Bridging competency and technology: User evaluation of a digital clinical workbook for nurse practitioner students

NILUFEUR MCKAY[1]
Edith Cowan University, Joondalup, Australia
MICHELLE PEDLOW
University of Western Australia, Crawley, Australia
PETER PALAMARA
Edith Cowan University, Joondalup, Australia
FIONA FOXALL
University of Western Australia, Crawley, Australia

The objective of this study was to evaluate the impact of an educationally designed digital clinical workbook for Master of Nursing (Nurse Practitioner) students' work-integrated learning experience. Sixteen students completed an anonymous online survey consisting of closed questions and open-ended free text items to capture students' experience of the usability and utility of the digital clinical workbook to complete work-integrated assessments. Three focus groups were conducted comprising nine students and one alumnus. Despite initially finding the technology challenging, students found the digital platform navigable and useful. They preferred the digital clinical workbook over paper-based assessment methods and acknowledged the benefit of intentionally embedding the digital platform across the curriculum, the importance of providing user resources, and the influence of the workbook on employability skills. The digital clinical workbook is an innovative option for nurse practitioner students to complete clinical-based assessments while increasing their digital literacy and employability skills.

Keywords: Nurse practitioner, work-integrated learning, ePortfolio, online workbook, education, digital literacy.

Nurse Practitioners (NPs) are increasingly recognized as important providers of healthcare and researchers have acknowledged their role in promoting positive patient outcomes, particularly in the prevention and management of chronic disease (Abraham et al., 2019; Htay & Whitehead, 2021; Poghosyan et al., 2018). All NP students, regardless of geographical location, undertake theoretical coursework and are required to complete a minimum number of supervised, clinical specialty work-integrated learning (WIL) hours to attain their final qualification (National Task Force on Quality Nurse Practitioner Education, 2016; Nursing and Midwifery Board of Australia [NMBA], 2021). In Australia, a minimum of 300 hours of supervised clinical practice are required for endorsement as a NP (NMBA, 2021) and up to 750 hours in the United States (US) (American Association of Colleges of Nursing [AACN], 2021).

Constructive feedback during WIL is essential for NP students' skills and competency development, however, there is a lack of standardized tools and criteria for documenting student performance. To demonstrate competency and prepare graduates to meet the needs of their specialty population, universities utilize technology to enhance the postgraduate student experience (Kavanagh & Sharpnack, 2021). This has become increasingly important for US based NP courses, with the endorsement of the AACN (2021) essentials of competency-based education, which requires repetitive formative assessments, timely feedback, self-reflection, and academic reporting based on the students' ability to demonstrate knowledge and skill as they progress through their educational program.

[1] Corresponding author: Nilufeur McKay, n.mckay@ecu.edu.au

The development of digital technologies has given rise to the use of ePortfolios in place of paper-based portfolios (Ciesielkiewicz, 2019). The use of ePortfolios facilitates the streamlining of student learning, assessment, and professional preparation and are well-established tools for recording WIL hours in healthcare education (Janssens et al., 2022). In nursing education, ePortfolios are popular platforms for integrating nursing theory, clinical practice and personal experience to build professional competencies (Green et al., 2014). Psychological preparation of graduate nurses for their future clinical role in healthcare is also a feature of ePortfolios (Chang et al., 2019; Wassef et al., 2012). ePortfolios are well suited to the structure of NP courses, which have a strong focus on recording WIL hours and competency-based assessment (Anderson et al., 2009) and to build digital literacy skills (Lokmic-Tomkins et al., 2022). For the target population of this study (NP students), COVID-19 necessitated a change in 2021 from a paper-based workbook and assessment to an entirely online digital clinical workbook which is described in the methods section and detailed in Table 1.

Currently there is a lack of standardized tools and criteria for digital documentation of student performance during WIL. Although programs such as Typhon® (https://typhongroup.com/) exist in the US for recording clinical practice hours and patient documentation (Cullen et al., 2010). This platform to our knowledge is not used in other countries. Therefore, there is limited research and understanding of the students' perspective of the use of digital assessment platforms during NP WIL in Australia.

In the Australian higher education context, this study examined a digital clinical workbook implemented within a Master of Nursing (Nurse Practitioner) course. The workbook was developed within the PebblePad ePortfolio platform, to support students' clinical learning and assessment. To note the academic terminology specific to the study setting: 'course' refers to a complete program of study (known as a 'program' or 'degree' internationally), while 'unit' describes individual subjects within that course. This terminology is used throughout to reflect the Australian educational framework. The institution where this study was conducted utilizes PebblePad® as its designated ePortfolio platform across all disciplines, hereafter referred to as the *digital ePortfolio platform*, except where student quotes or product-specific features require explicit mention.

Overview of Nurse Practitioner Student Work-Integrated Learning

The nationally accredited master degree level NP course comprises two sequential semester-long WIL units. Students complete 200 clinical hours in primary care settings, under the direct supervision of endorsed NPs or medical practitioners during their first WIL placement. The unit develops comprehensive clinical assessment, communication and documentation skills, while incorporating health technologies and informatics which are applied during the care of patients/clients. Student assessments include health assessment documentation, WIL clinical objectives, competency based self-assessment, and patient interaction logs which also track the number of clinical hours completed. Clinical mentors access these assessment artifacts through the digital clinical workbook to verify the hours and complete a 'clinical mentor report' at the end of each student's placement. The second clinical placement unit focuses upon specialty nursing, for example, emergency, cardiology or rural and remote community nursing.

