nursing students who were provided EMR education at the rural clinical placement versus those who received no education on EMR while on clinical placement at a regional facility (Irwin et al., 2024). This is also reflected in the self-confidence of undergraduate nursing students from the rural university's ability to access and use EMR on clinical placement after receiving EMR education on commencement of clinical placement participants versus the undergraduate nursing students from the metropolitan university who received limited EMR education on clinical placement (Irwin et al. 2024). Undergraduate nursing students who responded also believed using traditional paper-based

patient documentation is outdated and not representative of the contemporary clinical environment (Irwin et al., 2024). This is representative in their responses around EMR and the reduction of making errors, especially medication errors, therefore improving patient outcomes (Irwin et al., 2023).

Being prepared for clinical placement is important for undergraduate nursing students as it improves self-confidence, develops critical thinking, and improves patient care. Exposure to EMR in the nursing laboratory would improve self-confidence accessing and using EMR while on clinical placement (Irwin et al., 2024). Therefore, the findings of Irwin et al. (2024) indicate and support the need for undergraduate nursing students to prepare for the documentation of patient data on clinical placement using both traditional paper-based and EMR patient documentation.

Ng et al.'s (2024) quantitative descriptive research project on n=530 second year undergraduate nursing students enrolled at a regional, four campus university in Australia used an online survey guided by the Technology Acceptance Model (TAM) to explore the perceptions of usefulness, ease of use, and acceptability of an academic EMR implemented into a course specific nursing laboratory. Participation was voluntary and conducted online at the conclusion of the nursing laboratory with a total of n=433 undergraduate nursing students completing the online survey (Ng et al., 2024). Findings from the 80% of available participants, indicate that undergraduate nursing students were more likely to accept and use EMR if they perceived the program as useful (Ng et al., 2024). However, the researchers' found challenges were experienced by undergraduate nursing students due to internet connectivity and the availability of technology aides such as computers and keyboards (Ng et al., 2024).

2.8. Faculty education in EMR

Whilst the importance of the implementation EMR in higher education for contemporary patient documentation is well documented, there needs to be an understanding that faculty education is required to support a successful implementation of EMR. One systematic review completed by Williams et al. (2021) explores student and faculty perceptions on academic EMR. Following an inclusion/exclusion criteria n=11 journal articles were identified by Williams et al., (2021) which clearly identify faculty understand the importance of digital documentation and EMR however, the literature also identified there was a lack of support and training, and little direction provided on the implementation of EMR within the academic curricula. The literature review recognised many educators felt their own digital literacy impacted their ability to confidently teach EMR to undergraduate nursing students (William et al., 2021). In contrast, recruiting clinical nurses who have clinical experience with EMR to educate undergraduate nursing students with little to no teaching experience could impact a student's learning journey (William et al., 2021). William et al.'s (2021) findings discussed the importance of a supportive interactive learning environment, faculty training and support, and roles in leadership such as a simulation coordinator, has on improving undergraduate nursing student's self-confidence, outcomes and learning experience (William et al., 2021).

DeBlieck & Mullins (2016) also explored how faculty education on EMR can enhance student learning. The three-phase research project consisted of a one-hour training session provided to faculty, implementation EMR into the curriculum, and submission of student's assignments using templates provide in EMR (DeBlieck & Mullins, 2016). DeBlieck & Mullins (2016) first explored

faculties previous knowledge on EMR and found that 20% of respondents were knowledgeable while 20% of respondents had no previous knowledge. The authors then explored faculty's ability to use EMR post training and found 73.3% of faculty identified themselves as EMR novices with only 6.7% of faculty identifying as advanced (DeBlieck & Mullins, 2016). DeBlieck & Mullins (2016) identified a lack of digital understanding by faculty can initially impact the selection of an appropriate academic EMR, thereby affecting the undergraduate nursing student's learning experience (DeBlieck & Mullins, 2016). Similar to Williams et al. (2021) research, poor faculty knowledge on EMR around documentation and navigation is also seen to impact an undergraduate nursing student's ability to learn effectively thereby impacting self-confidence (DeBlieck & Mullins, 2016). However, while DeBlieck & Mullins (2016) research explored faculty education on EMR and identified training sessions can improve and enhance student outcomes, there was no discussion on how the training was provided to the faculty.

2.9. Satisfaction and self-confidence on clinical placement

Contemporary research continues to explore the impact EMR education has on undergraduate nursing students while on clinical placement. The importance of preparing nursing students to the clinical environment has been identified through research projects by authors Booth et al. (2017), Bowers et al. (2011), Brown et al. (2020), Lucas (2010), and Warboys et al. (2014). Limited introduction to theory and exposure to EMR in the nursing laboratory can lead to increased documentation time by nursing students when accessing and using EMR in the clinical environment (Lucas, 2010). The use of EMR in the nursing environment could lead to a reduction of nursing students medication errors in

the clinical environment, therefore increase nursing students' self-confidence levels when using EMR to administer medication was identified by Booth et al. (2017) and Campanella et al. (2016). A lack of digital literacy was recognised as impacting a nursing student's ability to critical think and problem solve (Bowers et al., 2011).

Digital literacy was also identified in a research project by Brown et al. (2020), who identified students who had access to EMR during clinical placements scored higher in four of the five survey categories. The categories included clinical informatics attitudes, computer skills, clinical informatics role and applied computer skills (Brown et al., 2020). Digital literacy is important in the clinical environment as EMR contains patient information and communication leading to improved patient outcomes (Nes et al., 2021).

The objective of the nursing laboratory is to prepare nursing students for clinical placement. Digital technology, specifically EMR, continues to be implemented in the clinical environment. However, the lack of ability to document clinical data and the impact a lack of EMR exposure is evident in a research project conducted by Chung & Cho (2017). This research project used a mixed method approach with quantitative data collected via cluster convenience sampling using randomly selected 100 undergraduate nursing programs with five schools agreeing to participate (Chung & Cho, 2017). From those five schools n=21 faculty members and n=62 students responded. The qualitative data was collected through purposive sampling from one university with nine faculty members participating (Chung & Cho, 2017). Through their research project, Chung & Cho (2017) identified 21% of students had no EMR education. The absence of EMR education in the clinical nursing laboratory, as well as

limited education on EMR while on clinical placement, can affect nursing students' self-confidence when on clinical placement as well as impact their ability to transition from nursing student to graduate nurse (Chung & Cho, 2017). This is demonstrated by one fifth of respondents in Chung & Cho's (2017) survey indicating they felt unprepared for nursing using EMR in the clinical environment. Furthermore, the research project identified nursing students found EMR difficult to use and access in the clinical environment (Chung & Cho, 2017). This is evident in the respondents identifying a lack of exposure to EMR practice in the clinical laboratories impacted their ability to use and access EMR in the clinical environment (Chung & Cho, 2017). In contrast, one of the positive findings from Chung & Cho's research project was that even though three quarters of the respondents struggled with EMR they believed their critical thinking and problem-solving skills improved (2017). Care to implement an effective educational EMR is relevant to a nursing student's self- confidence and ability to document patient information (Chung & Cho, 2017).

Two research projects conducted by Baillie et al. in 2012 and 2013, explore nursing students' experiences on the benefits and concerns of EMR for patient care and reviewed nursing students and midwives' experiences navigating EMR in practice. The findings from both research projects recognised nursing students lack experience with EMR leading to increased time documenting patient information and a lack of accuracy in documentation (Baillie et al., 2012; Baillie et al, 2013). Like Chung & Cho's (2017) findings, implementing EMR education into the academic curricula prior to entering the clinical environment would support a smoother transition from nursing student to graduate registered nurse (Baillie et al, 2012; Baillie et al, 2013).

The impact of a lack of knowledge and skill in relation to accessing and using EMR is also evident in a research project by Ward et al. (2011). During the implementation of EMR in a clinical setting, Ward et al. (2011) conducted a pre-posttest on registered nurses to identify the impact EMR implementation had on a nurse's self-confidence and perception of patient care. By using an information systems expectation and experience scale survey, the authors reported nurses lacked confidence when attempting to access the correct patient documentation, which led to an inability to make appropriate clinical decisions (Ward et al., 2011). In contrast, Ward et al. (2011) identified nurses with previous EMR knowledge had positive perceptions and improved self-confidence.

Warboys et al. (2014) identified the clinical environment can limit the ability for undergraduate nursing students to receive effective feedback on their ability to document using EMR. The lack of feedback on clinical placement can impact the undergraduate nursing student's ability to develop skills, satisfaction, and self-confidence using EMR (Warboys et al., 2014). To improve undergraduate nursing students' ability to navigate and use EMR, Warboys et al. (2014) implemented an EMR training tool in the first semester of a nursing program. They went on to identify undergraduate nursing students who access the learning tool prior to clinical were more likely to be confident in the ability to access and document in EMR (Warboys et al., 2014). They found a high correlation between time spent accessing and practicing on EMR and positive experiences by students (Warboys et al., 2014).

Research conducted by Hansbrough et al., (2020) identified undergraduate nursing students limited access to EMR to document patient data was impacted on clinical placement due to a lack of support by clinical staff and

lack of authority to access EMR. They identified that nursing students' digital skills with EMR severely impacted their ability to work in the clinical environment. By not being able to access EMR in the clinical environment, Hansbrough et al. (2020) identifies pertinent patient information relating to care plans is lacking thereby impacting the ability to provide safe patient care. Furthermore, the authors conclude a nursing students' inability to develop digital skills on clinical placement in the clinical environment can impacting a nursing student's ability to be work ready at the completion of the degree (Hansbrough et al., 2020).

The identification and review of policies from New South Wales health districts of EMR training and access for healthcare students including undergraduate nursing students was undertaken by Stanceski et al. (2023). Of the seventeen local health districts (LHD) that were contacted via email, thirteen responded. Each respondent was asked if they had a policy for students EMR use, if students were given individual log on credentials to EMR, did they provide the ability to read and write in EMR, and how was EMR training provided to students (Stanceski et al., 2023). Official policies that not only permitted students access to EMR but also endorsed students to write in EMR were identified in six of the thirteen responding LHD's (Stanceski et al., 2023). In contrast, LHD's that had no official policy were less likely to permit students to document in EMR (Stanceski et al., 2023). All thirteen LHDs provided individual student log in credentials for undergraduate nursing students (Stanceski et al., 2023) however, only two LHDs encouraged undergraduate nursing student to view and read information documented in EMR (Stanceski et al., 2023). Training was provided to undergraduate nursing students by half of the LHDs with further

support given while on clinical placement by the facilitator (Stanceski et al., 2023).

While Stanceski et al. (2023) research has identified inconsistencies within LHDs regarding access to EMR by different groups of healthcare students, undergraduate nursing students have the highest rate of accessibility while on clinical placement. Mandatory training provided by some but not all LHDs has identified a lack of cohesion in preparing undergraduate nursing students and other healthcare students for clinical placement in individual healthcare facilities (Stanceski et al., 2023). Skills are developed through structure and practice. If it is not being provided by the clinical environment it needs to be provided in the academic environment.

2.10. Summary

The importance of EMR education has on the preparation of undergraduate nursing students for the nursing clinical setting has been ascertained throughout this literature review. The importance of having job-ready nurses in the contemporary digital age can improve the clinical thinking thereby improve patient outcomes. Implementation of EMR in an undergraduate program is vital in providing an ease in transition to the workforce. Contemporary research has examined and explored different components of EMR from implementation in an academic curriculum, reviewing immediately post education in the clinical nursing laboratory environment, through to comparing experiences of undergraduate nursing students on clinical placement however, there is little research exploring whether providing education in EMR in the simulated clinical environment improves an undergraduate nursing students' self-confidence and satisfaction accessing and using EMR in the clinical

environment or is their self-confidence and satisfaction impacted by a decay of knowledge between education and clinical placement. This chapter presented the literature; the next chapter will present the frameworks used to guide the research project; the ADDIE model and the National League for Nursing (NLN)/Jeffries Simulation theory.

CHAPTER 3: Framework

3.1. Introduction

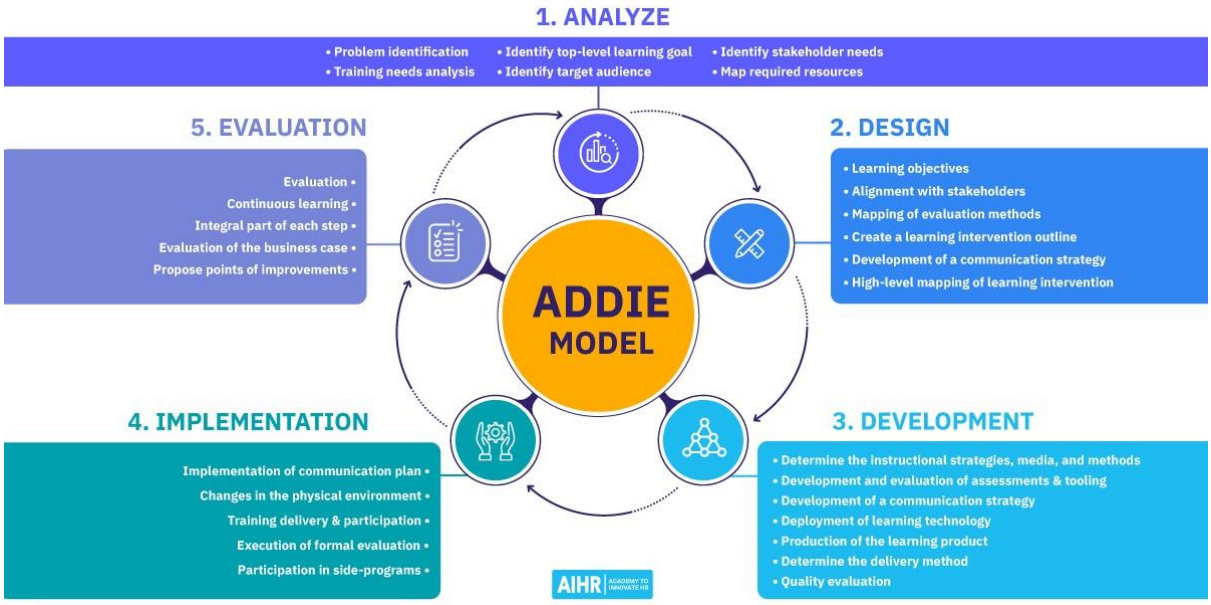
The previous chapter explored the importance of EMR education by performing and reporting the outcomes from a literature review. This chapter presents the two theoretical frameworks that underpin this research project: the ADDIE model; and the National League for Nursing (NLN)/ Jeffries Simulation Framework. The ADDIE model stands for Analyse, Design, Develop, Implement and Evaluate. For this research project the two frameworks were combined and renamed the Modified ADDIE / NLN Jeffries Simulation Framework. The ADDIE model was used for the development of the education intervention of the research project and the NLN/Jeffries Simulation Framework was chosen to evaluate the effectiveness of the intervention by evaluating undergraduate nursing students' satisfaction and self-confidence accessing and using EMR on clinical placement post education on EMR in the nursing laboratory. This chapter will also provide a comprehensive overview of the background and previous applications of the ADDIE model and the NLN/Jeffries Simulation Framework.

