

INVESTIGATING THE LINK BETWEEN AN EPORTFOLIO AND NURSING STUDENTS' SELF-EFFICACY: A PROTOCOL OF A SEQUENTIAL EXPLANATORY MIXED METHOD STUDY

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ABSTRACT

The global pandemic pushed universities to adopt online platforms for academic continuity, but capturing clinical practice evidence was challenging. ePortfolio pedagogy emerged as a solution, integrating technology, reflection, and assessment to support nursing students' development. This approach enhances digital literacy, lifelong learning, and professional growth by facilitating communication and collaboration. A PhD-funded study at Queen's University Belfast, using a mixed methods sequential explanatory design, explores the understanding and impact of ePortfolios on nursing students, lecturers, and practice staff. The study, ethically approved by the Faculty of Medicine, Health & Life Sciences, aims to evaluate ePortfolio technology's effect on curriculum delivery and student performance. Initial results are expected in 2026, focusing on its impact within nursing and higher education.

KEYWORDS

ePortfolio, Education, Nursing.

1. INTRODUCTION

The pace of technology within health care is gaining momentum, and educators must provide nursing students with the necessary skills to navigate this emerging field. Tacit knowledge can be open to interpretation, and comparability across the undergraduate population is challenging. The use of practice assessment documents (widely known as portfolios) to capture evidence within health care sectors, encouraging professional, reflective growth and academic achievement, is not a new phenomenon [1]. However, the use of electronic practice assessment documents (known as ePortfolios) within nursing to assess competency is still in its infancy, despite the potential impact this may have on practice [1].

The National Health Service (NHS) is moving towards digital reform through the Long-Term Plan [2]. This has led to collaboration between the Joint Information Systems Committee, Health Education England, and the Royal College of Nursing (RCN) to develop essential criteria and the aspiration of every nurse being an “e-nurse” [3]. The Joint Information Systems Committee [4] advocates the use of ePortfolios to support and record nursing students' pursuit and achievement of personal, professional, and clinical competencies. It states that the ePortfolio encompasses both product and process, and while the former is result-driven and performance-

orientated, the latter is development-focused with reflective competence and ability, which is aligned to professional behaviors and mastery-orientated [5]. It states that the ePortfolio encompasses both product and process, and while the former is result-driven and performance-orientated, the latter is development-focused with reflective competence and ability, which is aligned to professional behaviors and is mastery-orientated [5].

The evolution of digital pedagogy to facilitate and foster clinically based learning has resulted in ePortfolios and patient safety being inextricably linked. Practitioners must use electronic platforms ethically and responsibly, while maintaining appropriate standards of behavior online. Breaches in privacy, confidentiality, and misuse of data online are known to lead to patient harm and compromise patient safety. The regulator has sought to clarify this area [6] in Article 3[4A] of the Nursing and Midwifery Order 2001, which states that its aim is to protect, promote, and maintain the health and well-being of the public with further guidance published in March 2015, when the Nursing and Midwifery Council (NMC) implemented *The Code: Professional standards of practice and behaviour for nurses, midwives and nursing associates* [7]. Venkatesh (2003), in the Unified Theory of Acceptance and Use of Technology model (UTAUT), outlined that ease of use and perceived ease of use are markers that promote learners' ability to engage with technology and are correlated with the likelihood of success. This understanding of individual acceptance and ease of use of technology continues to challenge, as highlighted by Abdullah (2016), in the application of the original Technology Acceptance Model (TAM) by Davis (1989). Within programs of study, there is assumption that nursing students, as part of the wider student population, are digital natives [8].

Debate continues about the best strategies for the undergraduate nursing population in relation to how nursing students navigate this evolving field of ePortfolios. This project draws on several evidence-based inputs which have been formative in its design. Brown Wilson et al. [8] and Kirby [9] shared the conclusion that many nursing students were poorly informed on how best to navigate this platform, especially when nursing students are required to collect evidence from vulnerable groups while on placement and upload into their eportfolio. Ethical issues such as privacy and protection of data in an online environment are discussed within the literature, but how nursing students equate professional and clinical attributes on an online platform is less clear. A scoping review of e-professionalism in health care education literature by Slade et al. [10] explored the concept of e-professionalism and its development, to understand the results from both the nursing student and educator points of view. The review sought to gauge its potential usefulness as a construct to assist nursing students understand professionalism online and ultimately meet set proficiencies. The reviews by Brown Wilson et al. [8] and Slade et al. [10] clearly identified that there is little evidence of research that systematically investigates the effect of ePortfolios on nursing students.