At present there are 2,200 NPs in Australia (Australian Government Department of Health and Aged Care, 2024) and there is a reliance on external industry clinical mentors for NP students to complete clinical WIL. To maintain assessment integrity, a secure method for clinical mentors and academic staff

to provide collaborative feedback to NP students needed to be expediated, providing the impetus to ensure a digital workbook could be accessed by industry partners.

Development and Use of the Digital Clinical Workbook

The course coordinator and the school's senior learning designer developed the first iteration of the digital clinical workbook in Semester 1, 2021 using PebblePad®, a commercial digital ePortfolio platform, which facilitates the delivery and assessment of learning activities, both within and outside the classroom. Student and clinical mentor feedback informed subsequent iterations of the clinical workbook, with the 2021 version forming the basis of this evaluative study, which can be viewed online at https://s.ecu.edu.au/3Pihvud. The digital ePortfolio platform functions to support streamlined assessments and facilitate timely communication among users (Kaminski, 2020). Students build scaffolded ePortfolios, culminating in a capstone assessment, through compilation of artefacts and evidence of professional and academic achievements which are mapped to the national Nurse Practitioner Standards for Practice (NMBA, 2021). Students can share their digital clinical workbook within the ePortfolio as a weblink to prospective employers and submit for endorsement (licensure) as a NP.

The workbook incorporates clinical competency requirements whilst integrating with the content and learning resources within the learning management system (LMS). As part of the accredited master's degree, students complete assessment milestones during supervised WIL (Australian Nursing and Midwifery Accreditation Council [ANMAC], 2015). A multipage accordion-style workbook engages students through interactive activities and materials (Garrett et al., 2013). Components of the digital clinical workbook, with descriptions, are listed in Table 1. Students log WIL hours, create clinical learning objectives, provide reflective accounts of their practice, complete self-assessment and maintain patient logs aligned with the NMBA (2021) Nurse Practitioner Standards of Practice. Clinical mentors document feedback on history-taking, physical assessments, student performance, culminating in an oral clinical viva voce, which is verified by digital signature, confirming completion. The study examined both the digital clinical workbook's usability (its instrumental quality for completing WIL assessments) and utility (the intrinsic qualities of the digital ePortfolio platform).

LITERATURE REVIEW

Technology in Clinical Education and Assessment

The integration of digital platforms in clinical education has transformed traditional paper-based assessment methods, particularly through the adoption of ePortfolios (Bramley et al., 2021). These digital tools have demonstrated significant advantages in tracking clinical competencies, work-integrated learning hours, and facilitating self-reflection (Green et al., 2014). The evolution from paper-based to digital documentation has been driven by the need for more efficient, accessible, and comprehensive assessment methods in healthcare education. NPs are a well-established member of the healthcare team, with an expanding level of practice (Htay & Whitehead, 2021). This extending role has heightened the importance of robust clinical education and assessment methods. The use of ePortfolios has become particularly relevant in nursing education, serving as popular platforms for integrating nursing theory, clinical practice, and personal experience to build professional competencies (Green et al., 2014).

TABLE 1: Clinical workbook components to support the student clinical practice hours.

Workbook Page	Title	Description
1	Instructions	Detailed instructions for students and clinical mentors relating to the utilization of the workbook
2	WIL placement objectives	Two separate tables for students to document clinical practice objectives at the beginning and halfway through completing their allocated WIL.
3	Health history workbook	A dedicated page for students to complete and save comprehensive and focused assessments completed during WIL.
4	NP self-assessment tool	Formative and summative self-assessment to be completed by the student and reviewed by clinical mentor and academic staff.
5	Patient activity log	List of deidentified patients seen/examined during WIL.
6	Clinical hours table	A running log of completed WIL hours including locations and sign-off by the supervising clinical mentor.
7	NP clinical mentor report	Final clinical mentor report completed at the end of the WIL placement. Report is mapped against the Australian NP Standards of Practice to ensure students work towards competency/are competent.
8	Viva voce workbook	Final assessment of students' clinical competencies which is accompanied by an oral viva voce in conjunction with the students' clinical mentor and academic staff member.

While platforms like Typhon® are commonly used in the United States for recording clinical hours and patient documentation (Cullen et al., 2010), there remains limited standardization of these platforms globally, particularly in NP programs outside the United States. This gap is notable given the increasing emphasis on digital competency in healthcare education and the varying requirements for supervised clinical practice hours across countries - from 300 hours in Australia (NMBA, 2021) to 750 hours in the United States (AACN, 2021). The implementation of digital health tools has significantly improved clinical documentation and feedback processes. Gray et al. (2019) documented how Australian midwifery students benefited from both paper-based and electronic portfolios, highlighting the transition challenges and ultimate advantages of digital platforms. Similarly, in physiotherapy education, Dean and Levis (2016) demonstrated how digital tools enhanced the quality and consistency of clinical assessment feedback.

Complexities of Assessing Professional Competencies

The assessment of professional competencies in nurse practitioner education presents unique challenges, particularly regarding standardization and consistency. Drayton-Brooks et al. (2017) identified significant variations in assessment approaches across NP programs, highlighting the need for more structured evaluation tools. McCarthy and Murphy (2008) noted in their study of undergraduate nursing assessment strategies that the complexity of assessment is further compounded by the challenge of engaging clinical mentors and ensuring quality feedback. ePortfolios have emerged as valuable tools in addressing these challenges through structured frameworks for authentic

assessment. Kaider et al. (2017) proposed a practical typology for work-integrated learning activities and assessments, providing a foundation for more systematic evaluation approaches. Chang et al. (2019) emphasized the importance of reflective practice in developing professional competencies, particularly during the final semester of clinical practice.