3.2. ADDIE model

The ADDIE model is used for the instructional design for educators to help create digital learning environments (Curtis et al., 2017; Kim et al., 2020; van Vulpen, 2023), and was chosen as the framework to guide the development of the EMR education package. Developed in the 1970s, the ADDIE model uses a methodical approach to the development of instructional systems that help ensure learning activities serve a goal (Lavin et al., 2019; Lu et al., 2016; Molenda, 2003).

Defined in the framework, the ADDIE model offers integrative learning that supports job behaviours, knowledge, and skills that are required for undergraduate nursing students to succeed in the clinical environment (Lavin et al., 2019; Lu et al., 2016; Molenda, 2003). Each stage must be considered. The five stages for the ADDIE model are:

- Analyse
- Design
- Development
- Implement
- Evaluate



From “ADDIE Model Explained: All You Need to Know,” by E. van Vulpen (n.d.), Figure 3.1.https://www.aihr.com/blog/addie-model/

3.2.1. Previous use of the ADDIE model in nursing

Workflow issues were found in one hospital in the United States of America (USA) in relation to the adoption of electronic health records, which led

to unsafe workarounds, decreased productivity, inefficient clinical documentation and slow EMR adoption (San Jose, 2017). San Jose (2017) used the ADDIE model to improve process mapping, cognitive walkthrough, eLearning module development, pilot study and evaluation. San Jose's (2017) research project used a qualitative design of n = 30 nurses from emergency (ED) and found the participants described a positive learning experience (San Jose, 2017).

Three educators and instructional designers developed and implemented first term courses in a newly developed registered nurse (RN) to Bachelor of Science in nursing program (Curtis et al., 2017). The ADDIE model served as the framework for the design of the program. Students demonstrated meeting course objectives for three courses whilst synthesising and applying newly gained knowledge and skills (Curtis et al., 2017).

Another research project used the ADDIE model to develop nursing information system training for a new graduate nurse in Taiwan and found the framework helped design the training program on nursing information systems (NIS) training programs (Lu et al, 2016). After the training program the students' reported self-efficacy significantly improved ($p<.001$) compared to pre-test and 88% of participants passed the pragmatic exam (Lu et al, 2016).

The ADDIE model was used to integrate the development of the online learning kits using "ThinkLink" software program aimed to meet the health care needs of pregnant women and children suffering from chronic illness who are impacted by public health emergencies (Lavin, et al., 2019). An innovative online education program provided to the Society of the Advancement of Disaster Nursing aimed to help advance health practitioner readiness, increase knowledge and understanding (Lavin, et al., 2019).

Other uses of the ADDIE model in nursing include in mental health online courses for nurses (Jones et al., 2021), training nurses on paediatric performance with blood transfusions (Abbass et al., 2022), designing clinical ethics education for nurses (Kim et al., 2020), simulation education on telemetry (Hall et al., 2023) and the use of a mobile application based cultural competency program (Sung & Park, 2021). Research has therefore identified ADDIE is an effective framework to use when implementing a variety of educational programs that are provided using digital technology.

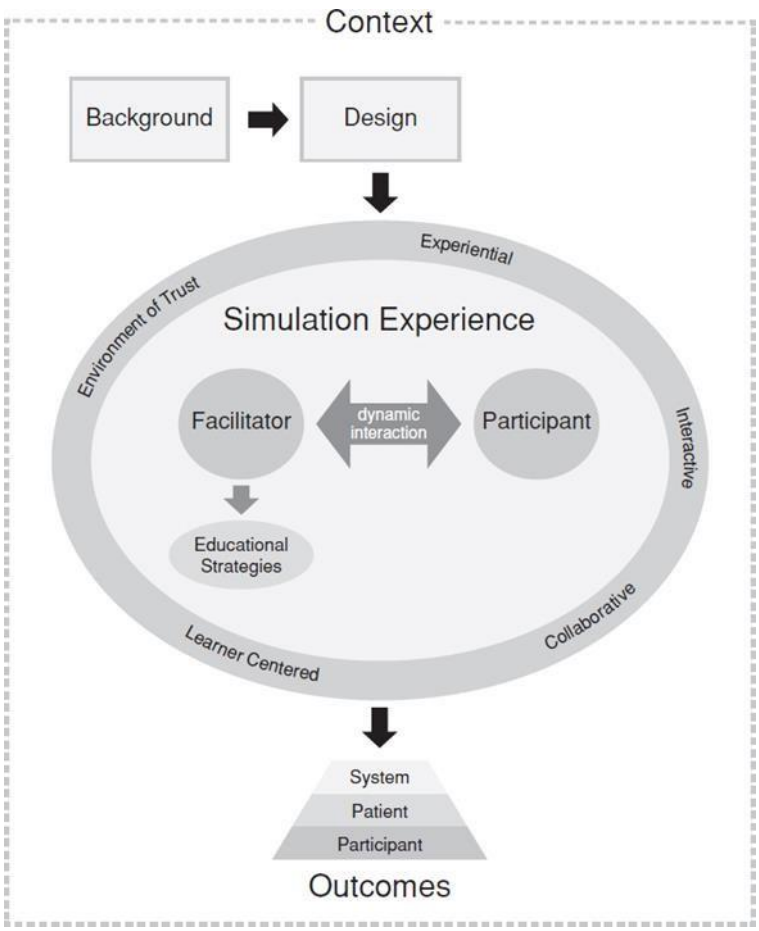
3.3. NLN/Jeffries Simulation framework

The second framework used in this research project was developed by Dr Pamela Jeffries and team, along with support from the National Leagues of Nurses (NLN, 2005). The NLN/Jeffries Simulation Model (2005) has been used to conduct multisite research project's evaluating the design, implementation, and evaluation of simulation within nursing education (Al Khasawneh et al., 2021; Bowden et al., 2022; Cowperthwait, 2020; Jeffries & Rodgers, 2021). The NLN/Jeffries Simulation Theory is broken down into seven components which include:

1. Context
2. Background
3. Design
4. Simulation experience
5. Facilitator and educational strategies
6. Participant
7. Outcomes

While the framework specifically assesses simulation in nursing education, in this research project rather than simulation the education program

was the digital EMR education provided in the nursing laboratory. The associated National League for Nursing Student Satisfaction and Self-Confidence in Learning survey designed by Jeffries & Rizzolo (2006), also linked to the framework, evaluates satisfaction and self-confidence of participants with newly established simulations programs. Modification of the survey to support education around EMR and digital technology supports the goal of the research project.



From "The NLN Jeffries Simulation Theory: Brief narrative description," by R. P. Jeffries, R. B. Jeffries & R. K. Adamson, (2015), *Nursing Education Perspectives,* 36(5), 292–293, Figure 3.2. https://doi.org/10.5480/1536-5026-36.5.292

3.3.1. Development of Pamela Jeffries Simulation framework

In 2012, after the dissemination of the initial research project, a review of both the Jeffries model and nursing simulation was identified by International Nursing Association for Clinical Simulation and Learning (INACSL). The in-depth

review executed by the INACSL identified further development to the original theory was required to promote and guide advanced research in simulation (Jeffries & Rodgers, 2021). Renamed The NLN/Jeffries Simulation Theory in 2015, the framework continues to evolve over time, by identifying and addressing variables that can impact simulation, such as planning, design, implementation, and outcomes of educational simulation activities (Jeffries & Rodgers, 2021; Kardong-Edgren, 2021). The NLN/Jeffries Simulation Theory continues to be used for research for the evaluation and help guide best practice approaches within education techniques employed in the laboratory clinical environment.

3.4. Modified ADDIE/NLN Jeffries Simulation framework

The ADDIE framework has previously been used in conjunction with other frameworks to develop education programs to become a more rounded learning experience (Jose, 2017; Multak et al., 2013; Patel et al., 2018). By using the ADDIE framework, the research project could align to the development of the intervention, EMR education). Due to the inability of ADDIE to evaluate the undergraduate nursing students experience accessing and use the EMR education software in the clinical placement environment after providing education on the EMR software in the nursing laboratory, a second framework, namely the NLN/Jeffries Framework, was used to address the research questions. Previous research has used the NLN/Jeffries Framework on its own or in conjunction with and / or adapted to evaluate satisfaction and self-confidence in learning (Alharbit & Alharbit, 2022; Cowperthwait, 2020; Cummings & Connely, 2016; Omer, 2016). Thus, the ADDIE and NLN/Jeffries Framework was combined, and modified to meet the aims of the research

project. The modified ADDIE/ NLN Jeffries framework supports contemporary thoughts regarding the importance to incorporating EMR into the academic environment to support undergraduate nursing students transition to the clinical environment (Brown et al., 2020; Mollart et al., 2020; Missen et al., 2015; Williams et al., 2021).

A description on the components and how they were applied to the research project is included below.

3.4.1. Phase 1 Analyse

The analyse phase is used to identify the problem needing solved within a specific population (Lavin et al., 2019; van Vulpen, 2023). Some healthcare facilities where undergraduate nursing students are allocated clinical placement have implemented EMR as their preferred electronic patient documentation system, whereas other healthcare facilities continue to use traditional paper documentation to record patient data (Williams et al., 2021). Therefore, it is important that students receive a combination of electronic and paper-based patient medical records during their undergraduate nursing degree. Currently there are a small number of universities in Australia that have evaluated or have implemented EMR patient documentation education into their Bachelor of Nursing degree, however, the numbers are increasing as academia recognises the need for EMR education within contemporary undergraduate nursing degrees (Jedwab et al., 2019; Sullivan et al., 2016). The ADDIE component “Analyse” applied in this research project refers to the identification in literature of the need for digital informatics’ to be embedded into undergraduate nursing programs that are provided in the nursing laboratory and assist preparedness for a variety of healthcare clinical placements settings and employability.

3.4.2. Phase 2 Design

The design phase allows for the collection of information from the analysis phase into a learning design (Lavin et al., 2019). This includes delivery methods such as online blended learning of EMR in nursing laboratory classes with feedback on the effectiveness. The course objective of second year second semester nursing laboratory course states “ability to use information literacy and the ability to communicate information accurately and effectively” (University of Southern Queensland [UniSQ], 2024) this aligns with the objectives set out by the Nursing and Midwifery Board of Australia (NMBA, 2016), Australian Nursing and Midwifery Accreditation Council (ANMAC, 2019), Australian College of Nursing (ACN, 2017), and the National Nursing and Midwifery Digital Health Capability Framework (2022) concerning the implementation and use of digital technology to document patient data. The learning outcomes also represent the contemporary clinical environment where there has been a shift away from paper-based patient documentation to EMR.

For this research project the researcher evaluated the outcomes of the implementation of an EMR education into the nursing laboratory by using the Modified Student Satisfaction and Self-Confidence in Patient Documentation Survey to address the implementation of EMR into the nursing laboratory and whether it met the course objectives.

3.4.3. Phase 3 Development

In the development phase prototypes are normally created. It is important for any software tools that are developed and implemented in the academic curricula to be evaluated to determine if they achieve their outcomes within the relative cohort of students (Lavin et al., 2019). The delivery strategies engaged in the EMR education in the nursing laboratory included dividing the student

cohort into smaller groups, each using one of the three touch screen computers. Undergraduate nursing students were shown how to log into the EMR system, find the relevant patient scenario, document using either the keyboard or stylus pen, and find specific documentation relevant to the patient scenario such as fluid balance charts, medication charts, vital observation chart, laboratory results, and progress notes. The time provided in the nursing laboratory gave the undergraduate nursing students time to familiarise themselves with the system and to check if their login details worked and allowed the clinical facilitator the ability to assist each cohort.

3.4.4. Phase 4 Implementation

This phase consists of the delivery of the training and project management (Lavin et al., 2019). For this research project the implementation phase referred to the undergraduate nursing students accessing and using the EMR in the nursing laboratory. During the three-day nursing laboratory class undergraduate nursing students performed clinical cares for each patient three times as the scenarios are linked to different shifts. In a regular 16 student class, undergraduate nursing students were broken down to smaller groups of three to four students. This meant each undergraduate nursing student would access and use EMR at least twice during the three-day nursing laboratory. Each session lasted for approximately 45- 60 mins before moving to another patient scenario. Support and direction were provided by the nursing laboratory facilitator as required. If a group struggled to access and use the EMR, the nursing laboratory facilitator would either demonstrate how to access the specific areas of the EMR program and then having the undergraduate nursing student access the area of interest, or verbally explaining so the undergraduate nursing

student can work their way through the program. Undergraduate nursing students also demonstrated peer support for each other. If a student lacked confidence in using the EMR another student would support them through positive encouragement. The undergraduate nursing student who was accessing the EMR oversaw the patient scenario, working with the team deciding on what was required and allocating team members to each task/skill. This enabled undergraduate nursing students to participate as a group, develop leadership skills and understand the importance of documenting patient data. The nursing laboratory facilitator continued to support each group as and when required. This allowed undergraduate nursing students to challenge themselves or make errors while learning in a safe environment.

