Nurse Education in Practice 41 (2019) 102650

Contents lists available at ScienceDirect

Nurse Education in Practice

journal homepage: www.elsevier.com/locate/nepr

Original research

Reframing evidence-based practice curricula to facilitate engagement in nursing students

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ARTICLE INFO

Keywords:
Nursing
Nurse education
Research
Evidence-based practice
Clinical translation

ABSTRACT

Evidence-based practice underscores a modern approach to nursing to ensure delivery of safe, up-to-date and person-centred care in the evolving clinical environment. While most entry-to-practice nursing courses incorporate elements of evidence-based research curricula, nursing students commonly struggle to see the relevance of research in their training. This study sought to understand nursing students' satisfaction and perspectives on research after an undergraduate research subject was redesigned to make overt the connection between research and professional nursing practice. Satisfaction significantly improved on routinely collected satisfaction surveys over a one-year period (mean increase 0.57, 95% CI 0.40–0.77, $P < 0.001$; medium effect size, 0.64). Open-ended questions elicited five themes: change to preconceived ideas of research to something accessible and useful; clear link between research and clinical and professional nursing practice; comments on subject format and scaffolded learning; increased skills in effective searching and extracting evidence; and improvements for the future. Student satisfaction increased when the connection between research learning and professional practice was made overt in a core research subject. This approach, along with scaffolded activities to increase confidence, had a marked positive impact on student's attitude and understanding of the utility of evidence-based practice and confidence in scrutinising practice in the clinical environment.

1. Background

Evidence-based practice (EBP) was originally defined be Sacket and colleagues as the 'explicit and conscientious attempts to find the best available research evidence to assist health professional to make the best decisions for their patients' (Sackett et al., 1996, p. 71). Since this original definition, the definition of EBP has been broadened to include healthcare provider's life-long commitment that integrates individual clinical expertise with the best available evidence that incorporates clients and patients' preferences and values (Hoffman et al., 2017). EBP is the pinnacle of nursing practice to deliver high quality and safe patient-centred care and empowers nurses as clinicians to actively contribute and in some situations lead clinical-decision making discussion as part of the inter-professional team (Hoffman et al., 2017). As such, dedicated EBP curricula or nursing research courses are now embedded in entry-to-practice programs and an accreditation requirement by professional nursing bodies (Commission on Collegiate Nursing Education, 2013; Australia Nursing & Midwifery Accreditation Council [ANMAC], 2012).

Despite EBP being embedded throughout nursing curricula and novice nurses acknowledging that EBP is pivotal to improve patients' health outcomes (Mackey and Bassendowski, 2017), several international studies highlight the issue that graduate nurses have limited understanding and appreciation of EBP to inform their clinical practice (Rojjanasrirat and Rice, 2017; Jackson, 2016; Saunders et al., 2016; DeBruyn et al., 2014). Commonly cited student-related barriers for engagement with EBP include: lack of recognition of nursing as an autonomous profession (DeBruyn et al., 2014); perceived limited availability and utility of nursing evidence (DeBruyn et al., 2014); a lack of knowledge regarding relevant and current research findings (Doran et al., 2010); and understanding the steps of EBP (Hoffman et al., 2017). Anecdotally, many entry-to-practice students may perceive the step of critical appraisal (including interpretation of study results) as one of the biggest obstacles to overcome when considering implementing evidence into practice. Historically, nursing 'best practice' has been conveyed via generational transfer of knowledge-to-practice through direct observation, role-modelling and nurses' own

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https://doi.org/10.1016/j.nepr.2019.102650
Received 15 August 2017; Received in revised form 23 August 2019; Accepted 23 October 2019

experiences lending itself to a professional based on 'tradition' versus research-based findings (O'Connell et al., 2017). Not only does failure to link research and practice continue among entry-to-practice and graduate nurses (Rojjanasrirat and Rice, 2017), but is also the reason for graduate nurses or more experienced nurses not to seek and engage in quality improvement projects, higher degree research qualifications, and become independent nurse researchers (Bianchi et al., 2018).