Challenges of Clinical Placement and Supervision

The healthcare sector faces persistent challenges in procuring clinical placements and supervision, exacerbated by workforce shortages and geographical disparities. These issues were further complicated by the COVID-19 pandemic, which necessitated rapid adoption of digital solutions to ensure continuity in clinical education. Lokmic-Tomkins et al. (2022) investigated nursing students' digital literacy baseline, revealing varying levels of technological preparedness among students transitioning to digital platforms. The implementation of digital solutions, while necessary, has highlighted existing disparities in technological access and competency. Abrams (2015) emphasized the importance of reflexive pedagogy in digital resource implementation, particularly in supporting diverse student populations and learning needs.

Digital Literacy and Employability

Digital literacy has become increasingly central to healthcare education and practice. This has become particularly crucial with the American Association of Colleges of Nursing's (2021) endorsement of competency-based education, which emphasizes repetitive formative assessments, timely feedback, self-reflection, and academic reporting based on students' demonstrated knowledge and skills. Bramley et al. (2021) demonstrated how implementing novel work-based clinical assessment tools, such as ePortfolios with embedded professional activities, contributes to both professional development and employability. The psychological preparation of graduate nurses for their future clinical role in healthcare is another significant feature of the ePortfolio (Chang et al., 2019; Wassef et al., 2012). These digital platforms facilitate the development of transferable skills essential for modern healthcare practice while building crucial digital literacy skills (Lokmic-Tomkins et al., 2022).

Research Gaps Identified

The literature review reveals several gaps in current research:

1. While digital platforms are increasingly adopted in healthcare education, there is limited empirical evidence specifically examining student experiences with these tools in NP programs, particularly in the Australian context.
2. There is a notable absence of comprehensive studies evaluating the effectiveness of digital tools in enhancing supervision and assessment rigor within NP education.
3. The relationship between digital platform utilization and the development of digital literacy and employability skills in Australian NP courses remains understudied, despite its growing importance in healthcare delivery.

These gaps highlight the need for further research to understand better how digital platforms can support NP education, while developing essential professional and technological competencies for contemporary healthcare practice.

Aims and Objectives

Recognizing the above gap in knowledge, this study incorporated a digital clinical workbook that provides a platform for clinical mentors and academic staff feedback. The aim was to evaluate the NP students' experience of the interactive digital online workbook, which was used during their WIL placements. The specific objectives of the study were to explore students' perceptions of (i) the technical and resource usability of the online workbook for students and clinical mentors (ii) the utility of the online clinical workbook to complete WIL assessments, receive mentor and academic staff feedback, log patient care, complete a clinical capability self-assessment and log WIL hours completed, and (iii) the potential benefits of the workbook to their future employability through reflective practice relating to the assessments and activities completed and the relevant feedback received from clinical and academic supervisors.

METHODOLOGY

Study Design

A sequential, explanatory integrative mixed methods design (Fetters et al., 2013) with an embedded qualitative component (Creswell & Creswell, 2018) was used to collect both quantitative and qualitative data for a comprehensive understanding of the students' perspectives.

Setting

Study participants were recruited from a nationally accredited Master of Nursing (Nurse Practitioner) course in an Australian university which was established in 2011.

Participants and Recruitment

The target population were NP students across different stages of an 18-month (full-time or part-time equivalent) Master of Nursing (Nurse Practitioner) course at an Australian university. At the time of the study, there were approximately 65 students enrolled in the course. Students that were enrolled in one of the two practice units within the course were eligible to participate in the study. A total of n=35 eligible students were emailed a link to the study information sheet and online survey in week 12 of semester one 2021 and were invited to participate anonymously. For the focus group component of the study, n=16 students meeting the eligibility criteria and n=8 alumni (students having completed the course in the previous six months) were invited via email to participate in the focus groups conducted in June 2022. Eight students and one alumnus agreed to participate in the focus groups.

Data Collection

Data were collected using a study-specific online survey, which was adapted from a previous survey used within the School to evaluate the digital ePortfolio platform. Teaching staff and a senior learning designer collaborated in the design, content, and readability of the online survey. The survey consisted of 40 branched closed-ended questions and two open-ended questions, covering participant demographics, motivation, workbook design and usability. The survey was uploaded to the Qualtrics© platform for distribution and participants provided consent at the beginning of the survey. The median time taken to complete the survey was 12 minutes. Online focus groups were held in semester one of 2022 for feedback on the second iteration of the workbook. The focus groups included three open-ended questions on graduate capabilities and employability skills (Table 2). A focus group methodology was chosen to allow participants to build on each other's responses and generate ideas

that they may not have thought of in an individual interview. This also allowed the moderator to interact and ask follow-up questions.

TABLE 2: Focus group questions.

1	How did the online clinical workbook impact your success with the assessment tasks?
2	Do you feel the online clinical workbook assisted in developing your potential employability?
3	Do you feel the accessibility and usability of the online workbook for both students and clinical mentors has improved with additional access to the support resources (information/support/demonstration tip sheets) provided by the university?

The senior learning designer who did not have any direct relationship with the students led the focus groups to minimize the likelihood of coercion or an unequal power dynamic. However, the course coordinator was present online for the discussions which could have potentially affected the discussion. The focus group discussions were recorded using Microsoft Teams® software, with the participants providing consent for the recording and transcribing of the focus group discussions.

The study and data collection methods and instruments were reviewed and approved by the Human Research Ethics Committee of the higher education institution where the lead investigator is employed (2021-02485).