The control group of undergraduate nursing students had previous exposure to traditional paper-based patient documentation that included vital observations, medication, fluid balance, and intravenous fluid charts, along with risk assessments, progress notes and medical records in earlier nursing laboratory courses. The control group of undergraduate nursing students attend a three-day nursing laboratory which required students to care for five mannequin patients over three sessions which consisted of three shifts of patient care. The nursing laboratory facilitator aided individual groups as required.

3.4.5. Phase 5 Participants

Phase five of the Modified ADDIE/NLN Jeffries Simulation Framework incorporates the sixth component of the NLN/Jeffries Simulation Theory, the participant. In this research project, the participants of the research project included undergraduate students who had attended specific nursing laboratory session and attended clinical placements. Sociodemographic details collected

on each participant such as age, gender, highest level of qualification, previous experience in nursing, and previous exposure to EMR, were used to help identify if there were any differences between satisfaction and self-confidence in different cohorts of undergraduate nursing students (Jeffries & Rodgers, 2021).

3.4.6. Phase 6 Evaluation

Phase six aims to provide a formal evaluation of the design, development, and delivery stages and a continuous evaluation of the program (van Vulpen, 2023). The evaluation phase evaluates the EMR education using a post-test survey. For this phase of the research project The NLN Student Satisfaction and Self-Confidence in Learning survey helped guide the development of the Modified Student Satisfaction and Self-confidence in Patient Documentation Survey. The Modified Student Satisfaction and Self-Confidence in Patient Documentation Survey was used to evaluate the effectiveness of the EMR digital education package by addressing research question two: do levels of satisfaction in undergraduate nursing students increase when accessing and using EMR in the clinical environment after receiving education on EMR in the nursing laboratory as measured by the Modified Student Satisfaction and Self-Confidence in Patient Documentation Survey; and research question three: do levels of self-confidence in undergraduate nursing students increase when accessing and using EMR in the nursing laboratory as measured by the Modified Student Satisfaction and Self-Confidence in Patient Documentation Survey.

The intervention group was those participants who received education on EMR and paper-based patient documentation in the nursing laboratory settings and the control group were those participants who received traditional paper-based patient documentation only in the nursing laboratory settings.

3.4.7. Phase 7 Outcomes

Separated into three stages – participant, patient, and system outcomes, outcome is the final component of the framework (Cowperthwait, 2020; Jeffries & Rodgers, 2021). For this research project, the findings from the Modified Student Satisfaction and Self-Confidence in Patient Documentation survey were analysed to address the research questions.

3.5. Summary

This chapter discussed the ADDIE and NLN/Jeffries Simulation models. Use of the ADDIE model has been shown in the forementioned studies to be an effective method of delivery of a digital education package. The ADDIE model has been used in this research project for the design and the development of the education component of EMR education in the nursing laboratory environment. The NLN/Jeffries Simulation theory and NLN Student Satisfaction and Self-Confidence in Learning survey was used for guidance on the final evaluation and outcomes phase. A combination of the two frameworks, renamed The Modified ADDIE/NLN Jeffries Simulation Framework, was used to provide structure to this research project and to assist addressing the three research questions. The following chapter provides information on the methodology of the research project including participant recruitment, ethics, and identification of the research questions.

CHAPTER 4: Methodology

4.1. Introduction

This research project was conducted to evaluate undergraduate nursing students' satisfaction and self-confidence accessing and using electronic medical records (EMR) on clinical placement post education on EMR in the nursing laboratory. Justification of the research, research design, aims and objectives along with research questions, intervention, instrument, data collection processes, and data analysis are presented in this chapter. Identification of the independent and dependant variables, and discussion on participant recruitment and eligibility criteria will also be considered in this chapter, along with ethical consideration, confidentiality, and consent. Identification of the original survey instrument along with a discussion on the modifications made to the original survey instrument, and the reliability and validity of the research instrument will also be discussed.

4.2. Aims and objectives

The aim of the research project was to evaluate if undergraduate nursing students' satisfaction and self-confidence in accessing and using EMR on clinical placement improved after receiving EMR education in the nursing laboratory. Research objectives were set out to address the following scientific hypothesises and questions.

4.2.1 Scientific hypotheses

The scientific hypotheses that were addressed in this research project are as follows:

1) Levels of satisfaction in undergraduate nursing students will increase when accessing and using EMR in the clinical environment after receiving education on EMR in the nursing

laboratory as measured by the Modified Student Satisfaction and Self-Confidence in Patient Documentation Survey.

2) Levels of self-confidence in undergraduate nursing students will increase when accessing and using EMR in the clinical environment after receiving education on EMR in the nursing laboratory as measured by the Modified Student Satisfaction and Self-Confidence in Patient Documentation Survey

4.2.2 Research questions

The three questions used to explore the hypotheses are as follows:

1. What are the differences and or similarities in the demographic data between the intervention (students who received a combination of EMR and paper-based patient documentation in the nursing laboratory) and control group (students who received paper-based patient documentation education in the nursing laboratory)?
2. Do levels of satisfaction in undergraduate nursing students increase when accessing and using EMR in the clinical environment after receiving education on EMR in the nursing laboratory compared to students who received paper-based patient documentation education as measured by the Modified Student Satisfaction and Self-Confidence in Patient Documentation Survey?
3. Do levels of self-confidence in undergraduate nursing students increase when accessing and using EMR in the clinical environment after receiving education on EMR in the nursing

laboratory compared to students who received paper-based patient documentation education as measured by the Modified Student Satisfaction and Self-Confidence in Patient Documentation Survey?

4.3. Design

The introduction to EMR education in the nursing laboratory negated the ability to conduct a pre-post-test quasi-experimental research project. Instead to address the research questions, a retrospective quasi experimental, single blind, post-test two group (intervention [EMR education and paper] and control group [paper]) cross-sectional research design was used. Participants of this research project were selected by the inclusion and exclusion criteria identified further in the methodology chapter.

4.4. Variables

The independent variable or the intervention in this research project was education provided to the undergraduate nursing students in the nursing laboratory. Either traditionally, paper-based documents education on patient medical records in undergraduate nursing programs or a combination of paper-based and EMR patient documentation education. All participating undergraduate nursing students received education on traditional paper-based documentation during previous nursing laboratory courses. Undergraduate nursing students who attended a second year second semester nursing laboratory course during 2021 were introduced to EMR education, along with paper-based documentation to document patient data. The dependent variables included age, gender, previous education provided in patient documentation, previous level of education, industry experience, and clinical placement.

4.5. Research project sample

This research project involved undergraduate nursing students enrolled in a Bachelor of Nursing program at one, four-campus regional university based in Australia. Undergraduate nursing students participated in the second year second semester nursing laboratory course; throughout the two semesters of 2021. A power analysis was used to determine the appropriate sample size. A level of significance of 0.05 and a power of 80% with a medium effect was used to determine a sample size of 126 participants (Kohn & Senyak, 2021).

Inclusion criteria

- Participants aged over 18 years old and
- Enrolled and successfully completed second year second semester patient documentation education in nursing laboratory course and
- Enrolled and completed second- or third-year clinical placement following receiving either traditional paper-based or EMR documents education and
- Able to consent.

Exclusion criteria

- Unsuccessful completion of second year second semester nursing laboratory course and
- Had not attended clinical placement within allocated time.

4.6. Recruitment of participants

Once ethics (H22REA003) had been approved by the university, recruitment was commenced in early 2022. In the initial stages of the research project participants were recruited through an announcement made on the university's specific Study Desk course websites –relevant to the specific second

year nursing laboratory course and the corresponding clinical placement course. Other methods of recruitment included the university's School of Nursing and Midwifery's social media pages on Facebook, and flyers in the nursing laboratory [Appendix A]. All recruitment requests included an outline of the research project the researchers name, inclusion criteria, links to the Student Participation Sheet and consent, and a web-link and quick response (QR) code to access the questionnaire. Two further requests for participation were made at 4-week intervals.

Due to a limited response garnered from undergraduate nursing students', assistance in recruitment was sought from the Professional Practice Hub (PPH). Emails were sent out to 391 undergraduate nursing students enrolled into the second or third clinical placement courses via individual nursing students' university email address (as per ethics approval). Individual emails were sent out three times. All emails included the inclusion criteria, an outline of the research project, the researchers name, links to the Student Participation Sheet and consent, and a weblink and QR code to access the survey. Throughout the second phase of recruitment an improved response was garnered from undergraduate nursing students however, the last email sent request gathered one response, therefore it was decided to cease recruitment in November 2022.

4.7. Eligibility criteria

Eligibility for the research project was two-fold. The first eligibility criteria involved undergraduate nursing students who attended and successfully completed the second year second semester nursing laboratory course in 2021, during the two semesters in 2021 undergraduate nursing students were introduced to a EMR program in the nursing laboratory. Attending clinical

placement was the inclusion criteria. Initially undergraduate nursing students were required to attend the specific clinical placement attached to the second year second semester nursing laboratory course, in the following semester. However, due to a lack of response to survey from undergraduate nursing students and the length of time between the commencement and end of the survey, recruitment was opened to include any clinical placement in second and third year, post attendance and successful completion of the second year second semester nursing laboratory course either prior to 2021 (control group) or in 2021 (intervention group). This allowed the recruitment and participation in the survey of undergraduate nursing students enrolled and participating in clinical placement courses from second year second semester through to all of third year.

4.8. Intervention – Electronic Medical Records (EMR)

The traditional paper-based patient documentation found in the clinical environment includes all relevant documentation required to provide safe, quality patient care. Similarly, EMR in the clinical environment contains the same relevant patient documentation. Effective EMR education programs need to contain similar information as found in traditional paper-based and EMR patient documentation and should include nursing documentation such as vital observations chart, medication charts, and patient progress notes (Mollart et al., 2023). By not providing a thorough range of documentation in the EMR education program, undergraduate nursing students do not receive a completed patient file, therefore possibly impacting their ability to link and identify clinical patient data. The EMR implemented into this regional, four campus, Australian university included some extra patient documentation relevant to the specific patient scenario such as fluid balance charts, specialty observations charts such

as neurological observation chart. This provided undergraduate nursing students with a comprehensive representation of the EMR found in the clinical environment. Undergraduate nursing students who received the intervention (combination of EMR and paper-based patient documentation) where given access to the software prior to attending their nursing laboratory. More information on the design, development, and implementation of the EMR and traditional paper-based documents can be found in the previous chapter (three).

4.9. Survey Instrument

4.9.1. Original survey

The original National League for Nursing (NLN) Student Satisfaction and Self-confidence in Learning survey can be used to assess activities in the nursing laboratory environment. The original NLN Student Satisfaction and Self-Confidence in Learning Survey was developed in 2005 to assess each component of the NLN/Jeffries Simulation Framework, by measuring student's satisfaction (five questions) and self-confidence in learning (eight questions) with the simulation activities in the nursing laboratory (Cowperthwait, 2020: Jeffries & Rodgers, 2021; NLN: 2005; Rizzolo, 2021). Each response to the original NLN Student Satisfaction and Self-Confidence in Learning Survey comprises of a 5-point Likert scale response. As per the NLN copyright, permission to use the Student Satisfaction and Self-Confidence in Learning Survey is granted if the survey is being used for non-commercial activities such as a thesis however, modification is the responsibility of the researcher as it may affect the reliability and validity of the survey (NLN, 2022).

4.9.2. Adaptation of survey

A modified version of the NLN Student Satisfaction and Self-Confidence in

Learning Survey was chosen over the Technology Acceptance Model Questionnaire (TAM) as it addressed the research questions of satisfaction and self-confidence exchanging of the term simulation to inclusion of EMR education and paper-based patient documentation. The original questions from the NLN Student Satisfaction and Self-Confidence in Learning Survey included the term “simulation” these questions were exchanged in this research project for “EMR education”. Simulation has multiple applications including interactive digital learning software such as EMR education. Previous research has used the NLN Student Satisfaction and Self-Confidence in Learning survey in conjunction with other tools as well as expanding the survey by incorporating relevant questions related to the research project (Alharbit & Alharbit, 2022; Cummings & Connelly, 2016; Cowperthwait, 2020; Omer, 2016).

The survey was then renamed to enhance the aims of the research project - The Modified Student Satisfaction and Self-Confidence in Patient Documentation Survey [Appendix B]. An example of some questions that were included in the Student Satisfaction and Self-Confidence in Patient Documentation Survey include: prior to your current clinical placement, did you have any previous experience with electronic medical administration records (eMAR)?; How were you taught to document patient information in the simulated nursing laboratory?; If the methods used to teach paper-based and or electronic medical administration records (eMAR) in the simulated nursing laboratory were helpful and effective?; and If I understand the use of activities related to patient documentation in simulated nursing laboratory will improve my proficiency in accessing and using paper-based and or electronic medical administration records (eMAR) to document patient information?

The use of the five-point Likert scale with response's ranging from strongly disagree to strongly agree was maintained in-line with the NLN Student Satisfaction and Self-confidence in Learning Survey. Each question from the subgroups were added and a total Student Satisfaction and Self Confidence score was calculated for each student.

To improve participation and accessibility the survey was provided to undergraduate nursing students through a digital link and QR code to access the survey through mobile, laptop, and desktop digital devices.

4.9.3. Demographic questions

An additional ten demographic questions were included. Along with three questions relating to age, education, and gender, a further seven questions; related to topics such as whether the respondent had received paper-based patient documentation or a combination of EMR and paper-based patient documentation in the nursing laboratory, to the clinical environment the respondent attended for clinical placement; were evaluated.