In Australia, higher education sectors providing entry-to-practice Registered Nurse degree programs are required to incorporate evidence-based research subjects into their nursing curricula as an accreditation requirement (ANMAC, 2012). ANMAC require higher education providers to instil students with the desire and capacity to continue to use, and learn from, emerging research throughout their careers; provide a program of study that is congruent with contemporary and evidence-based approaches to professional nursing practice and education; and provide a program that centrally focuses on knowledge and skills that are evidence based, applied across the human lifespan and incorporate national and regional health priorities, health research, health policy and reform (ANMAC, 2012). However, while Australian Registered Nurse entry-to-practice programs incorporate EBP curricula into their courses and have dedicated nursing research subjects, there are variations in course content and structure, skills focus, and assessment of competency (Malik et al., 2016).

While there are different pedagogical approaches to EBP in teaching and learning, innovative approaches aiming to facilitate student engagement, teamwork and clinical relevance have been described (DeBruyn et al., 2014). Recently, Horntvedt and colleagues conducted a thematic review with the aim of identifying teaching strategies for EBP currently used in nursing education (Horntvedt et al., 2018). From seven studies four main themes were identified, including: interactive teaching sessions (i.e., research utilisation, information literacy and assignments as learning activities); interactive and clinically integrated teaching strategies (i.e., teaching EBP principles and clinical integration and collaborations); learning outcomes (i.e., enhancing analytical skills and changing attitudes toward research utilisation) and finally, barriers (i.e., information literacy knowledge and skills and challenging collaboration) (Horntvedt et al., 2018).

As Horntvedt et al. identified, there is a paucity of literature measuring the effectiveness of teaching strategies in EBP in nursing education (2018). Understanding how to increase understanding of EBP at entry-to-practice level is crucial to high quality person-centred care delivery and the ability of nurses to influence healthcare change as future leaders in healthcare. As such, this study sought to understand nursing students' satisfaction and perspectives on research after an undergraduate research subject was redesigned to make overt the connection between research and professional nursing practice. This understanding will inform how to effectively deliver EBP curricula in entry-to-practice nursing programs.

2. Methods

2.1. Study design, setting and participants

This retrospective observational study used both quantitative and qualitative methods to measure nursing students' satisfaction and perspectives on EBP curricula as taught within a core research subject within a Bachelor of Nursing program. The study was conducted at a large Australian University in 2014 to evaluate the redesign of this core research subject delivered within the University's Bachelor of Nursing (BN) program in 2013, in comparison with the previous delivery in 2012. The study included a convenience sample of students enrolled into in the subject who completed the student satisfaction survey at the completion of the academic year (2013, n = 247; 2012 n = 179). The cohort included students enrolled into the three-year BN program (i.e., school leavers and international students) or students enrolled into the two-year accelerated program (i.e., nurses with a Diploma of Nursing, or international students registered as a nurse overseas).

2.2. Research subject curriculum redesign

The core research subject was delivered over a full semester of study (12 weeks) within a three-year BN program. Subject activities included traditional face-to-face lectures and tutorials blended with online interactive activities and online discussions. Students attended five face-to-face days interspersed throughout the semester, including face-to-face lectures and tutorials. The remaining seven weeks were delivered in an interactive and blended online environment including online lectures, interactive online activities, quizzes and developmental exercises including data base searching training modules run by the university's library.

The research subject was targeted for redesign following a sustained period of suboptimal 'Student Satisfaction Survey' (SSS) results, with the subject falling significantly below the School of Health's average SSS scores in the years leading up to the redesign (mean difference -0.42, 95% CI -0.57 to -0.37, $P < 0.001$). Consequently, substantial efforts were made to redesign the subject's content and pedagogical approach to ensure EBP curricula were taught in an interactive, integrated and clinically relevant and meaningful way. In the new redesign, the aim was to shift the focus onto the clinical nursing context behind the theoretical research learning and to illustrate the relevance of findings to clinical practice through critical appraisal and interpretation of research data. Through facilitated group work students were required to breakdown large or vague clinical problems into specific searchable research questions overs a series of sequential learning experiences. For example, to cultivate a spirit of inquiry – the first step of EBP (Hoffman et al., 2017), students were asked to identify a clinical problem, such as '*How can we improve the health of Indigenous Australians?*, and facilitated to refine this large clinical issue into a more specific and searchable clinical question '*In Australians of Indigenous background, do smoking cessation interventions, compared to usual care, reduce smoking rates?'*. Utilising the steps of EBP, critical appraisal was further developed in tutorials where students were provided each week with a set of different methodological studies, on a chosen topic, and asked to decipher and scrutinise how best to answer the related clinical question and what practices were indeed supported by the presented evidence.