Data Analysis

The online survey responses were exported from Qualtrics into SPSS (IBM SPSS Ver. 29.0.1). Data were cleaned and recoded for aggregated descriptive analysis (e.g., frequency counts, percentages). The responses to the free-text survey items were exported verbatim from Qualtrics into Microsoft Word tables in preparation for analysis. The audio recordings of the focus group discussions were transcribed into Microsoft Word. Both sets of qualitative data were analyzed using the six-phase thematic analysis method described by Braun and Clarke (2022). This reflexive method assists with identification of repetitive ideas, topics, and themes for the purpose of classifying responses (data) into thematic categories (Braun & Clarke, 2022). After multiple readings of the text, codes were assigned to segments of text by two researchers: the course coordinator of the NP course (lead investigator) and a member of the research team who had experience with thematic analysis. After initial review, potential themes were identified and reviewed by the other member of the research team. The identified themes were then reviewed using the five questions proposed by Braun and Clarke (2022) for appropriateness, quality, and scope of the theme, the level of meaningful data and the uniformity of data to support the theme.

Rigor

The consistency, trustworthiness and dependability of the qualitative data and analysis methods were supported by several processes (Lincoln & Guber, 1985). Firstly, two members of the research team independently coded the qualitative data held in Microsoft Word documents. Secondly, the review of codes for the establishment of initial themes was independently undertaken by one member of the research team. Any disagreements over coding and the identification of the initial themes were resolved through discussion. Finally, the identified themes were then reviewed by the three researchers to verify and amend where necessary. These processes ensured analysis of the qualitative data was

iterative, reflexive, and provided a relevant and trustworthy synthesis of the responses of the participants.

RESULTS

Characteristics of Respondent Students

Sixteen students, representing 46% of the n=35 students eligible to participate, completed the online survey. Most respondents were aged 30-39 years (n=10, 55.5%), were enrolled in the Nurse Practitioner Professional Practice 2 unit (n=10, 62.5%), were part time students (n=9, 56.2%) and had completed two or more semesters of study (n=11, 68.7%). Less than half of the respondents (n=7, 44%) had used the online ePortfolio platform previously (either in a previous unit or to build a professional ePortfolio) (Table 3).

TABLE 3: Characteristics of respondent students.

Characteristic	n=16	%
Age Group (years)		
<20	0	0.0
20-29	1	5.6
30-39	10	55.6
40-49	5	27.8
≥50	2	11.1
Unit enrolled		
Nurse Practitioner Professional Practice 1	6	37.5
Nurse Practitioner Professional Practice 2	10	62.5
Study mode		
Full-time	7	43.8
Part-time	9	56.3
Number of semesters in the NP program completed		
One	5	31.3
Two	1	6.3
Three	5	31.3
More than three	5	31.3
Previous use of the online ePortfolio platform		
Yes	7	43.8
No	9	56.3

Usability of the Online Clinical Workbook

A majority of respondents (n=14, 87.5%) reported that the digital ePortfolio platform was easy to use (Table 3). The two respondents who did not rate the digital ePortfolio platform as easy to use, reported that they "couldn't find their way around PebblePad". Respondents reported using a range of resources to support their use of the system and to complete the various assessments and clinical placement tasks.

TABLE 4: Resources used by respondents.

Resource Used	n=16	%
Digital ePortfolio platform learning center videos and resources		
Yes	10	62.5
No	6	37.5
Contacted IT Services for assistance		
Yes	2	12.5
No	14	87.5
Information in the Learning Management System		
Yes	14	87.5
No	2	12.5
Contact with unit coordinator or tutor		
Yes	9	56.2
No	7	43.8
Contact with fellow student/friend		
Yes	3	18.8
No	13	81.3

In relation to the usability of the online workbook to log clinical hours, a quarter of respondents (n=4, 25%) indicated that they had not yet logged clinical hours, with n=10 (62.5%) indicating it was somewhat easy to very easy to log clinical hours. When asked to rate the resources used for the digital clinical workbook (Table 4), the (i) digital ePortfolio platform learning center videos and resources, the (ii) learning management system, and (iii) consultations with the unit coordinator or tutor were respectively rated 'moderately useful' to 'very useful' by 80%, 87.5%, and 100% of students respectively. Just under a third (n=5, 31.3%) of respondents considered that no additional resources were required to overcome problems using the digital clinical workbook, while approximately 50% recommended that the university create additional video resources (Table 5).

TABLE 5: Respondents endorsement of additional resources required to support the online workbook.

Additional resource requirements	n=16	%
Nothing – I think you are offering great support	5	31.3
Create "how to" videos	8	50.0
Have a discussion board forum for questions	2	12.5
Other	1	6.3

Utility of the Online Clinical Workbook

The respondents were evenly divided in their use of the digital clinical workbook to inform their clinical mentor of the clinical practice assignments (Table 6). The majority (n=13, 81.3%) rated the clinical practice template in the digital clinical workbook as 'somewhat useful' to 'very useful', while just over two-thirds (n=11, 68.8%) considered that it was 'somewhat easy' to 'easier' to complete the assigned clinical practice tasks using the online workbook, compared to a Word document. The same number of students (n=11, 68.8%) also considered that the self-assessment scoring page of the digital clinical workbook was helpful in meeting the learning objectives. Most respondents (n=15, 93.8%) claimed the digital clinical workbook enabled them to complete WIL assignments on time.

TABLE 6: Use of online clinical workbook during the clinical placement.

Activity	n=16	%
Show assignments to the Clinical Mentor		
Yes	8	50.0
No	8	50.0
Using the practicum template to complete assignments		
Very useful	10	62.5
Somewhat useful	3	18.8
Not useful	1	6.3
Not sure yet	2	12.5
Completing the assigned practice tasks		
Easier	6	37.5
Less than easy	5	31.3
Not easy – I prefer to use a Word document and submit individually	3	18.8
Not sure – I'm still getting used to the workbook function	2	12.5
Self-assessment scoring page to meet learning objectives		
Yes, helpful	11	68.8
No, not helpful	1	6.3
Somewhat helpful	4	25.0
Submitting assignments on time		
Yes	15	93.8
No	1	6.3

Student Experience of the Online Workbook

Three primary themes emerged from the thematic analysis of students' free-text survey responses and the focus group feedback: 1) benefits of intentional embedding across the curriculum, 2) benefits of ensuring adequate instructional support and 3) workbooks were designed authentically to build employability skills.