4.9.4. Reliability and validity of survey

When conducting research, it is vital that any instrument/tool used must be consistent (reliability) and have accuracy (validity) (LoBiodo-Wood & Haber, 2018). Reliability and validity minimise the level of error that can be attributed to the instrument used to measure the outcomes (Watson, 2015). Cronbach's alpha is used to assess the reliability and validity of the instrument (LoBiodo-Wood & Haber, 2017). The original NLN Student Satisfaction and Self-Confidence in Learning reliability was tested using Cronbach's alpha (NLN, 2005). Previous use of the tool found the satisfaction component of the survey scored a 0.94, and the self-confidence component scored a 0.87. The Modified

Student Satisfaction and Self-Confidence in Patient Documentation Cronbach's alpha scores for satisfaction was 0.948 and for self-confidence was 0.702.

4.10. Data collection

Originally the timeline for data collection was to commence recruitment and collection once ethics had been approved and continue to the end of semester one (June) 2022. However, due to limited responses the data collection phase was extended to the end of semester two (November) 2022.

Data was collected through the university's digital survey tool provided on the university website. Using the university's survey tool minimised the digital footprint of the survey. As a university abides by the NHMRC guidelines, university's digital survey site provides participant privacy, supports approved data management plans, and identifies conduct when researching.

4.11. Data cleaning

Survey responses were collected with the assistance of the university's digital survey tool and transferred to Microsoft Excel spreadsheet before being imported to Statistical Package for the Social Sciences version 29 (SPSS v.29). This allowed the researcher to clean the data at each stage of the transference process. On transferring data from the survey tool to the Microsoft Excel spreadsheet, data was checked to make sure all data had been transferred and entered correctly to remove any errors. This was achieved with the help from the university survey tool. Errors with data import was then checked when importing to SPSS v.29. Checking the categorical and continuous variables for scores outside the range for each specific question were two ways the data was checked for errors when importing the data to SPSS v.29.

4.12. Ethics, confidentiality, and consent

4.12.1. Ethical considerations

The National Health and Medical Research Council (NHMRC) (2018) provides guidelines on conducting of research that involves the human participants. Participants required for the research project were limited to undergraduate nursing students from four campuses of one regional university who had successfully completed the relevant nursing laboratory course and clinical placement. Complying with the NHMRC guidelines; ethics was sought and approved by the University of Southern Queensland, with the allocated ethics approval number H22REA003 [Appendix C].

4.12.2. Confidentiality, anonymity, and consent

It is important to maintain participants' confidentiality, anonymity and consent when conducting research. As highlighted in a study by Long & Johnson (2000) perceived or actual coercion was avoided by not actively recruiting within the nursing laboratory space. Therefore, as the researcher was a teaching member of the course team recruitment was conducted outside the nursing laboratory space.

Informed consent is required prior to participants activating the survey. Informed consent includes the participant understanding what the research project is attempting to achieve and whether they wish to participate (Ruane, 2016). Consent to participate in the research project as well as information on the research project was included on the front page when accessing the digital survey. Consent was implied if the participant clicked on the continue button to proceed with the survey.

Maintaining confidentiality during and post survey is important as some of the demographic data could be deemed as sensitive to some people (Jones &

Rattray, 2010). As this research project is a quantitative research project, specifically evaluating nursing students' satisfaction and self-confidence in accessing and documenting patient data while on clinical placement after being introduced to EMR in the nursing laboratory, personal information was kept to a bare minimum. Participants had the option to skip demographic questions.

To assist with the anonymity of participants, recruitment flyers and announcements were made on through the university specific digital platforms. However, due to a lack of participants in the initial recruitment phase, eligible undergraduate nursing students' university email addresses (using an individual's unique university number) was used to contact each eligible nursing student individually. Contact via email was made through the university specific email and included contact information of the researcher. Undergraduate nursing students who accessed the survey from either announcements or email received the same flyer documenting the aim of the research project, wed hyperlink address, and a QR code allowing easy links to the survey. The paper and digital recruitment requests also included links to the participant information sheet (PIS) [Appendix D] and the consent form [Appendix E].

4.13. Summary

Determining the aims and objectives of a research project underpin the choice of the appropriate methodology. This chapter discussed how the planning and design of the research project can be impacted by variables. Participant recruitment along with inclusion, exclusion criteria was identified before discussion on the choice of instrument used to achieve the aims and objectives was considered. Reliability and validity of the survey was identified prior to discussing data collection and cleaning. Ethics, confidentiality, and consent were

the final topics considered. In chapter five, the researcher will report the results from the modified Satisfaction and Self-Confidence in Patient Documentation survey.

CHAPTER 5: Results

5.1. Introduction

The previous chapter discussed the methodology for the research project. This chapter presents the results from the Modified Student Satisfaction and Self-Confidence in Patient Documentation survey. Descriptive data of demographics included total numbers, percentages and Chi Squared are presented. Research questions are presented as total numbers, means, standard deviations, and analysis of variance (ANOVA). Statistical analysis of data was performed using ANOVA. Cronbach's alpha was calculated to test for reliability of the Modified Student Satisfaction and Self Confidence in the Patient Documentation Survey.

5.2. Sample size

The research project's sample size was calculated at n=126 participants. Recruitment was extended as per ethics approval to reach the sample size. While the sample size was achieved, when analysing the data, it was found that there were several incomplete surveys. Once incomplete surveys were removed the final sample size of N=113 was achieved, indicating the study to be underpowered. Of the N=113 completed survey's n=51 were in the combination EMR and paper-based (intervention) group and n=62 were in the paper-based (control) group

5.3. Demographics

To help identify the demographic results, the data is presented in the tables below. The demographic tables are split into the two groups – undergraduate nursing students who received paper-based only patient documentation education and undergraduate nursing students who received

both paper-based (control) and EMR (intervention) education in the nursing laboratory. This is to help demonstrate that the two groups were similar.

5.3.1. Age

Table one describes the age of the undergraduate nursing students who participated in the survey. It further identifies the type of patient documentation each group received in the nursing laboratory. Forty-two participants reported that they were aged between 18–25 years, with n=17 of those participants indicating they were taught a combination of paper and EMR to document patient data in the clinical nursing laboratory environment. Out of the n=34 participants identified in the 26–35-year age bracket, n=16 received a combination EMR and paper-based education. Among the n=21 participants were between 36-45 years, n=11 receiving a combination of EMR and paper-based patient documentation education. Over 46 years old is the final group with n=16 identifying they are in that age bracket. Of those n=9 indicated the received a combination of EMR and paper-based patient documentation education. A Chi Square Test for Independence (with Yates' Continuity Correction) demonstrates the Likelihood Ratio (LRT) accepts there is no statistically significant difference between the two groups: x^2 (1, n=113) =8.583, *p* = .299, *phi* = .273.

Table 1 Demographic - age

Age	Combination	Paper	Total	Column N %	Sig. value *p*
18-25 years old	17	25	42	37.2%	.299
26-35 years old	16	18	34	30.1%	
36-45 years old	11	10	21	18.6%	
>46 years old	7	9	16	14.1%	

5.3.2. Gender

Dissemination of gender identification is documented in table two. A total of n=13 undergraduate nursing students identified as male, nine in the control group and four in the intervention group. Of the n=100 female undergraduate nursing students, n=47 received combination EMR and paper-based education. A Chi-Square Test for Independence (with Yates" Continuity Correction) indicated no significant association between the methods of patient documentation taught in the nursing laboratory environment and their gender, x^2 (1, n=113) = .67*p* = .418, *phi* = .104.

Table 2 Demographic - gender

	Paper-based only	Combination	Total	Column N%	Sig. value *p*
Female	53	47	100	88.5%	.418
Male	9	4	13	11.5%	

5.3.3. Qualification

Table three disseminates the level of qualification/s the participants had previously obtained, and the methods of patient documentation taught in the nursing laboratory environment. Thirty-eight participants (33.6%) identified completion of year 12 as their highest form of education. Among these participants, an equal number of participants indicated they received paper-based or combination EMR and paper-based patient documentation in the nursing laboratory. Fourteen participants (12.4%) reported being awarded a previous certificate, with half of them indicating they received a combination of EMR and paper-based patient documentation education. Thirty-eight participants (33.6%) had been awarded a previous diploma, with one-third (35%) of this group receiving combination patient documentation education. The final group of n=20 participants (17.7%) reported having another degree prior to

commencing their Bachelor of Nursing, and n=12 of these participants received the combination EMR and paper-based patient documentation education in the nursing laboratory environment.

A Chi-Square Test for Independence (with Yates' Continuity Correction) indicated no significant association between the methods patient documentation taught in the nursing laboratory environment and previous education, x^2 (1, n=113) = 5.6, *p* = .23, *phi* = .23.

Table 3 Demographic – previous education held by participants

Education	Paper-based	Combination	Total	Column N%	Sig. value *p*
<year 12	3	0	3	2.7%	
Year 12	19	19	38	33.6%	.23
Certificate	9	5	14	12.4%	.
Diploma	23	15	38	33.6%	
Degree	8	12	20	17.7%	

5.3.4. Education of patient documentation in the nursing laboratory

Table four presents the overall data on the type of patient documentation education received in the nursing laboratory, with n=51 (45.1%) of the participants indicated they were taught paper-based patient documentation within nursing laboratory.

Table 4 Demographic – methods of patient documentation taught in the nursing laboratory.

Patient documentation taught in the nursing laboratory	Frequency	Column N%
Combination	51	45.1%
Paper	62	54.9%

5.3.5. Clinical placement and type of patient documentation

Table five disseminates what type of education the undergraduate nursing student received in the nursing laboratory (combination or paper-based) and whether the facility they attended for clinical placement had EMR. Seventy-three participants (64.4%) attended a healthcare facility that used EMR. Of these participants', n=40 reported having received education in both EMR and paper patient documentation. A Chi-Square Test for Independence (with Yates' Continuity Correction) indicated there is a medium effect on the type of patient documentation provided to an undergraduate nursing student in the nursing laboratory and whether they attend a healthcare facility with EMR, x^2 (1, n=113) = 7.78, *p* = .010, *phi* = .262.

Table 5 Demographic – patient documentation on clinical placement

Patient documentation on Clinical Placement	Combination	Paper based	Total	Column N %	Sig. value *p*
EMR patient documentation	40	33	73	64.6%	.010
Paper-based patient documentation	11	29	40	35.4%	

5.3.6. Where did you attend clinical placement.

The most common response identified for the scale properties of "where the undergraduate student nurse attended clinical placement" was a public hospital facility as seen by n=80 (70.8%) of the participants response. A further with n=21 participants (18.6%) indicated they attended clinical placement in a private hospital. Of the participants who attended a public hospital, just under n=35 received a combination of EMR and paper-based patient documentation education. Of those participants who attend a private hospital facility, n=11 received a combination EMR and paper-based patient documentation. The final

n=12 participants indicated they attended an alternative placement with five indicating they had received a combination of EMR and paper-based education in the nursing laboratory. A Chi-Square Test for Independence indicated no significant association between how an undergraduate nursing student was taught patient documentation in the nursing laboratory environment and where they attended clinical placement, x^2 (1, n=113) = 2.34, *p* = .66, *phi* = .15.

Table 6 Demographic - where did you attend clinical placement?

Where did you attend Clinical Placement?	Combination	Paper based	Frequency	Column N%	Sig. value *p*
Public Hospital	35	45	80	70.8%	.66
Private Hospital	11	10	21	18.6%	
Other including aged care & community	5	7	12	10.6%	

5.3.7. Previous experience with EMR

No previous experience with EMR was identified in n=59 (52.2%) of the undergraduate nursing students who participated in the survey as presented in table seven. Of the participants with no previous EMR knowledge n=18 received combination EMR and paper-based education in the nursing laboratory prior to clinical placement. Previous EMR knowledge gained from previous clinical placement was indicated by n=44 (38.9%) of the participants with n=28 receiving the combination patient documentation education in the nursing laboratory. Of the n=10 participants who indicated they had previous EMR knowledge due to employment, an equal number of students received a combination EMR and paper-based patient documentation and paper-based only patient documentation. A Chi-Square Test for Independence indicated there was

significant association between how an undergraduate nursing student was taught patient documentation in the nursing laboratory environment and their previous experience with EMR, x^2 (1, n=113) = 11.28, *p* = .004, *phi* = .32.

Table 7 Demographic – previous EMR experience before attending clinical nursing laboratory

Previous experience with EMR	Combination	Paper based	Frequency	Column N%	Sig. value *p*
No	18	41	59	52.2%	.004
Yes; previous/regular employment	5	5	10	8.8%	
Yes; previous clinical placement	28	16	44	38.9%	

5.3.8. Time between education and clinical placement

Table eight presents the demographic question on the time between education on patient documentation provided in the nursing laboratory and clinical placement. Of the N=113 undergraduate nursing students who participated in the survey, n=56 indicated they attended clinical placement more than five months after receiving education on patient documentation. A further n=28 participants indicated they attend clinical placement between three to four months after receiving education on patient documentation in the nursing laboratory. The final n=29 participants attended clinical placement between one and two months after receiving education. A Chi-Square Test for Independence indicated no significant association between how an undergraduate nursing student was taught patient documentation in the nursing laboratory environment and the time from receiving education and attending clinical placement, x^2 (1, n=113) = 8.61, *p* = .07, *phi* = .28.

Table 8 Demographic – time between receiving patient documentation education in the nursing laboratory and clinical placement

Length of time between nursing laboratory and clinical placement	Combination	Paper based	Frequency	Column N%	Sig. value *p*
<1 month – 2 months	12	17	29	25.6%	0.07
3 – 4 months	10	18	28	24.8%	
>5 months	29	27	56	52.5%	

5.4. Research Questions

The Student Satisfaction and Self-Confidence in Patient Documentation survey was utilised to analyse whether undergraduate nursing students' satisfaction and self-confidence levels improved when accessing and using EMRs in the clinical environment, following their education on EMR in the nursing laboratory.