Furthermore, formative assessments were introduced to provide early, timely, low-stake feedback to build students' knowledge, skill and confidence before submitting larger summative assessments. For example, students were asked to develop and submit a search strategy in week three of the program, for 10% of the overall subject mark, and were then given the opportunity to resubmit this search strategy as part of a larger assessment once they had received individual feedback – this scaffolded assessment approach sought to build confidence and provide early and timely feedback. Teaching academics were directed to engage through a contextual experience with a strong focus on clinical nursing experience, to foster student engagement and appreciation of research as relevant to their clinical practice and future roles (Malik et al., 2016).

2.3. Student satisfaction surveys

The SSS were administered centrally within the university at the end of each teaching semester and contained nine standardised ordinal questions and two open-ended questions (Table 1). Ordinal questions utilised a five-point Likert scale ranging from 1 = 'strongly disagree' to 5 = 'strongly agree'. Six ordinal questions related to the subject delivery, including satisfaction that the subject was delivered consistent with the stated learning objectives; experiences were interesting and provoking; assessments were fair and reasonable; appropriate resources were available; constructive feedback was given when needed; and overall satisfaction with the subject. Three ordinal questions related to their experience with their tutorial teacher, in that they were satisfied that their teacher: appeared well prepared and organised; able to explain concepts clearly; and their overall satisfaction with the teaching

Table 1
Change in student satisfaction scores (SSS) in an entry-to-practice core research subject research subject.

SSS questions	2012 scores N = 247	2013 scores N = 179			
	Mean (SD)	Mean (SD)	Mean difference	95% CI	Effect size
Q.1 The subject was delivered in a way which was consistent with its stated objectives	3.64 (0.93)	4.33 (0.69)	0.69*	0.53–0.85	0.84
Q.2 My learning experience in this subject were interesting and thought provoking	3.20 (1.17)	3.91 (1.01)	0.71*	0.50–0.92	0.65
Q.3 I found the assessment fair and reasonable	3.60 (1.02)	4.00 (0.93)	0.40*	0.21–0.59	0.40
Q.4 There were appropriate resources available to support the subject	3.71 (0.95)	4.17 (0.80)	0.46*	0.29–0.63	0.52
Q.5 I received constructive feedback when needed	3.57 (0.96)	4.09 (0.95)	0.52*	0.33–0.71	0.54
Q.6 Overall, I am satisfied with the quality of this subject	3.32 (1.12)	4.02 (0.93)	0.70*	0.50–0.90	0.68
Q.7 The teacher appears to be well prepared and presents the material in a well organised manner	3.99 (0.82)	4.53 (0.67)	0.54*	0.39–0.69	0.72
Q.8 The teacher is able to explain concepts clearly	3.88 (0.88)	4.45 (0.80)	0.57*	0.40–0.74	0.68
Q.9 Overall, I am satisfied with the teaching of this staff member	3.89 (0.86)	4.46 (0.74)	0.57*	0.41–0.73	0.71
Total average:	**3.64 (0.97)**	**4.22 (0.84)**	**0.57***	**0.40–0.77**	**0.64**

*$P < 0.001$.
Measured on a five-point scale from 1 = Strongly Disagree to 5 = Strongly Agree).

staff member. The further two open-ended questions explored: 'What did you like about this subject?'; and 'What improvements could be made?'.

2.4. Data sources and benchmarking

Students were invited, as per standard practice, to complete the SSS at the end of the teaching period in 2012 and 2013. All responses were voluntary and anonymous and data analyses were completed after the subject's results were finalised and conferred. Subject SSS scores were also compared with School of Health average scores to benchmark this subject within the overall academic program.