Theme 1: Benefits of intentional embedding across the curriculum

Students acknowledged the benefits of early exposure to the workbook's digital ePortfolio platform, PebblePad, in the curriculum. This early introduction aided in facilitating familiarity with the technology, as commented by one student: "I think it was good starting it in that very first semester. …. it was really important because then you had an opportunity to start to learn how to use PebblePad" (Alumni 2).

Additionally, the student expressed appreciation for PebblePad's capabilities, emphasizing its importance for self-reflection and assignment organization from the first semester: "I liked PebblePad and all of the functions, using it from semester one is imperative as it allows for self-reflection and is a way to store all your work and reflect on assignments as you do them" (Alumni 1).

One participant suggested that an initial overview of PebblePad's benefits at the start of the course would be helpful: "I didn't understand the value … of PebblePad at the beginning - would be really handy if you had like somebody that has just qualified come in and talk about PebblePad and how important it is" (Student 5).

Students reinforced the value of scaffolding the technology platform through the curriculum by stating that the technology was hard to learn, but once familiar with it, they found it easier: "I continued to use a word template and would copy and paste the text into the electronic workbook textbox" (Student 6).

The importance of embedding the technology throughout the curriculum was further highlighted by a student's preference for electronic over hand-written medical records during clinical practice: "I've been working with both handwritten and electronic medical records and much, much, much prefer electronic" (Student 5).

Students also recognized the value of repeated assignments, such as patient logs and health assessments, in the workbooks for reflective practice. One student commented on the visible progression throughout these logs: "making sure that we're seeing enough patients throughout the semester, you can actually see that you're making progression towards your end goal" (Student 3).

Theme 2: Benefits of ensuring adequate instructional support

The students initially felt the instructional support was inadequate. However, improvements were noted in the second iteration of the workbook with clearer instructions on assessment requirements and communication with clinical mentors. One student requested further user-friendly instructional videos, while more assistance from the unit coordinator was required by another respondent. Two students highlighted that mentors found providing feedback within the workbooks difficult stating they would prefer paper-based documents. Another student raised concerns about privacy, especially in the reflective accounts, and requested that mentors should not have access to any information within the workbook, other than essential elements. Conversely, another student said, allowing mentors to see all clinical assessments was not an issue: "For me it keeps you honest with what you're documenting with your patients and what patients you're seeing" (Student 7). Another student commented: "I think it's good because it meant that [clinical mentor] can see and ask me questions based on what patients were entered into the workbook" (Student 6).

Students identified that reflective accounts should be recorded separately, and this change was made in the third workbook iteration, with only the university academic staff having access to a separate reflection workbook.

> I didn't write anything that was very personal or anything like that, but I think if other students had done a reflection on something negative that happened during PRAC [WIL] …. that the mentor might have read that or something. (Student 2)

For the question 'Do you feel the accessibility and usability of the online workbook for both students and clinical mentors has improved with the additional support resources (information/support/demonstration tip sheets) provided by the university?', one student considered there was an improvement and stated: "I didn't have help [clinical mentors name] at all. He said he has a tip sheet and was able to access and complete [his] mentor sign off" and "the new videos created were also helpful" (Student 4). Another student said: "I have the video playing on one screen with what I'm doing open on the other" (Student 6).

In terms of improving the communication between university staff and clinical mentors, one student responded that: "I had two GPs an ED consultant and Pediatrician, and all were able to access and sign off the hours. The emailed instructions seemed sufficient, and they would ask me if they had further questions" (Student 3).

Theme 3: Workbooks were designed authentically to build employability skills

The student alumni who attended the focus groups reported using the skills and templates provided through the workbook in their current NP role: "I use the … full history assessment template in my current job all the time" (Alumni 1).

Students felt the workbook guided them through the health assessment documentation and keeping them on track for the tasks to be completed: "Once you got into it, it's actually not that hard, but it's so overwhelming when you start" (Student 2).

The workbooks were noted to be helpful in guiding students through health assessment documentation and keeping them on track with tasks. The inclusion of specific text boxes for history and physical assessment documentation in the second iteration was particularly beneficial. These text boxes helped students during patient history taking and served almost as entries in an electronic medical record, reinforcing the development of digital literacy skills. The patient log entries, completed to ensure students had adequate patient encounters to meet clinical practice requirements for the course, was a helpful feature to complete the required assessment item.

General feedback from the students was that the second iteration of the workbook was positive, with students noting improvements in the workbook's format, structure, and user friendliness:

> …better in terms of format and accessing the different sort of workbook things. I just remember there being tabs and then you go into them, especially when you did the reflections…[and]… it definitely was improved from the first semester, from memory, it was a lot more user-friendly, a lot more structured. (Alumni 1)

DISCUSSION

The study aimed to explore NP students' experience of the usability, utility, and accessibility of an interactive online workbook during WIL. This study is the first to our knowledge to report on the development, implementation, and student experience of an interactive digital clinical workbook for NP students. The combined findings suggest the embedded digital clinical workbook was well-received. Most students found the workbook easy to access via the digital ePortfolio platform and considered there was sufficient resource support for their use of the workbook. The online clinical workbook increased students' perceptions of successfully completing their assessment tasks, required hours and number of patients seen while completing WIL. There was the added benefit that the use of the digital clinical workbook increased students' digital literacy and employability skills. Similar findings were reported for midwifery (Gray et al., 2019) and dietetics (Bramley et al., 2021) on students' use of ePortfolios.