Further to this, a recent systematic review carried out by the author (<https://doi.org/10.17605/OSF.IO/8CV9G> registered with Open Science Framework) highlighted the assumption that nursing students should be able to automatically make connections between clinical practice and theory, yet learning does not occur without guidance and support, especially at the start of their learning journey. Therefore, this research seeks to investigate and to explore the level of support required for nursing students from nurselecturers and practice staff when using an ePortfolio and how nursing students' self-efficacy might be impacted by this technology.

2. METHODS

Methods were chosen in line with pragmatism as a research paradigm that allows for flexibility in the approach to embrace the possibility that there may be multiple realities that are open to

empirical inquiry as no two people will have the same experience [11]. An explanatory sequential mixed methods design will be employed combining qualitative and quantitative research to provide a more comprehensive understanding of the research problem. The significant advantage of using a two-phase approach is that the first quantitative phase, in which numerical data can be statically analyzed to identify patterns, relationships, and/or trends, is followed by qualitative data providing insights into participants' perspectives [12]. Integrating the data from phases one and two will then provide a more comprehensive and nuanced understanding of the research question by triangulation of the results from both phases [13].

Fetters [14] argues that using an explanatory mixed methods design allows a combination of methods and data that will provide triangulation of data to corroborate findings, thus increasing the validity and reliability of the study results. This will include the analysis of questionnaires, focus groups, and process notes by the researcher to enhance rigor [14].

2.1. Participants

This is a multi-site study across Northern Ireland based at the Faculty of Medicine, Health & Life Sciences (FMHLS) at Queen's University Belfast (QUB), a large, research-intensive university, and will incorporate Ulster University and Open University; all three offer BSc Nursing. The study will have nursing student, lecturer, and practice staff participation from across Northern Ireland.

In the first phase, primary inclusion criteria for participants will be sought from all undergraduate first-year nursing students in Northern Ireland across all fields of practice, from registered nurse lecturers who teach the undergraduate nursing curriculum, and from registered nurses (practice staff) who are part of the QUB community of practice. Nursing students, nurse lecturers, and practice staff will be recruited across the sites and invited to take part voluntarily. The sample frame of survey participants is expected to be 1,048 nursing students, 100 nurse lecturers and 30 practice staff. This sampling frame should meet the required threshold for power calculation and requirement analysis as detailed by Cohen [15]. Raosoft software was used, confirming a recommended sample size of $n= 290$, giving a 5% margin of error and a 95% confidence level. In the second phase, three focus groups—one group with 4–8 nursing students, one group with 4–8 lecturers, and one group with 4–8 practice staff—will be convened from participants who took part in the first phase and who wish to be involved.

Sampling will occur over multiple sites. In the first phase, non-probability sampling will be used, particularly purposive sampling. Although purposive sampling is more often associated with qualitative research, it is appropriate given the mixed methods approach and is justified as all participants in the sampling frame will be eligible for inclusion and be specifically selected because of their attributes [16]. This will allow the study to be focused on specific issues. It could be argued that the sample will also be a convenient one, but as Parahoo [17] points out, most non-probability samples will contain a mixture of both purposiveness and convenience. In the second phase, eligible participants will be contacted to take part in the focus groups.

2.2. Study Duration

The study is proposed over 24 months spanning October 2023 until October 2025. The study duration has been planned to ensure that a breadth of participants across all fields of practice are recruited. It will access first-year nursing students across three higher education institutions (HEIs) in Northern Ireland at two time points, before and after their first clinical placement. All nursing students who complete the questionnaires and give informed consent will be contacted to take part in the focus groups. Nursing students will be invited to complete two questionnaires

sequentially: before they commence their first clinical practice and when they return from their first clinical placement. The first section of the questionnaire will take approximately ten minutes to complete and presents nursing students with a total of eight demographic questions and 12 questions relating to how useful they think the ePortfolio will be. The questionnaire's second section will take about 15 minutes to complete and presents nursing students with 22 questions about how they think their self-efficacy could be impacted by this technology.

Nurse lecturers and practice staff will be asked to complete only the first section of the questionnaire. All nurse lecturers and practice staff who complete the questionnaire and gave informed consent will be contacted to take part in the focus groups.

3. ETHICS

Prior to commencing this study, ethical approval was obtained from FMHLS (FMHLS 23_90). A gatekeeper not associated with the project will contact eligible participants prior to undergraduate nursing students' first clinical placement. An information sheet and contact details of the research team will be sent to all participants. Participants who wish to take part will be taken to a Qualtrics forms survey. Each participant will need to tick a box to confirm they have read the participant information sheet and that they consent to participate prior to completing each questionnaire.