5.4.1. Satisfaction

According to original National League for Nursing (2005) the Student Satisfaction and Self-Confidence in Learning Survey has good consistency, with a Cronbach alpha coefficient reported of 0.94. In the current research project, the modified Student Satisfaction and Self-Confidence in Patient Documentation survey Cronbach alpha coefficient was 0.948.

Table 9 Satisfaction Cronbach Alpha

Cronbach Alpha	Cronbach's Alpha Based on Standardized Items	N of items
.948	.948	5

A two-way between-groups analysis of variance was conducted to evaluate how education on patient documentation in the nursing laboratory was provided and where an undergraduate nursing student attended clinical

placement had on satisfaction levels, as measured by the Modified Student Satisfaction and Self-Confidence in Patient Documentation survey. The interaction effect between where the undergraduate nursing student attended clinical placement was not statistically significant, F (1, 109) = .467, p = .496. There was statistically significant interaction effect for education, F (1, 109) = 9.571, p = .003. The mean score for the education group who received a combination of EMR and paper-based patient documentation in the nursing laboratory and attended clinical placement at a healthcare facility with EMR (M = 19.07, SD = 4.184) did not differ significantly for undergraduate nursing students who had a combination of EMR and paper-based education in the nursing laboratory and attended a clinical placement at a healthcare facility that used paper to document patient data (M = 19.27, SD = 5.331). For undergraduate nursing students who received paper education in the nursing laboratory and attended a healthcare facility that used EMR to document patient data (M = 16.85, SD = 4.353) did not differ significantly from those undergraduate nursing students who received paper education in the nursing laboratory and attend a clinical placement in a healthcare facility that documented patient data on paper (M = 15.28, SD = 5.567). The mean effect for the healthcare facility they attended and education they received, F (1, 109) = .775, p = .381) was not statistically significant.

Table 10 Satisfaction levels of participants

Intervention or control group	Patient documentation on clinical Placement	Mean	Std. Deviation	N
Intervention	Electronic only	19.07	4.184	40
	Paper only	19.27	5.331	11
	Total	19.12	4.398	51
Control	Electronic only	16.85	4.353	33
	Paper only	15.28	5.567	29
	Total	16.11	4.979	62
Total	Electronic only	18.07	4.376	73
	Paper only	16.27	5.728	40
	Total	17.47	4.939	113

5.4.2. Self-Confidence

According to original National League for Nursing (2005) the Student Satisfaction and Self-Confidence in Learning Survey has good consistency, with a Cronbach alpha coefficient reported of 0.704. In the current research project, the Cronbach alpha coefficient was 0.702 for the modified Student Satisfaction and Self-Confidence in Patient Documentation survey.

Table 11 Self-Confidence Cronbach Alpha

Cronbach Alpha	Cronbach's Alpha Based on Standardized Items	N of items
.702	.702	7

A two-way between-groups analysis of variance was conducted to explore the impact education on patient documentation in the nursing laboratory and where an undergraduate nursing student was attended clinical placement on self-confidence levels, as measured by the Modified Student Satisfaction and Self-Confidence in Patient Documentation survey. The interaction effect between where the undergraduate nursing student attended clinical placement was not

statistically significant, F (1, 109) = .761, p = .385. There was no statistically significant interaction effect for education, F (1, 109) = 1.643, p = .203. The mean score for the education group who received a combination of EMR and paper-based patient documentation in the nursing laboratory and attended clinical placement at a healthcare facility with EMR (M = 29.80, SD = 2.710) did not differ significantly for undergraduate nursing students who had combination EMR and paper-based education in the nursing laboratory and attend clinical placement at a healthcare facility that used paper to document patient data (M = 29.55, SD = 3.267). For undergraduate nursing students who received paper education in the nursing laboratory and attended a healthcare facility that used EMR to document patient data (M = 29.24, SD = 3.725) did not differ significantly from those undergraduate nursing students who received paper education in the nursing laboratory and attend a clinical placement in a healthcare facility that documented patient data on paper (M = 28.76, SD = 3.933). The mean effect for the healthcare facility they attended, F(1, 109) = .761, p = .385 not significant. The main effect for healthcare facility they attended, and education received, F (1, 109) = .279, p = .599.

Table 12 Self-Confidence levels of participants

Intervention or control group	Patient documentation on clinical placement	Mean	Std. Deviation	N
Intervention	Electronic only	29.80	2.710	40
	Paper only	29.55	3.267	11
	Total	29.75	2.806	51
Control	Electronic only	29.24	3.725	33
	Paper only	28.21	4.152	29
	Total	28.76	3.933	63
Total	Electronic only	29.55	3.197	73
	Paper only	28.58	3.935	40
	Total	29.19	3.490	113

5.5. Summary

The findings indicate there were no differences or statistically significant differences regarding the two hypotheses. Therefore, the hypothesis cannot be supported, and the null hypothesis is accepted. The findings indicated that some education, either paper-based or electronic, did have the desired impact on the satisfaction and self-confidence of undergraduate nursing students when on clinical placement. Interestingly, the time between education provided in the nursing laboratory and the clinical placement may have an impact on the level of satisfaction and self-confidence and will be discussed in the following chapter. Chapter six will discuss the findings from the results of the survey, limitations of this research project and discusses possible recommendations and future research into EMR education for undergraduate nursing students before concluding the research project.

CHAPTER 6: DISCUSSION AND CONCLUSIONS

6.1. Introduction

In this chapter the results presented in chapter five will be analysed in relation to the outcomes of this research and the literature. The focus of this research project was to explore undergraduate nursing students' satisfaction and self-confidence accessing and using electronic medical records (EMR) to document patient data while on clinical placement after receiving EMR education in the nursing laboratory. The research questions and hypotheses will be discussed and the implications for practice identified. The chapter will further explore whether findings produce new knowledge on the transference of knowledge from the nursing laboratory to the clinical environment, and undergraduates nursing student's satisfaction and self-confidence accessing and using EMR while on clinical placement post education in the nursing laboratory. The recommendations, limitations, and conclusion will also be presented in this chapter.

6.2. Problem identification

There is a shift in the clinical environment away from paper-based patient documentation to EMR, which means it is important to understand the impact it has on contemporary nursing education and undergraduate nursing students' satisfaction and self-confidence while on clinical placement (Mollart et al., 2020). The lack of consistency with patient documentation in the healthcare environment during clinical placement, variety of EMR platforms and paper-based documentation (Baillie et al., 2013), can impact on an undergraduate nursing student's knowledge, satisfaction and self-confidence using digital technology to document patient data. Having limited to no access to a combination of EMR and paper-based patient documentation throughout an

undergraduate nursing student's academic journey can impact their ability to be employable thereby influencing their satisfaction and self-confidence accessing and using EMR to document patient data upon graduation (Choi, 2024). Therefore, it is important to the academic journey of an undergraduate nursing student to experience EMR, along with paper-based, patient documentation in the nursing laboratory prior to attending clinical placement.

Research by Ahmed et al., (2023), Morrell & Ridgway (2014), McNamara (2014), Ng et al., (2024), and Rashawn Mohamed Abd-Elhady et al., (2022) demonstrates the importance of the nursing laboratory as a safe space when providing education to undergraduate nursing students. In the nursing laboratory, undergraduate nursing students can learn how to access and practice EMR to document patient information. This safe environment and positive learning experience leads to high levels of satisfaction and self-confidence (Ahmed et al., 2023; Fathi Ibrahim et al., 2019; Rashawn Mohammed Abd-Elhady et al., 2022). Consequently, enhanced satisfaction and self-confidence can bolster an undergraduate nursing students critical thinking skills and patient safety awareness enabling them to make informed decisions regarding safe patient care during clinical placement (Ahmed et al., 2023; Fathi Ibrahim et al., 2019; Rashawn Mohammed Abd-Elhady et al., 2022). Ultimately, leading to improved patient care and better identification and management of deteriorating patient conditions.

6.3. Summary of major findings

6.3.1. Evaluation of the Modified ADDIE/Jeffries Simulation framework

Throughout this research project the Modified ADDIE/NLN/Jeffries Framework, along with the Modified Student Satisfaction and Self-confidence in Patient Documentation survey, was used to address the three research questions and two hypotheses.

As previously identified in the framework chapter, due to the previous implementation of the EMR software into the nursing laboratory, frameworks such as the Technology Acceptance Model (TAM) did not meet the criteria for this research project (Ng et al., 2024). TAM did not address the aim of the research project which was to explore satisfaction and self-confidence in undergraduate nursing students in relation to the transfer of knowledge from the nursing laboratory to the clinical placement environment. This researcher found a combination of the ADDIE model and the NLN/Jeffries Simulation framework would help support the research aims and objectives. Previously used by itself or in conjunction with other frameworks, the ADDIE model has helped develop education programs that provide a comprehensive learning experience (Jose, 2017; Multak et al., 2013; Patel et al., 2018). While the ADDIE supported the development of the intervention (academic EMR) and the delivery of EMR in the nursing laboratory, it did not evaluate the user experience (van Vulpen, 2023). The NLN/Jeffries Simulation framework was able to access the learning outcomes of the user by exploring the undergraduate nursing student's satisfaction and self-confidence accessing and using EMR on clinical placement post EMR education in the nursing laboratory. The modified ADDIE/ NLN/Jeffries framework supports contemporary ideals regarding the importance of incorporating EMR into the academic environment to support undergraduate

nursing students transition to the clinical environment (Brown et al., 2020; Missen et al., 2015; Mollart et al., 2020; Williams et al., 2021).

The target audience for the EMR education were second year undergraduate nursing students at one regional, four campus, Australian university. There is limited literature that relates to this specific cohort of second year Australian undergraduate nursing students accessing and using EMR in the nursing laboratory. Recent research conducted by Mollart et al. (2021) and Mollart et al. (2023) examined first and third year Australian Bachelor of Nursing undergraduate nursing students' self-confidence and preparedness in using EMR. While first year undergraduate nursing students were not included in this research project, this research project's participants identified themselves as a mixture of second year and third year nursing students. Therefore, outcomes from Mollart et al. (2021) could be applied to this research projects cohort of undergraduate nursing students as they are a similar cohort of undergraduate students enrolled in a comparable Bachelor of Nursing program in Australia. A thorough evaluation and discussion on the outcome of the specific undergraduate nursing student cohort along with the discussion of the second and third research questions follow.

6.3.2 Difference in demographic data

Understanding the composition of the undergraduate nursing student cohort by asking questions relating to age, gender and previous education will help develop a targeted education program (Sinkowitz-Cohan, 2013). Participants age was collected as it helped identify if there are any differences in learning styles could impact an undergraduate nursing student's satisfaction and self-confidence accessing and using EMR to document patient data on clinical

placement post receiving education in the nursing laboratory. Similarly, identifying gender and how learning styles differ between genders could help develop effective education programs. Understanding previous education can influence an undergraduate nursing students' level of digital literacy thus, impacting their satisfaction and self-confidence.

6.3.2.1. Age of the participants

This research project found that there was no significance of variance in satisfaction and self-confidence accessing and using EMR in the nursing laboratory between participants who received traditional paper-based only patient documentation education versus those who received a combination of EMR and paper-based within the different age cohorts. This lack of variance held true across the different age cohorts, indicating that the type of patient documentation education (whether paper-only or combined with EMR) provided in the nursing laboratory did not impact their satisfaction and self-confidence accessing and using EMR on clinical placement.

The largest cohort of respondents (n=42 [37%]) in this research project identified themselves as being in the 18–25-year age group. This is consistent with research conducted by Ng et al. (2024) who identifies just over a third of respondents in their research project were in the 20-25 age group. This research project results are in line with Universities Australia (2022) who identify one quarter (25%) of undergraduate students enrolled into a Bachelor program indicated they were 20 - 25 years old. However, the results slightly differ from other research studies that examined undergraduate nursing students and EMR within Australia (Mollart et al., 2020; Mollart et al., 2023).

The 18–25-year-old cohort are the most technologically connected generation and therefore more experienced users of technology. They are more likely to engage with digital technology in the academic environment through formats such as online learning and virtual simulations (Shorey et al., 2021). Implementing an EMR in the nursing laboratory draws on their previous technology knowledge, enhancing their educational experience and thereby improving their satisfaction and self-confidence (Blevins, 2021; Ezzeddine, 2023).

The second highest number of participants came from the 26-35 years old cohort. This is consistent with the enrolment patterns of the research project university according to the 2021 annual report, which identified the median age of students enrolled was 30 years old (University of Southern Queensland [UniSQ], 2022). The final two groups of participants ages ranged from 36-45 years old (n=21) and over 46 years (n=16). The age of the cohort of students can influence their learning style. Ezzeddine et al. (2023) identified students over 25 years old were not only visual learners but also kinaesthetic and aural learners. While the over 25-year-old cohort may not engage in the same learning styles as their fellow undergraduate nursing students, they are more likely to have higher cognitive skills thus more likely to be confident in their ability to access and use EMR in the nursing laboratory after engaging in practice (Solvik & Struksnes, 2018).

Undergraduate nursing students learning styles was explored by Meehan Andrews (2009), who identified undergraduate nursing students are more likely to be unimodal kinaesthetic learners. While most undergraduate nursing students preferred learning mode remains the same throughout their academic

journey, some students do shift from a unimodal to a multimodal (Mitchell et al. 2015). On its own or combined with another learning mode, kinaesthetic learning remains one of the most common forms of learning modes for undergraduate nursing students (Meehan Andrews, 2009; Mitchell et al., 2015; Sinaga et al., 2018). Therefore, to assist with positive learning environments that promote satisfaction and self-confidence education needs to be provided using a multimodal approach.