Digital health technologies are increasing in healthcare (Perakslis & Stanley, 2021) and the findings of this study support embedding technology within the curriculum to enhance NPs' digital skills contributes to positive learning outcomes; a finding also supported by Strampel et al. (2017). This assessment strategy aligns with the WIL and clinical practice "Expanded authenticity - proximity framework" described by Kaider et al. (2017, p. 158). The interactive digital clinical workbook provides authenticity because students are producing artefacts (e.g., clinical documentation, patient logs and reflections) they will encounter as future NPs. The element of proximity is demonstrated by the students' learning occurring in the clinical environment with industry practitioners acting as mentors/assessors (Kaider et al., 2017). The utility of the digital clinical workbook for formative and summative assessments aligns with the AACN (2021) *Essentials framework for competency-based education*,

potentially providing an authentic assessment platform for other NP programs and meeting ANMAC (2015) accreditation standards.

There is extensive research on clinical assessment in undergraduate nursing and other disciplines (Dean & Levis, 2106; McCarthy & Murphy, 2008; Redwood et al., 2010), yet research specifically related to NP clinical assessment in Australia is scant. The complexity of assessing competence of NP students renders assessment challenging, (Drayton et al., 2016), as is securing experienced clinical mentors for students when undertaking WIL (Hinch et al., 2005). Problem-based and inquiry-based learning underpins the use of such clinical workbooks, which potentially offers a solution to some of the challenges identified in clinical practice assessments (Abrams, 2015; Barrow et al., 2002).

The whole-of-course assessment approach used to design the workbook was authentic and relevant to the students' clinical setting, with some students reporting the continued use of workbook artefacts after completion of the course, within their current NP role. The workbook was offered in both NP clinical practice subjects which provided an opportunity for constructive alignment of learning outcomes and assessment items (Ruge et al., 2019). Most students deemed the progressive completion of the digital clinical workbook assisted in the enhancement of their employability and digital literacy skills and therefore, perceived they would be more employable as a novice NP. These findings are consistent with research by Posey and Pintz (2017), who found blended learning (face-to-face and online) enhanced learning for undergraduate nursing students. Many of the NP students stated that completing the assigned practice assessment items within the online platform was easier and more streamlined than completing an unwieldy paper-based document. This contrasts with much earlier findings reported by Garrett et al. (2013) where nursing and medical students complained of poor connectivity, unsaved clinical documentation and a disrupted learning experience while using a personal digital assistant (PDA) to document reflections and access resources. The contrast in these findings potentially reflects the evolution and improvement in the technology of digital devices, Wi-Fi and internet connectivity, cellular network access, and the more highly developed digital literacy of today's students.

STRENGTHS AND LIMITATIONS

A limitation of the study was the small sample size, but many NP programs in Australia at present have small numbers of students because of the rigorous entry requirements and fewer employment opportunities. We would however argue that even though this study has a small sample size, this work contributed to knowledge within the Australian context and can be applied to other countries attempting to develop the NP role. The digital clinical workbook was implemented and tested using only the institution's official digital ePortfolio platform and there may be potential bias in the reported outcomes given the authors designed the work and students were providing feedback to their course coordinator via the survey and focus groups. A strength of the study is that it is unique in Australia, and possibly internationally, providing an evaluation of an interactive digital clinical workbook for NP students. A further identified strength is that the digital clinical workbook is contextualized to the specific accreditation requirements of Australia (ANMAC, 2015). The findings also support those of other studies relating to clinical practice assessments and the value added to the students' learning experience and graduate capabilities (Bramley et al., 2021; Gray et al., 2019).

CONCLUSION

The integration of an online platform to facilitate NP WIL assessments offers an authentic way to capture and integrate digital literacy to meet the needs of the evolving NP student population. This

was the pedagogical approach taken in the development and refinement of the interactive digital clinical workbook to further enhance students' employability and digital literacy skills. As the integration of such clinical workbooks in NP WIL was a poorly explored area, the findings from this study offer an important insight into the value of such technological platforms.

REFERENCES

Abraham, C. M., Norful, A. A., Stone, P. W., & Poghosyan, L. (2019). Cost-effectiveness of advanced practice nurses compared to physician-led care for chronic diseases: A systematic review. *Nursing Economics, 37*(6), 293-305.

Abrams, S. S. (2015). Digital resources, reflexive pedagogy, and empowered learning. In B. Cope & M. Kalantzis (Eds.), *A pedagogy of multiliteracies: Learning by design* (pp. 37-48). Palgrave Macmillan. https://doi.org/10.1057/9781137539724_2

American Association of Colleges of Nursing. (2021). *The essentials: Core competencies for professional nursing education*. https://www.aacnnursing.org/Portals/0/PDFs/Publications/Essentials-2021.pdf

Anderson, D. J., Gardner, G., Ramsbotham, J., & Tones, M. (2009). E-Portfolios: Developing nurse practitioner competence and capability. *Australian Journal of Advanced Nursing, 26*(4), 70-76.