4. RESEARCH AIM

To explore undergraduate nursing students', nurse lecturers,' and practice staff's understanding of an ePortfolio and explore how nursing students' self-efficacy could be impacted by this technology.

The following hypotheses were then generated to answer this central question:

- HO1) Nursing students, nurse lecturers, and practice staff engagement with the ePortfolio is increased with perceived usefulness.
- HO2) Self-efficacy in nursing students is increased with perceived usefulness of the ePortfolio.
- HO3) There is a relationship between the perceived usefulness of an ePortfolio and self-efficacy within clinical practice.

5. DATA COLLECTION

Data collection will be a two-phase, multi-site approach obtaining quantitative results from a survey of nursing students, nurse lecturers, and practice staff, followed up with purposefully selected focus groups comprising nursing students, nurse lecturers, and practice staff to explore the results.

5.1. Stage One

A questionnaire designed with two validated instruments and demographic questions will be administered sequentially: the Unified Theory of Acceptance and Use of Technology (UTAUT) model [17] and the Nursing Student Self-Efficacy scale [17,18,19]. The questionnaire will be administered sequentially to nursing students at two time points: before they go on placement and then when they return from their first placement, to assess whether there are changes pre- and post-test to the potential predictive power of selected variables on nursing students' achievement, understanding of, and engagement with the ePortfolio. Nursing students will be

asked for identifiable information (i.e., nursing student number) to enable the results of the UTAUT model [19] and the Nursing Student Self-Efficacy scale [18,19] to be paired before and after placement.

The UTAUT model [17] and demographic questions, including years of clinical practice assessment, will be administered to nurse lecturers and practice staff only once, to establish a base line to allow focus on how selected internal and external variables relating to ePortfolio use serve as predictors to student understanding and achievement.

Through this quantitative phase we intend to identify the potential predictive power of selected variables on nursing students' achievement, understanding of, and engagement with the ePortfolio. The original TAM by Davis [17] has had several iterations; this pioneering work is of great significance, provides valuable insight, and is crucial to our wider understanding of how to perceive, understand, and accept technology. Modifying this and taking cognizance of Venkatesh (2003), UTAUT will enable quantitative data to be collected via a web-based validated instrument in the first section and will include 12 content questions assessed with a 7-point Likert scale: 1 (strongly disagree), 2 (moderately disagree), 3 (somewhat disagree), 4 (neutral), 5 (somewhat agree), 6 (moderately agree), and 7 (strongly agree).

Self-efficacy is domain-specific [20] and is widely seen as a building block of self-confidence, especially within clinical practice [21]. To explore this, self-efficacy quantitative data based on the self-efficacy of Bandura [22] is to be collected via a web-based validated instrument administered only to nursing students. It is based on the following variables: learning process, reading, comprehension, memory, curricular activities, time management, teacher–nursing student relationship, peer relationship, utilization of resources, goal orientation, adjustment, and examination. To add to the validity of this study, a previously validated self-efficacy scale will be used. This scale, by Byrne [18], had been adapted from Zajacova et al. [19]; it identified items that were common to all undergraduate nursing students and added items for their study. Byrne [18] modified the scale by adding items specific to accountancy. In keeping with this approach, the questionnaire will delete the questions specific to accountancy and replace them with specific items related to the ePortfolio. It includes 22 content questions assessed with a 7-point Likert scale: 1 (not confident at all), 2 (minimally confident), 3 (slightly confident), 4 (neutral), 5 (somewhat confident), 6 (moderately confident), 7 (completely confident). The use of these tools has been informed by the analysis of the literature, which clearly demonstrates that there is need for further exploration in this field.

5.2. Stage Two

Following quantitative data collection, focus group discussions will be used to explore in-depth experiences and to gather perceptions about the impacts of the data gathered in the surveys. This is an established technique used by Patton [21] to explore the perspectives of undergraduate nursing students, nurse lecturers, and practice staff of using an ePortfolio. Focus groups will be employed to help explain why certain external and/or internal factors tested in the first phase are significant or not significant predictors of nursing students' understanding, engagement, and achievement.