A multimodal approach was provided from the pre-access stages of the EMR program, which provided undergraduate nursing students access to the digital program prior to nursing laboratory, through to the nursing laboratory stage, where undergraduate nursing students were allocated to groups of four to five students and provided verbal step by-step instructions on how to access and use the academic EMR. As the undergraduate nursing students progressed through each step, they were given the opportunity to gain a “hands on/ kinaesthetic approach” experience accessing and using EMR (Sinaga et al., 2018). This allowed the undergraduate nursing students the opportunity to understand, gain confidence in, and complete each step before moving on to the next. The undergraduate nursing students were then offered ongoing education and support during the delivery of the nursing laboratory.

By using a multimodal education approach to delivery of the academic EMR education in the nursing laboratory and providing a safe, positive learning experience that supported improved self-confidence, age was found not to impact the undergraduate nursing student’s satisfaction and self-confidence accessing and using EMR in the clinical environment post EMR education in the nursing laboratory.

6.3.2.2. Gender

In this research project, n=13 (10%) of the participants identified as male, reflecting the gender distribution typical of Bachelor of Nursing programs, as well as in the Australian nursing workforce (AHPRA & National Boards, 2023; Caputo & Ross, 2023; Gigli et al., 2024; Whitford et al., 2020). While previous studies suggested gender differences in attitudes towards learning and digital technology, with males being more likely to embrace new digital technologies (Sobieraj & Krämer, 2020) and engage in interactive educational modes (Chan et al., 2014). Similar to the findings regarding age, this research project determined that gender did not influence an undergraduate nursing students' satisfaction and self-confidence in accessing and using EMR during clinical placements after receiving education in the nursing laboratory.

6.3.2.3. Previous education

Participants' previous education was another demographic that was explored within the data collected in the survey. Of the N=113, n=72 (63.7%) participants identified they had been awarded a certificate, diploma, or another degree prior to enrolling into the Bachelor of Nursing program. While the survey question relating to previous education asked participants to identify the type of previous qualification they had obtained, the question did not identify what program the student had been awarded the qualification in. Therefore, while it could be presumed (enrolment numbers of undergraduate nursing students who held a Diploma of Nursing) some participants may have previous higher education in a healthcare program, this information was not collected.

Previous exposure to EMR either through nursing laboratory, preceding clinical placement or clinical employment has been shown to be advantageous for undergraduate nursing student's satisfaction and self-confidence when

attending clinical placement (Al Gharibi & Arulappan, 2020; Baillie et al., 2013; Cummings & Connelly, 2016; Mollart et al., 2021; Mollart et al, 2023). Approximately one third of the undergraduate nursing students who participated in this research project, work in clinical environments as Enrolled Nurses or Assistant in Nursing that use EMR software and are very familiar with the program. Often reporting that they have not used paper-based documents in their workplace.

Irwin et al.'s (2024) research on nursing students' perceptions being work ready for EMR also supports the concept of preparedness as 90% of respondents in their survey believed they would experience higher level of self-confidence if they were exposed to EMR in the nursing laboratory prior to clinical placement. Abu Raddaha (2018) exploration into nursing perceptions on self-confidence in using EMR identified higher self-confidence when a person's EMR experience is more than six years. This demonstrates the need for undergraduate nursing students to experience and practice using EMR every time they are allocated nursing laboratory.

Results from the Satisfaction and Self-Confidence in Patient Documentation survey indicated while previous education or healthcare employment did not impact the participants satisfaction and self-confidence accessing and using EMR in the clinical environment post receiving education on patient documentation in the nursing laboratory, it may have better prepared them for the use of digital technology to document patient data.

6.3.3. Satisfaction in patient documentation

The second question the research project explored was whether undergraduate nursing students' satisfaction levels increase when accessing

and using EMR in the clinical environment after receiving education on EMR in the nursing laboratory compared to students who received paper-based patient documentation education as measured by the modified Student Satisfaction and Self-Confidence in Patient Documentation Survey. This research project found a difference between the satisfaction levels of participants who received paper-only patient documentation education and those who received a combination of paper-based and EMR education in the nursing laboratory. However, this difference did not reflect in their overall satisfaction in accessing and using EMR during clinical placement.

Undergraduate nursing students' satisfaction is multifaceted (Rashawn Mohammed Abd-Elhady et al., 2022). High levels of satisfaction have previously been identified when students' learning needs are met and when students can link theory to practice (Ahmed et al., 2023; Fathi Ibrahim et al., 2019; Rashawn Mohammed Abd-Elhady et al., 2022). Nursing laboratory provides undergraduate nursing students with the ability to apply theory to practice prior to attending clinical placement. Individualised patient scenarios encourage undergraduate nursing students to practice their clinical skills while providing active engagement (Rashawn Mohammed Abd-Elhady et al., 2022). Fathi Ibrahim et al. (2019) and Rashawn Mohammed Abd-Elhady et al. (2022) identified it is the manner the nursing laboratory is structured that lends itself to higher satisfaction levels amongst undergraduate nursing students. This concept is taken further by Antohe et al. (2016) and Lee et al. (2009) who ascertained there were higher satisfaction levels demonstrated in clinical placements where structure (such as preceptorship/mentoring) had been implemented. Undergraduate nursing students from the regional university where this research

project was conducted are allocated clinical placement at multiple different healthcare environments such as aged care, community and hospital, and all healthcare facilities provided undergraduate nursing students different models of support. Therefore, the support an undergraduate nursing student received by the healthcare facility could have had an impact on their satisfaction levels.

Another factor that could have influenced the satisfaction outcomes from the survey is the demographic composition of the respondents. As previously identified undergraduate nursing students of specific age ranges are more likely to demonstrate higher levels of computer and digital literacy skills thus resulting in higher levels of satisfaction in comparison to an older cohort of students (Dubake et al., 2023). While the results from this research project identified n=16 of the respondents (14.1%) were over 46 years old, their computer and digital literacy skills did not influence their satisfaction levels accessing and using EMR on clinical placement after receiving education in the nursing laboratory.

Dubake et al. (2023) also identified how mandatory training prior to clinical placement can influence an undergraduate nursing students experience. Although not investigated in this research project it must be acknowledge that some clinical facilities provided mandatory training including access to an EMR training package, which may have influences satisfaction levels when accessing and using EMR in the clinical environment.

6.3.4. Self-Confidence in patient documentation

Recent findings by Irwin et al. (2024) found there was reduced levels of self-confidence in undergraduate nursing students when they were required to access and use EMR in the clinical environment for the first time, however this research project provided students with pre-laboratory education on EMR. Irwin

et al. (2024) also considered the impact different EMR programs implemented in the clinical and academic environment had on an undergraduate nursing student's self-confidence in accessing and using EMR. Similarly, the inconsistencies between healthcare facilities policies regarding student accessibility to pre- placement EMR training and EMR in the clinical environment could impact an undergraduate nursing student's ability to practice and gain self-confidence accessing and using EMR (Mollart et al., 2023; Stanceski et al., 2023). Therefore, the third research question the research project explored was if an undergraduate nursing student's self-confidence levels improved when accessing and using EMR on clinical placement after receiving education on EMR in the nursing laboratory compared to students who received traditional paper-based patient documentation as measured by the modified Student Satisfaction and Self-Confidence in Patient Documentation Survey. Findings from this research project indicate that the type of patient documentation (combination EMR and paper-based or paper-based) education provided in the nursing laboratory did not affect an undergraduate nursing student's self-confidence accessing and using EMR while on clinical placement. This is similar to Mollart et al. (2023) who found improved patient documentation using EMR while on clinical placement after undergraduate nursing students received education on EMR in the nursing laboratory. Although Mollart et al. (2023) did not specifically focus on the same cohort of undergraduate nursing students, their quasi-experimental research project on first-year undergraduate nurses in Australia is relevant to the cohort examined in this research project.

As previously discussed, the nursing laboratory used either paper-based only patient documentation, or a combination of paper based and EMR patient

documentation for multiple scenarios throughout the three-day nursing laboratory classes. To improve undergraduate nursing students' preparedness for clinical placement the nursing laboratory used an interactive, "hands on" approach to learning while providing visual and verbal support (Irwin et al., 2024). This engaging, interactive learning environment gave undergraduate nursing students the repetitive practice accessing and using EMR in the nursing laboratory, which in turn, assists in maintaining knowledge on EMR when attending clinical placement (Ličen & Prosen, 2023; Taylor et al., 2021). Hong et al. (2022); Mollart et al. (2023); and Williams et al. (2021) also recognise undergraduate nursing student's self-confidence can be gained via repetitive use of EMR in the nursing laboratory before being transferred into the clinical environment. It may be possible that the participants' participation in the nursing laboratory prior to accessing and using EMR in the clinical environment may have assisted with their self-confidence, however, further pre and post testing would be required to clearly identify improved self-confidence is transferable from the nursing laboratory to clinical placement.

Publicly owned healthcare facilities (state-dependent) currently provide mandatory online training for undergraduate nursing students before they commence clinical placements. This training package includes access to the digital EMR training module used in these facilities (QLD health, 2023). As a result, each clinical placement within the public healthcare environment ensures that undergraduate nursing students receive EMR training, thereby maintaining proficiency in digital documentation. The availability of the training module before clinical placement could have influenced the self-confidence survey results. However, not all undergraduate nursing students are assigned to

healthcare facilities where EMR is implemented during their clinical placements. Without the integration of EMR into the nursing laboratory, these students lack regular, repetitive access to EMR practice, which can negatively impact their self-confidence when accessing and using EMR on clinical placement or on graduation.

Whilst on clinical placement undergraduate nursing students are integrated into the facility. Supportive clinical environments cement positive learning experiences thus improving an undergraduate nursing student's self-confidence (Birk et al., 2017). Self-confidence is one of the ways to determine whether a clinical placement provided an undergraduate nursing student with a positive learning environment (Mohamed Abdelkader et al., 2021). During clinical placements, undergraduate nursing students depend on registered nurse (RN) preceptors to guide them. RN preceptors engage students, encouraging them to apply the skills learned in the nursing laboratory through repetitive practice, monitoring, teaching, and providing constructive feedback during bedside care (Anderson et al., 2018; Makhaya et al., 2023). This includes patient documentation on EMR. However, clinical placement experiences can vary significantly. Some RNs may be reluctant to support undergraduate nursing students, which can negatively impact the students' self-confidence to use EMR (Anderson et al., 2016). If students are not encouraged to practice with systems like EMR during their placements, they may experience a degradation of knowledge, affecting their self-confidence in accessing and using EMR in future clinical placements.

Education provided in the nursing laboratory, along with clinical placement experiences, encourages undergraduate nursing students to continually practice

patient documentation regardless of education in the nursing laboratories. Therefore, it is the combination of all learning methods that undergraduate nursing students engage in throughout their Bachelor of Nursing degree that contributes to their self-confidence in accessing and using EMR. This includes prior exposure at work, education in the laboratories, education before placement and exposure to EMR whilst on clinical placement.

6.4. Recommendations

6.4.1 Curriculum recommendations

While it is crucial for undergraduate nursing students to be prepared for the modern clinical environment, it is equally important for them to comprehend and interpret traditional methods of patient documentation. Barisone et al. (2019) defines blended/hybrid learning as the integration of traditional education with an additional form of education, in this instance, digital technology. Offering a combination of traditional paper-based patient documentation and EMR in the nursing laboratory supports a multimodal learning approach to patient documentation (Kadiriye et al., 2022).

Combining paper-based and EMR patient documentation in the nursing laboratory acknowledges that not all healthcare facilities in Australia have transitioned to EMR. It is also important to recognise that EMR systems require digital maintenance and are periodically updated. During these maintenance periods, nurses are required to document patient data using traditional paper methods. It is crucial for undergraduate nursing students to understand the impact that vital patient data can have on a patient's healthcare journey. Understanding and knowledge of patient documentation using paper-based methods enable undergraduate nursing students to transfer their skills to the digital format.

It is important that undergraduate nursing students be employable, and work prepared therefore providing education on software such as EMR are essential in the undergraduate curriculum (Barisone et al., 2019; Parker & Grech, 2018). The ability to practice using EMR in the nursing laboratory provides an authentic experience that improves student satisfaction and self-confidence while, reducing errors when accessing and using EMR on clinical placement thus improving patient outcomes (Barisone et al., 2019; Baumann et al., 2018). Therefore, implementing combination of paper based and EMR patient documentation would best prepare an undergraduate nursing student for the current clinical environment.

Digital literacy between undergraduate nursing students needs to be addressed prior to commencement on EMR education. Research by Hwang & Park (2011) explored the importance understanding how information on a digital platform can improve a patient's healthcare journey. They also demonstrated the need for understanding digital literacy and imbedding digital competency when accessing and using EMR (Hwang & Park, 2011). Chung & Cho (2017) found students digital literacy impacted an undergraduate nursing student's ability to use EMR. Lower digital literacy knowledge has been found to lead to increased dissatisfaction accessing and using EMR whereas, students who have competent digital literacy skills have higher satisfaction levels (George et al., 2016; Williams et al., 2021). Incorporating pre-testing on digital literacy into academic curricula can greatly enhance the implementation of EMR education. By assessing undergraduate nursing students' skills beforehand, educators can tailor their teaching strategies to address specific needs of the undergraduate cohort, resulting in a more effective learning experience. This targeted approach

aligns EMR education with students' existing knowledge, fostering better understanding and competence. Consequently, undergraduate nursing students' satisfaction and self-confidence in using EMR systems increase, leading to improved patient care outcomes. Additionally, pre-testing provides valuable data for ongoing curriculum improvements, ensuring the relevance and effectiveness of EMR training.

Embedding an Information Technology course that includes a digital literacy competency within the Bachelor of Nursing program may be beneficial to undergraduate nursing students (Stunden et al., 2024). The regional, four campus, Australian university where the research project was conducted provides a nursing communication course in their first year of research project. There is an information technology/digital technology theoretical module included in the communication course, where undergraduate nursing students are introduced to digital technology. The implementation of an information technology course in the first, second or third year of the Bachelor of Nursing program or a combination communication/information technology course could give undergraduate nursing students the opportunity to develop knowledge and skills not only in EMR but also in other commonly used digital platforms within the healthcare setting including smart phone applications, telehealth, and 3D technology.