Australian Government Department of Health and Aged Care. (2024). *Nurse practitioner workforce plan*. https://www.health.gov.au/our-work/nurse-practitioner-workforce-plan

Australian Nursing and Midwifery Accreditation Council. (2015). *Nurse Practitioner Accreditation Standards*. https://www.anmac.org.au/standards-and-review

Barrow, E. J., Lyte, G., & Butterworth, T. (2002). An evaluation of problem-based learning in a nursing theory and practice module. *Nurse Education in Practice*, *2*(1), 55-62. https://doi.org/10.1054/nepr.2002.0056

Bramley, A., Forsyth, A., & McKenna, L. (2021). Design, implementation, and evaluation of a novel work-based clinical assessment tool: An e-portfolio with embedded entrustable professional activities. *Nurse Education Today, 107*, Article 105101. https://doi.org/10.1016/j.nedt.2021.105101

Braun, V., & Clarke, V. (2022). *Thematic analysis: A practical guide.* SAGE.

Chang, C.-P., Lee, T.-T., Mills, M. E., & Hsieh, Y.-P. (2019). E-portfolio functional requirements for the final semester baccalaureate practicum course: A qualitative research study. *Journal of Professional Nursing, 35*(5), 405-411. https://doi.org/10.1016/j.profnurs.2019.04.004

Ciesielkiewicz, M. (2019). The use of e-portfolios in higher education: From the students' perspective. *Issues in Educational Research, 29*(3), 649-667.

Creswell, J. W., & Creswell, J. D. (2018). *Research design: Qualitative, quantitative, and mixed methods approaches* (5th ed.). SAGE Publications.

Cullen, D., Stiffler, D., Settles, J., & Pesut, D. J. (2010). A database for nurse practitioner clinical education. *Computers, Informatics, Nursing, 28*(1), 20-29. https://doi.org/10.1097/NCN.0b013e3181c04915

Dean, M., & Levis, A. (2016). Does the use of a university lecturer as a visiting tutor support learning and assessment during physiotherapy students' clinical placements? A survey of higher education institution providers. *Physiotherapy, 102*(4), 365-370. https://doi.org/10.1016/j.physio.2015.08.010

Drayton-Brooks, S. M., Gray, P. A., Turner, N. P., & Newland, J. A. (2017). Building clinical education training capacity in nurse practitioner programs. *Journal of Professional Nursing, 33*(6), 422-428. https://doi.org/10.1016/j.profnurs.2017.05.001

Fetters, M. D., Curry, L. A., & Creswell, J. W. (2013). Achieving integration in mixed methods designs: Principles and practices. *Health Services Research, 48*(6pt 2), 2134-2156. https://doi.org/10.1111/1475-6773.12117

Garrett, B. M., MacPhee, M., & Jackson, C. (2013). Evaluation of an eportfolio for the assessment of clinical competence in a baccalaureate nursing program. *Nurse Education Today, 33*(10), 1207-1213. https://doi.org/10.1016/j.nedt.2012.06.015

Gray, M., Downer, T., & Capper, T. (2019). Australian midwifery students' perceptions of the benefits and challenges associated with completing a portfolio of evidence for initial registration: Paper based and ePortfolios. *Nurse Education in Practice, 39*, 37-44. https://doi.org/10.1016/j.nepr.2019.07.003

Green, J., Wyllie, A., & Jackson, D. (2014). Electronic portfolios in nursing education: A review of the literature. *Nurse Education in Practice, 14*(1), 4-8. https://doi.org/10.1016/j.nepr.2013.08.011

Hinch, B. K., Murphy, M., & Lauer, M. K. (2005). Preparing students for evolving nurse practitioner roles in health care. *MEDSURG Nursing, 14*(4), 240.

Htay, M., & Whitehead, D. (2021). The effectiveness of the role of advanced nurse practitioners compared to physician-led or usual care: A systematic review. *International Journal of Nursing Studies Advances, 3*, Article 100034. https://doi.org/10.1016/j.ijnsa.2021.100034

Janssens, O., Haerens, L., Valcke, M., Beeckman, D., Pype, P., & Embo, M. (2022). The role of ePortfolios in supporting learning in eight healthcare disciplines: A scoping review. *Nurse Education in Practice, 63*, Article 103418. https://doi.org/10.1016/j.nepr.2022.103418

Kaider, F., Hains-Wesson, R., & Young, K. (2017). Practical typology of authentic work-integrated learning activities and assessments. *Asia Pacific Journal of Cooperative Education*, *18*(2), 153-165.

Kaminski, J. (2020). The promise of PebblePad for dynamic learning. *Canadian Journal of Nursing Informatics, 15*(3). http://cjni.net/journal/?p=8097

Kavanagh, J. M., & Sharpnack, P. A. (2021). Crisis in competency: A defining moment in nursing education. *OJIN: The Online Journal of Issues in Nursing, 26*(1). https://doi.org/10.3912/OJIN.Vol26No01Man02

Lincoln, Y., & Guber, E. (1985). *Naturalistic inquiry.* SAGE Publications.

Lokmic-Tomkins, Z., Choo, D., Foley, P., Dix, S., Wong, P., & Brand, G. (2022). Pre-registration nursing students' perceptions of their baseline digital literacy and what it means for education: A prospective cohort survey study. *Nurse Education Today, 111*, Article 105308. https://doi.org/10.1016/j.nedt.2022.105308

McCarthy, B., & Murphy, S. (2008). Assessing undergraduate nursing students in clinical practice: Do preceptors use assessment strategies? *Nurse Education Today, 28*(3), 301-313. https://doi.org/10.1016/j.nedt.2007.06.002

National Task Force on Quality Nurse Practitioner Education. (2016). *Criteria for evaluation of nurse practitioner programs* (5th ed.). American Association of Colleges of Nursing, National Organization of Nurse Practitioner Faculties. https://cdn.ymaws.com/www.nonpf.org/resource/resmgr/ntfstandards/ntf_evalcriteria2016final.pdf