6. DATA ANALYSIS

The quantitative data from the survey results have been collected from the platform www.qualtrics.com, they will be downloaded into IBM SPSS Statistics for Windows, version 28.0, a statistical software package commonly known as the Statistical Package for the Social

Sciences. The data will be subjected to normality testing to determine whether parametric or non-parametric tests are appropriate. Descriptive and inferential tests will be conducted to explore participant characteristics and establish relationships between the perceived usefulness of the ePortfolio and self-efficacy. Variables that have shown significance will undergo bivariate analysis. Furthermore, linear regression will be employed where relevant to measure the extent of variance explained by the independent variables and evaluate the strength of their association with the scores. Dependent paired t-tests will be used to analyze the results of the nursing student responses before and after their first placement.

The qualitative data from the focus groups will be transcribed verbatim by the researcher and the transcriptions studied to identify common themes within the data. The qualitative data will be analyzed using a thematic analysis approach as described by Braun and Clarke [25]. This approach has been chosen as it aligns with the pragmatist approach of the study. The aim of the pragmatist researcher is to incorporate operational decisions on what will work best, and Braun and Clarke [25] detail six stages of data analysis that aid the researcher in doing this: collecting data, generating initial codes, searching for themes, reviewing themes, defining and naming themes, and writing the report. By using this form of data analysis, the researcher can recognize and group a list of themes that have emerged from the data that will give an insight into the views and experiences of the participants. This will help to achieve the most complete understanding of the complex experiences of the nursing students. Additionally, the researcher can focus on actionable knowledge, recognition of interconnectedness between experience, knowing, and acting, and a view of inquiry as an experiential process allowing interpretation of the meanings of the data and therefore moving beyond mere descriptions of the participants' accounts [25]. To assist the management and the sorting of the data, a computer software package such as NVivo will be used. Advice will also be sought from the supervisory team after the data is analyzed to verify the researcher's interpretation of the data collected.

6.1. Data Management

For lecturers and practice staff, no identifiable data will be collected. This information will be anonymized after the data is collected. Data will be managed via the platform www.qualtrics.com; nursing students will be asked for their nursing student number to enable before and after placement questionnaires to be paired. This will allow us to use dependent paired t-tests to determine significance. Once the questionnaires are paired, Qualtrics will give a unique number to each nursing student and the data will be pseudonymized so that no individual nursing student can be identified. All data will be uploaded to SPSS for statistical analysis (at which time the data from Qualtrics will be deleted). The research team will be the only individuals with access to the Qualtrics data. The focus groups will be digitally audio-recorded and saved on a QUB password-protected server; recordings will be fully transcribed. Files will be saved according to focus group number. Any personal information that may identify participants will not be saved together with the recording. All data collected during this study will comply with the General Data Protection Regulations (GDPR) 2018 [26]. Hard copies of any participant data (e.g., consent forms) will be stored in a locked filing cabinet within a lockable office.

The information will be stored as an encrypted password-protected file on a password-protected computer from QUB. Storage of data will be in accordance with the GDPR [26]. Participants will be informed that focus group data will be retained for five years after study completion before being destroyed.

7. DISCUSSION

Within the literature there is no clear guidance on how best to support nursing students as they navigate the evolving ePortfolio landscape; it is highlighted that comprehensive training for both students and staff is required, and this should be based on a sound pedagogical approach [27]. Slade et al. (2019) illuminate that both staff and students are time poor, but it is recognized that ePortfolios, as a framework for showcasing learning, set their foundations on the ability to deliver the pedagogy that underpins that value [28]. Therefore, explicit, and implicit values, skills, and tacit knowledge required for the nursing student and future registrant need to be integrated throughout their program and beyond, with a focus on learning, reflection, and self-efficacy. ePortfolios can be more than just resumés or repositories – they can portray professionals' identity and learning [29] and provide a strong pedagogical framework that enables clear underpinnings on clinical assessment encompassing both product and process [30]. This approach enables students to take ownership of their learning and understand the multi-faceted approach required when dealing with health care issues [31].

8. CONCLUSION

The study aims to address a critical issue in nursing education, and it acknowledges the necessity for further research to determine the efficacy and impact of technological interventions on nursing students. By focusing on supporting nursing students through their educational journey, this research has the potential to inform pedagogical practices and improve the preparation and competence of future nursing professionals. The strength of the proposed study lies in three aspects: i) diverse stakeholders; ii) verified survey and frameworks; iii) mixed method approach. The study highlights a critical gap in the literature regarding the support of undergraduate nursing students in navigating the evolving field of nursing. This has implications not just for the nursing student population, but it emphasizes the need for clear guidance rooted in strong pedagogical understanding to aid all higher education students in focusing on clinical practice. This study hopes to inform the leverage of this technology integration and additionally underscore the importance of self-regulated learning and the creation of a personal learning space, along with clear connections to legal, moral, and professional responsibilities.

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