The timing of when to introduce EMR education to undergraduate nursing students in academic curricula requires careful consideration. It is recommended that the implementation of EMR education in the nursing laboratory should span across all year levels of the Bachelor of Nursing degree. Irwin et al. (2024) supports this recommendation and found that undergraduate nursing students

perceived themselves as unprepared for clinical placement when EMR education in the nursing laboratory was limited to first-year courses.

Relloso et al., (2021) identified insufficient “hands on” practice in the nursing laboratory can impact on undergraduate nursing students experience in the clinical environment. “Hands on” practice can relate to any clinical skill including patient documentation. At the regional university where this research project was conducted the undergraduate nursing students attended a three-day nursing laboratory once in the semester. If an undergraduate nursing student did not attend clinical placement for over five months as indicated by some of the participants in the research project, there can be a decrease in satisfaction and self-confidence in relation to their ability to document patient data. Therefore, increasing accessibility to nursing laboratories outside the allocated class schedule and prior to clinical placement could improve degeneration of knowledge and improve satisfaction and self-confidence.

Ajani & Moez, (2011), Daniels & Heradien (2023), Hoffman & Willemse (2024, and Saifan et al. (2021) discuss the impact learning opportunities in the nursing laboratory can have on clinical skills which can influence satisfaction and self-confidence levels. Patient documentation is a vital part of nursing clinical skills that undergraduate nursing students are required to possess. Currently the Bachelor of Nursing program at the regional university where the research project was conducted has separate courses for theory, nursing laboratories, and clinical placement. Half of the participants in the survey indicated a gap of five months or more between their three-day nursing laboratory and clinical placement courses. Unless an undergraduate nursing student continues to have access to EMR during this period, the time between laboratory and placement

could lead to discrepancy between theorical and practical knowledge therefore impacting an undergraduate nursing students' satisfaction and self-confidence when using EMR on clinical placement consequently, impacting safe clinical practice Therefore, the final recommendation from this research project is to combine the nursing laboratory and clinical placement course together. Doing this would reduce the time between each, reduce knowledge degradation and maintain safe clinical practice, thus improving satisfaction and self-confidence.

6.4.2. Clinical recommendations

Prior to clinical placement some healthcare providers require undergraduate nursing students to complete a digital training package however, this is not consistent throughout healthcare facilities (Irwin et al., 2024, Stanceski et al., 2023). Furthermore, there are differences between the technology on offer through an academic EMR and an EMR implemented into a healthcare facility (Irwin et al., 2024).

To enhance the clinical experience, the EMR education needs to mirror what is used in the clinical environment. As previously identified, this can be an issue as there are several EMR software packages in use within healthcare. Therefore, there needs to be a collaborative approach in the allocation of clinical placement and academia. While it is acknowledged pre-placement education on EMR is currently a mandatory requirement for some facilities, early identification and allocation of clinical placements can allow a specifically targeted training package to be provided to all undergraduate nursing student on allocation to a healthcare facility. This would encourage undergraduate nursing students to access and practice using the specific EMR for their allocated clinical placement prior to commencing clinical placement. Practice would support improved self-confidence and satisfaction thus improving safe clinical nursing. However,

accessibility to a digital specific EMR training format would also require the support of the healthcare providers.

Another area that could benefit from further development is the support provided to undergraduate nursing students and the role of the RNs who support them. Some undergraduate nursing students have identified differences between preceptors and facilitators on the clinical floor during clinical placement. Furthermore, restrictions placed on undergraduate nursing students' accessing and using EMR while on clinical placement has been identified as a negative influence in safe clinical practice. The inability to complete core nursing skills such as documenting patient data in EMR systems can impact critical thinking and influence patient outcomes (Hansbrough et al., 2020). Accessing and using EMR while on clinical placement can therefore be dependent of facility and or the facilitator/preceptor (Hansbrough et al., 2020). Improving training programs aimed at preceptors and facilitators would help address these differences between years and academic facilities, thereby enhancing the experience for both students and preceptors.

Additionally using a collaborative approach towards digital technology can promote enhanced preparation for clinical placement, thus freeing up clinical staff on clinical placement to support the undergraduate nursing students as they transition skills they have learnt in the nursing laboratory to the clinical environment. Clinical nursing staff would therefore have a clear understanding of the level of digital literacy of an undergraduate nursing student dependent on the stage of the undergraduate nursing student's journey. Embedding and implementing local healthcare providers EMR system into the academic curricula can reduce the disadvantage of those students who do not have prior

knowledge of EMR, thus improving satisfaction and self-confidence accessing and using patient documentation.

6.4.3. Research recommendations

There is limited evidence that satisfaction and self-confidence levels are affected by the time between nursing laboratory and clinical placement. Knowledge degradation could impact an undergraduate nursing students' satisfaction and self-confidence accessing and using EMR while on clinical placement (Bruce et al., 2019). By continuing ongoing education in digital technology such as EMR in all year levels of the Bachelor of Nursing degree, undergraduate nursing students' can continue to develop their satisfaction and self-confidence thus, supporting a transfer of knowledge that incorporates and promotes safe nursing practices in the clinical environment (Stolic et al., 2022). Therefore, further development of the survey questions to include the specific time between nursing laboratory and clinical placement, and previous knowledge of EMR is required to sufficiently identify whether knowledge degradation occurs when transferring knowledge from the nursing laboratory to clinical placement. Other questions extended to include individual values, and professionalism could also enhance the results.

When completing further examination on the transfer of satisfaction and self-confidence from the nursing laboratory and clinical placement the use of pre and post-test along with the inclusion on multiple universities encompassing a wider and more diverse background will deliver a more conclusive result. To achieve this the researcher recommends a longitudinal research project over three years that encompass a variety of academic facilities including universities, other higher education facilities such as Technical and Further Education (TAFE) and regional higher education providers.

6.5. Limitations

Low response rates for online surveys are not uncommon and have been observed in other undergraduate nursing studies (Kent-Wilkinson et al., 2015, Sweet & Broadbent, 2017). Limitations such sample size, instrument used, post testing data collection, use of EMR in healthcare facilities and academic curricula need to be identified and discussed.

This research project involved a single cohort of undergraduate nursing students that resulted in a small sample size which impacted the ability to reach statistical power. EMR education was already provided in the nursing laboratory before the commencement of the research project. During the initial recruitment phase only undergraduate nursing students who attend clinical placement in the course where EMR had been implemented and trialled were eligible to participate in the survey. Even though the researcher circulated three emails to undergraduate nursing students' individual university email accounts to recruit their participation in the survey, there was a poor response rate from the targeted cohort of undergraduate nursing students. In an attempt to garner a larger response but stay within the ethics approval guidelines, the inclusion criteria expanded to include undergraduate nursing students who had attended nursing laboratory in the 2020 cohort for the specific laboratory course and had attended the following clinical placement in second or third year. This did lead to an increase of participants; however, overall participation was limited. Therefore, the researcher acknowledges the project was underpower and the results from the survey are limiting and the results nongeneralised.

Limitation on the results from the survey was identified due to the survey questions. Further review and development to the survey based on the results would provide a more in-depth examination on undergraduate's self-confidence

and satisfaction accessing and using EMR in the clinical environment post education in the nursing laboratory. Inclusion of a question that addresses if a participant has access and used EMR in a work environment between nursing laboratory and clinical placement could have been included to explore the impact repetitive use of EMR has on satisfaction and self-confidence. Also, a question on digital literacy should be included to help identify previous levels of digital knowledge. The researcher also acknowledges that the implementation of the EMR in the nursing laboratory affected the ability to perform a pre-and post-test survey on undergraduate nursing student's satisfaction and self-confidence. Therefore, the results of this research project relate to post EMR education in the nursing laboratory.

Along with many other research projects conducted during 2020-2022, limitations may be linked to the impact of COVID 19. Undergraduate nursing students' clinical placements were severely impacted in the early stages of the pandemic. To support the academic progression of undergraduate nursing students, clinical placements were sought from a wider range of healthcare providers. However not all healthcare organisations allowed nursing students in their facilities. This led to the allocation of undergraduate nursing student's clinical placement being prioritised dependant on their progression. Therefore, impacting the time between nursing laboratory and clinical placements. This is demonstrated in the results with over a third of respondents indicating they attended clinical placement more than four months after their nursing laboratory experience. COVID 19 also impacted the way education was provided during the pandemic. On returning to the nursing laboratory environment, assistance was given to prevent extended interruption to academic progression. Changes

included on campus students attending residential school; three full-time days in the nursing laboratory rather than weekly nursing laboratory session. The impact this had on the time between nursing laboratory and clinical placement differed for each undergraduate nursing student dependant on when they attended nursing laboratory and clinical placement. Degeneration of knowledge and the impact it has on an undergraduate nursing students' satisfaction and self-confidence would therefore be impacted, dependent on the time between nursing laboratory and clinical placement (Bruce et al., 2019).

Another limitation to the research project is academic curricula program at this regional university. As previously identified the Bachelor of Nursing program at the university where the research project was conducted allows undergraduate nursing students to enrol in the relevant nursing laboratory course and clinical placement course separately. That is, the nursing laboratory course is not combined with the clinical placement course rather it is a prerequisite. When an undergraduate student enrols into their relevant clinical placement course depends on their progression plan. The impact on time between nursing laboratory and clinical placement, along with knowledge degradation is identified as a limitation.

Undergraduate nursing students who participated in the research project identified a third of the healthcare facilities they attended for clinical placement did not have EMR implemented. Therefore, this has been identified as a limitation of this research project. As the university provides undergraduate nursing students the opportunity to complete their nursing degree within multiple healthcare organisations and facilities, not all healthcare facilities use EMR. This impacts an undergraduate nursing student's ability to practice patient

documentation using different formats while on clinical placement and restrict them to one method only.

Education on patient documentation has also been identified as a limitation, as there is limited research within this specific area of the project. It is disadvantageous not to include a combination of paper-based and EMR training in the academic curriculum, as it can jeopardises the educational journey of undergraduate nursing students. A lack of education in contemporary nursing methods can have a bearing on an undergraduate nursing student's readiness and preparation for the clinical environment thus impacting their employability.

The final limitation identified through this research project is addressing an individual undergraduate nursing student's digital literacy. Prior knowledge of digital literacy due to socioeconomic, previous education, and understanding can impact a student's ability to progress through patient documentation impacting identification and understanding which then in turn impacts self-confidence and satisfaction. This information was not collected and has been identified as an area that needs further research.

6.6. Conclusion

The purpose of this research project was to evaluate undergraduate nursing students' satisfaction and self-confidence accessing and using electronic medical records (EMR) while on clinical placement after receiving education on EMR in the nursing laboratory. The modified ADDIE/Jeffries Framework, along with the Modified Student Satisfaction and Self-Confidence in Patient Documentation survey assisted in the exploration of satisfaction and self-confidence from the nursing laboratory to the clinical environment.

The results from the Modified Student Satisfaction and Self-Confidence in Patient Documentation survey indicate some undergraduate nursing students may experience minimal knowledge deficit due to time between nursing laboratory and clinical placement, knowledge gained in the nursing laboratory. However, the method of teaching undergraduate nursing students to document patient information in the nursing laboratory did not influencing their satisfaction and self-confidence in accessing and using EMR on clinical placement.

In summary, undergraduate nursing students need to experience contemporary nursing documentation practice such as EMR in the nursing laboratory. Learning how to document patient data accurately is an effective way of communicating and maintaining patient safely and safe nursing practices. A combination of EMR and paper-based patient documentation education provided to an undergraduate nursing student in the nursing laboratory, their previous knowledge via employment and or previous clinical placements where EMR has been adopted, and the time between their nursing laboratory and their clinical placement can influence satisfaction and self-confidence.

Although there are some limitations found within this research project, the knowledge gained from this research could help in the development of academic education programs within Australian universities and higher education facilities regarding the implementation of an academic EMR. Further research is required around the degradation of knowledge from nursing laboratory to the clinical environment through pre-post testing could enhance academic programs where EMR has been imbedded further. This research project has contributed to literature by exploring the transference of satisfaction and self-confidence of an undergraduate nursing student's knowledge and clinical skill accessing and

using an academic EMR in the nursing laboratory to their satisfaction and self-confidence accessing and using EMR in the clinical environment.

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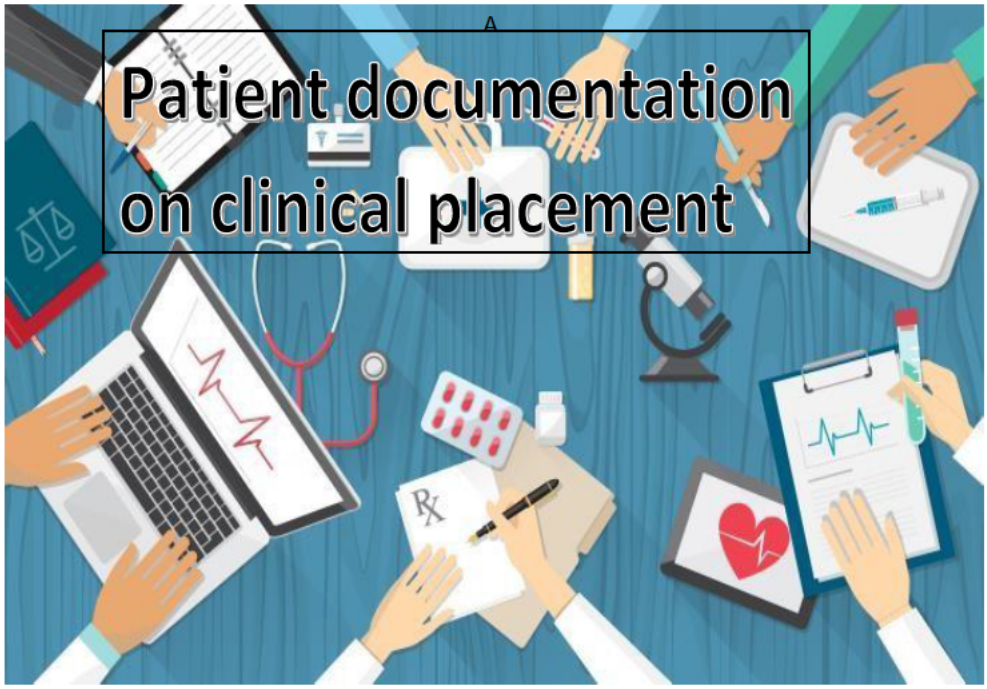
APPENDIX A

USQ HREC Approval number: H22REA003



Are you going out on clinical placement?