Nursing and Midwifery Board of Australia. (2021). *Nurse practitioner standards for practice.* https://www.nursingmidwiferyboard.gov.au/Codes-Guidelines-Statements/Professional-standards/nurse-practitioner-standards-of-practice.aspx

Perakslis, E., & Stanley, M. (2021). The evolution of digital technologies in health care. In E. D. Perakslis, M. Stanley, & E. Brodwin (Eds.), *Digital health: Understanding the benefit-risk patient-provider framework* (pp. 49-63). Oxford University Press. https://doi.org/10.1093/oso/9780197503133.003.0004

Poghosyan, L., Norful, A. A., Liu, J., & Friedberg, M. W. (2018). Nurse practitioner practice environments in primary care and quality of care for chronic diseases. *Medical Care, 56*(9), 791-797. https://doi.org/10.1097/MLR.0000000000000961

Posey, L., & Pintz, C. (2017). Transitioning a bachelor of science in nursing program to blended learning: Successes, challenges, & outcomes. *Nurse Education in Practice, 26*, 126-133. https://doi.org/10.1016/j.nepr.2016.09.006

Redwood, C., Winning, T., Lekkas, D., & Townsend, G. (2010). Improving clinical assessment: Evaluating students' ability to identify and apply clinical criteria in dental education. *European Journal of Dental Education, 14*(3), 136-144. https://doi.org/10.1111/j.1600-0579.2009.00598.x

Ruge, G., Tokede, O., & Tivendale, L. (2019). Implementing constructive alignment in higher education: Cross-institutional perspectives from Australia. *Higher Education Research & Development*, *38*(4), 833-848. https://doi.org/10.1080/07294360.2019.1586842

Strampel, K., Sibson, R., & Main, S. (2017). Professional development to support the embedding of ePortfolios in higher education programs. In J. Rowley (Ed.), *ePortfolios in Australian universities* (pp. 33-46). Springer. https://doi.org/10.1007/978-981-10-1732-2_3

Wassef, M. E., Riza, L., Maciag, T., Worden, C., & Delaney, A. (2012). Implementing a competency-based electronic portfolio in a graduate nursing program. *Computers Informatics Nursing 30*(5), 242-248 https://doi.org/10.1097/NXN.0b013e31824af6d4

International Journal of Work-Integrated Learning
ISSN: 2538-1032
www.ijwil.org

About the Journal

The International Journal of Work-Integrated Learning (IJWIL) publishes double-blind peer-reviewed original research and topical issues related to Work-Integrated Learning (WIL). IJWIL first published in 2000 under the name of Asia-Pacific Journal of Cooperative Education (APJCE).

In this Journal, WIL is defined as:

> *An educational approach involving three parties – the student, educational institution, and an external stakeholder – consisting of authentic work-focused experiences as an intentional component of the curriculum. Students learn through active engagement in purposeful work tasks, which enable the integration of theory with meaningful practice that is relevant to the students' discipline of study and/or professional development* (Zegwaard et al., 2023, p. 38*).

Examples of practice include off-campus workplace immersion activities such as work placements, internships, practicum, service learning, and cooperative education (co-op), and on-campus activities such as work-related projects/competitions, entrepreneurships, student-led enterprise, student consultancies, etc. WIL is related to, and overlaps with, the fields of experiential learning, work-based learning, and vocational education and training.

The Journal's aim is to enable specialists working in WIL to disseminate research findings and share knowledge to the benefit of institutions, students, WIL practitioners, curricular designers, and researchers. The Journal encourages quality research and explorative critical discussion that leads to the advancement of quality practices, development of further understanding of WIL, and promote further research.

The Journal is financially supported by the Work-Integrated Learning New Zealand (WILNZ; www.wilnz.nz), and the University of Waikato, New Zealand.

Types of Manuscripts Sought by the Journal

Types of manuscripts sought by IJWIL is primarily in two forms: 1) *research publications* describing research into aspects of work-integrated learning and, 2) *topical discussion* articles that review relevant literature and provide critical explorative discussion around a topical issue. The journal will, on occasions, consider good practice submissions.

Research publications should contain; an introduction that describes relevant literature and sets the context of the inquiry. A detailed description and justification for the methodology employed. A description of the research findings - tabulated as appropriate, a discussion of the importance of the findings including their significance to current established literature, implications for practitioners and researchers, whilst remaining mindful of the limitations of the data, and a conclusion preferably including suggestions for further research.

Topical discussion articles should contain a clear statement of the topic or issue under discussion, reference to relevant literature, critical and scholarly discussion on the importance of the issues, critical insights to how to advance the issue further, and implications for other researchers and practitioners.

Good practice and program description papers. On occasions, the Journal seeks manuscripts describing a practice of WIL as an example of good practice, however, only if it presents a particularly unique or innovative practice or it was situated in an unusual context. There must be a clear contribution of new knowledge to the established literature. Manuscripts describing what is essentially 'typical', 'common' or 'known' practices will be encouraged to rewrite the focus of the manuscript to a significant educational issue or will be encouraged to publish their work via another avenue that seeks such content.

By negotiation with the Editor-in-Chief, the Journal also accepts a small number of *Book Reviews* of relevant and recently published books.

Reference
Zegwaard, K. E., Pretti, T. J., Rowe, A. D., & Ferns, S. J. (2023). Defining work-integrated learning. In K. E. Zegwaard & T. J. Pretti (Eds.), *The Routledge international handbook of work-integrated learning* (3rd ed., pp. 29-48). Routledge. https://doi.org/10.4324/9781003156420-4

International Journal of Work-Integrated Learning
ISSN: 2538-1032
www.ijwil.org

Publisher: Work-Integrated Learning New Zealand (WILNZ)
www.wilnz.nz