Have you recently completed your clinical placement?

My name is Georgina Sheridan, and I am conducting research to evaluate your satisfaction and self-confidence accessing and using patient documentation while on clinical placement.

Survey - once only, voluntary, confidential, 5-minutes to complete

Available online via QR code OR through the link below

https://surveys.usq.edu.au/index.php/156612?newtest=Y&lang=en

If you have any questions, please contact me at [redacted]

Thank you for your participation

Participant Information Sheet.docx

Consent form.docx

University of Southern Queensland

APPENDIX B

University of Southern Queensland

Student Satisfaction and Self-Confidence in Patient Documentation Questionnaire

Instructions. This questionnaire should take you no more than 10 minutes to complete. The questionnaire is a series of statements about your personal attitudes in relation to your satisfaction with instruction during the simulated clinical laboratory environment and your self-confidence accessing and using patient documentation during your clinical placement. There are no right or wrong answers as you may agree or disagree with some of the statements. Please indicate your own personal feelings about each statement by marking the answer that best describes your attitude /belief. The data collected from the anonymous questionnaire will be corelated as a group, not individually.

Mark:
1= STRONGLY DISAGREE with the statement
2= DISAGREE with the statement
3= UNDECIDED – you neither agree nor disagree with the statement
4= AGREE with the statement
5=STRONGLY AGREE with the statement

By pressing the "start survey" button you have provided consent for your participation.

START SURVEY

How were you taught to document patient information in the simulated clinical laboratory	◯ Combination electronic and paper	◯ Paper only			
Satisfaction with Current Learning	SD	D	N	A	SA
The simulation provided me with a variety of learning materials and activities to promote my learning.	◯	◯	◯	◯	◯
The methods used to teach paper based and or electronic medical administration records (eMAR) in the simulated clinical laboratory were helpful and effective.	◯	◯	◯	◯	◯
The way my teacher/instructor taught paper-based and or electronic medical administration records (eMAR) during the simulated clinical laboratory was suitable to the way I learn.	◯	◯	◯	◯	◯

I enjoyed how my teacher/instructor taught paper based and or electronic medical		◯	◯	◯	◯

administration records to document patient information in the simulated clinical laboratory.					
The materials used to teach paper based and or electronic medical administration records (eMAR) patient documentation during the simulated clinical laboratory were engaging and helped me learn.	◯	◯	◯	◯	◯
Self-confidence in learning	SD	D	N	A	SA
The content provided on patient documentation improved my proficiency in document patient information during the simulated clinical laboratory.	◯	◯	◯	◯	◯
As a student, learning how to document patient information is part of my responsibility.	◯	◯	◯	◯	◯
I understand the use of activities related to patient documentation in simulated clinical laboratory will improve my proficiency in accessing and using paper-based and or electronic medical administration records (eMAR) to document patient information	◯	◯	◯	◯	◯
The teacher has a responsibility to ensure I (as the student) learn patient documentation in preparation for clinical placement.	◯	◯	◯	◯	◯
Self-confidence on clinical placement	SD	D	N	A	SA
I am proficient in document patient information during clinical placement	◯	◯	◯	◯	◯
In the instances where I am unsure of the correct patient documentation while on clinical placement, I know how to seek help.	◯	◯	◯	◯	◯

My ability to document patient information on clinical placement was supported by the skills and knowledge I developed in the simulated clinical laboratory.	◯	◯	◯	◯	◯
Demographics					
Did you attend a clinical placement in a facility with electronic medical administration records (eMAR)?	◯ Electronic	◯ Paper			
Where is your current clinical placement?	◯ Aged Care	◯	◯	◯	◯ Other
		Community or General Practice clinic	Public Hospital	Private Hospital	
Prior to your current clinical placement, did you have any previous experience with electronic medical administration records (eMAR)	◯ Yes	◯ No			
Reflecting on your last simulated clinical laboratory course, how long was that before your current clinical placement?	◯ less than 1 month	◯ 2 months	◯ 3 - 4 months	◯ 5 - 6 months	◯ over 7 months
What is your age?	◯ Under 25	◯ 26 - 35	◯ 36 - 45	◯ 0ver 46	◯ prefer not to answer
What gender do you identify with?	◯ Female	◯ Male	◯ other	◯	◯ prefer not to answer
What is the highest-level of qualification you have received?	◯ < Y12 or equivalent	◯ Y12 or equivalent	◯ Certificate	◯ Diploma	◯ Tertiary

If there is anything you wish to add in relation to your self-confidence in accessing and using electronic medical records on clinical placement, please add below.

Thank you for your participation.

Outcomes from the research project will be made available through academic literature or if you wish to request a short summary of the outcomes, please contact the principal investigator Georgina Sheridan [redacted]

APPENDIX C

[RIMS] USQ HRE Application - H22REA003 - Expedited review outcome -Approved

Inbox

human.Ethics@usq.edu.au

Mon, Jan 31, 2022,

9:54 AM to me, Linda Ng

Dear Georgina

I am pleased to confirm your Human Research Ethics (HRE) application has now been reviewed by the University's Expedited Review process. As your research proposal has been deemed to meet the requirements of the National Statement on Ethical Conduct in Human Research (2007), ethical approval is granted as follows: USQ HREC ID: H22REA003

Project title: Comparing undergraduate nursing students' ability to access and use, along with self-confidence, paper-based patient document and or electronic medical administration records during clinical placement.

Approval date: 31/01/2022

Expiry date: 31/01/2025

USQ HREC status: Approved

The standard conditions of this approval are:

a) responsibly conduct the project strictly in accordance with the proposal submitted and granted ethics approval, including any amendments made to the proposal;.

(b) advise the University (email:ResearchIntegrity@usq.edu.au) immediately of any complaint pertaining to the conduct of the research or any other issues in relation to the project which may warrant review of the ethical approval of the project;

(c) promptly report any adverse events or unexpected outcomes to the University (email: ResearchIntegrity@usq.edu.au) and take prompt action to deal with any unexpected risks;

(d) make submission for any amendments to the project and obtain approval prior to implementing such changes;

(e) provide a progress 'milestone report' when requested and at least for every year of approval.

(f) provide a final 'milestone report' when the project is complete;

(g) promptly advise the University if the project has been discontinued, using a final 'milestone report'.

The additional conditionals of approval for this project are:

(a) Nil.

Please note that failure to comply with the conditions of this approval or requirements of the Australian Code for the Responsible Conduct of Research, 2018, and the National Statement on Ethical Conduct in Human Research, 2007 may result in withdrawal of approval for the project.

Congratulations on your ethical approval! Wishing you all the best for success!

If you have any questions or concerns, please don't hesitate to make contact with an Ethics Officer.

Kind regards

Human Research Ethics

University of Southern Queensland

Toowoomba – Queensland – 4350 – Australia

Email: human.ethics@usq.edu.au

APPENDIX D

University of Southern Queensland

Participant Information Sheet

Questionnaire

USQ HREC Approval numberH22REA003

Project Title

Comparing undergraduate nursing students' ability to access and use, along with self-confidence, paper based patient documentation and or electronic medical administration records during clinical placement.

Research team contact details

Principal Investigator Details

Georgina Sheridan
[redacted]

Supervisors

Dr Linda Ng
[redacted]

Dr Snezana Stolic
[redacted]

Description

This project is being undertaken as part of a Masters project (Master of Science – Applied Research) through the University of Southern Queensland.

Electronic medical administration records are one example of contemporary digital technology implemented in the clinical environment. Improved clinical outcomes for patients in relation to improved performance by healthcare providers and increased data sharing can be accredited to the implementation of electronic medical administration records. Undergraduate nursing students are taught to document patient data using traditional paper-based documentation. Through 2021 one course has trailed electronic medical administration records. By exposing undergraduate nursing students to a more authentic learning environment, undergraduate nursing students will gain confidence and familiarity to accessing and documenting on electronic medical administration records while on clinical placement and as a graduate registered nurse.

This project will evaluate an undergraduate nursing students' satisfaction and self-confidence documenting patient information when taught using paper-based documentation or electronic medical administration records in the simulated clinical laboratory and comparing their experiences in the clinical environment.

Participation

You have been invited to participate in an online questionnaire due to your previous engagement with paper-based documentation or electronic medical administration records in the simulated laboratory environment. The online questionnaire should take 5-10 minutes of your time at the completion of your clinical placement.

Questions will include your perception of your self-confidence, knowledge, skill and clinical decision making during clinical placement using patient documentation.

Your participation in this project is entirely voluntary. If you do not wish to take part, you are not obliged to. If you decide to take part and later change your mind, you are free to withdraw from the project at any stage.

You will be unable to withdraw data collected about yourself after you have participated in the questionnaire. Your decision whether to take part, do not take part, or take part and then withdraw will in no way impact your current or future relationship with the University of Southern Queensland.

Expected benefits

It is expected that this project will not directly benefit you. However, the goal of the research project is to identify how electronic medication administration records are embedded into the simulated learning environment impacts nursing students' self-confidence during clinical placement. Therefore, it is expected that the outcomes from the research

project will benefit further development and expansion of the electronic medication administration record's into all simulated learning environments in the Bachelor of Nursing program.

Risks

In participating in the questionnaire, there are no anticipated risks beyond normal day-to-day living.

Sometimes thinking about the sorts of issues raised in the questionnaire can create some uncomfortable or distressing feelings. If you need to talk to some about this, you can contact the USQ student counselling service available online through USQ student services (http://www.usq.edu.au/current-students/support), or Australia wide counselling service on 13 11 44 who can direct you to your nearest provider.

Privacy and confidentiality

All comments and responses are confidential unless required by law.

An invitation to participate in the research project will be made through relevant School of Nursing and Midwifery study desk sites and email, and you will be provided a link to the online USQ survey tool. No names or contact details of nursing students will be collected. All answers will be kept confidential. Only the principal investigator will have access to de-identifying data. Upon publication of any results from the study, data will be reported in aggregate form and your identify will not be revealed. All data will be stored, accessed and destroyed in accordance with the University of
Southern Queensland's Research Data and Primary Materials Management Procedure, Records Management Governance Policy and Procedure, and the Records and Information Management Procedure (https://policy.usq.edu.au/documents/151985PL).

Consent to participate

Participation in the survey is voluntary.

By clicking on the 'Start survey' button at the beginning of the questionnaire you have consented to participate in the survey. You may decline to answer a question or discontinue participation without penalty.

Questions

Please contact the principal investigator, Georgina Sheridan[redacted], if you have any questions or enquires for further information in relation to this project.

Concerns or complaints

If you have any concerns or complaints about the ethical conduct of the project, you may contact Dr Linda Ng [redacted] or Dr Snezana Stolic[redacted] (supervisors), or the University of Southern Queensland, Manager of Research Integrity and Ethics on +61 7 4631 1839 or email researchintegrity@usq.edu.au. The Manager of Research Integrity and Ethics is not connected with the research project and can address your concern in an unbiased manner.

Thank you for taking the time to help with this research project. Please keep this document for your information.

APPENDIX E

University of Southern Queensland

Consent form

Questionnaire

USQ HREC Approval number:H22REA003

Project Title

Comparing undergraduate nursing student's ability to access and use, along with self-confidence, paper based patient documentation and or electronic medical administration records during clinical placement.

Research team contact details

Principal Investigator Details

Georgina Sheridan
[redacted]

Supervisors

Dr Linda Ng
[redacted]

Dr Snezana Stolic
[redacted]

Statement of consent

By signing below, you are indicating that you:

- Have read and understood the information document regarding this project. ☐Yes / ☐ No
- Have had any questions answered to your satisfaction. ☐Yes / ☐ No
- Understand that if you have any additional questions, you can contact the research team. ☐Yes / ☐ No
- Are over 18 years of age. ☐Yes / ☐ No
- Understand that any data collected may be used in future research activities. ☐Yes / ☐ No
- Agree to participate in the project. ☐Yes / ☐ No

Name (first & last)			
Signature		**Date**	

Please return this document to a research team member before undertaking the questionnaire.

APPENDIX F

The test between subject effects ANOVA for satisfaction table

Dependent Variable: Satisfaction

Source	Type III Sum of Square	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	291.1494[a]	3	97.050	4.334	.006	.107
Intercept	27484.527	1	27484.527	1227.293	<.001	.918
Q1D	214.342	1	214.342	9.571	.003	.081
Q14CP	10.461	1	10.461	.467	.496	.004
Q1D*Q14CP	17.345	1	17.345	.775	.381	.007
Error	2440.992	109	22.394			
Total	37216.000	113				
Corrected Total	2732.142	112				

[a]. R Squared = .107 (Adjusted R Squared = .082)

The test between subject effects ANOVA for self-co nfidence table

Dependent Variable: Self-Confidence

Source	Type III Sum Square	df	Mean of Square	F	Sig.	Partial Eta Squared
Corrected Model	44.372[a]	3	14.791	1.221	.305	.033
Intercept	75492.009	1	75492.009	6234.063	<.001	.983
Q1D	19.897	1	19.897	1.643	.203	.015
Q14CP	9.210	1	9.210	.761	.385	.007
Q1D*Q14CP	3.375	1	3.375	.279	.599	.003
Error	1319.946	109	12.110			