Subject Performance Ratings were also used to benchmark the subject of interest against key performance indicators as outlined by the Australian Technology Network of Universities (ATNU), a network of four universities across Australia (ATNU, n.d.). Subject Performance Ratings are based on the following factors: student load; pass rate; distribution of grades; timetabled hours; and SSS results. Subject ratings are reported as a variance from a target of 0.00 with a score between 1.00 and −1.00 considered acceptable variance in rating scores.

2.5. Statistical analysis

The core research subject's SSS scores from 2012 to 2013, and School of Health average scores, were entered into Microsoft Excel and checked by two independent study investigators. Data were analysed using SPSS version 20. Ordinal student responses were analysed using descriptive statistics including, frequencies and percentages (%); mean and standard deviation (SD); and 95% confidence intervals (CI). Comparisons were made between 2012 (pre-subject redesign) and 2013 (post-subject redesign) (Table 1), and School of Health SSS results for the associated semester (Table 2), and compared SSS mean score differences and effect size (*d*) for each question and overall survey average scores. Effect size (d) was categorised as: very small (0.01); small (0.20); medium (0.50); large (0.80); very large (1.20); and huge (2.0) (Sawilowsky, 2009). Independent Student *t*-tests were undertaken to compare mean SSS scores between the core research subject offered in 2012 and in 2013 as well as the School of Health's average SSS scores. A significant difference of a probability (*P*) less than or equal to 0.05 was deemed statistically significant (Fletcher et al., 2014).

Open-ended questions were analysed using thematic analysis, with initial line by line coding completed by two independent investigators prior to these being condensed into descriptive themes, and then analytical themes regarding student perspectives on 'subject experience' and applicability of EBP to their nursing education and professional practice. Coding and analytical themes were then presented to the study's investigation team for discussion and confirmation (Thomas and Harden, 2008).

Ethics approval

This was a low-risk study and ethics approval was granted by the university's Human Research Ethics Committee.

3. Results

3.1. Student satisfaction surveys (SSS)

In 2012, prior to the research subject's redesign, a total of 604 were enrolled into the subject and of which, 247 (40.9%) responded to the SSS. In 2013, post redesign of the subject's curriculum, 523 students were enrolled into the subject with a SSS response rate of 179 (34.2%). As summarised in Table 1, satisfaction across all nine survey responses significantly improved in 2013 when compared to 2012 with an overall average satisfaction of 4.22 out of 5.00 in 2013 compared to 3.64 out of 5.00 in 2012 ($P < 0.001$) with a medium effect size observed from 2012 to 2013.

In 2012, all nine SSS questions prior to the research subject's redesign were significantly below other subjects offered within the School of Health as outlined in Table 2, with the total average SSS for the research subject significantly below the total average for the School's ($P < 0.001$). Following the redesign in 2013, however, all nine SSS questions were in line with the rest of the School's averages with four questions (questions 1, 7, 8 and 9) found to be significantly above the program's average scores ($P = 0.005$, < 0.001, 0.005, < 0.001 respectively) and the five remaining scores on parity with the School's averages with no significant differences observed, indicating a significant improvement in performance overall.

As seen in Table 1, the three most poorly performed SSS items in 2012 were question 2, 5 and 6. Question 2 related to whether the subject experience was 'interesting and thought provoking', this question showed a significant improvement from 3.2 to 3.9 ($P < 0.001$) and also showed the most improvement across the items in 2013 increasing by 0.71 mean difference, with a medium effect size. While Question 2 for this subject had also been significantly lower the School of Health's average for that question in 2012 ($P < 0.001$) (Table 2), by 2013 this question was now in line with other subjects delivered across the school ($p = 0.291$). Question 6, referring to the 'overall quality of the subject', was scored second lowest in 2012, but significantly improved from 3.3 out of 5 in 2012 to just over 4.0 in 2013 ($P < 0.001$) with a medium effect size. As with Question 2, the question also improved from significantly lower than the School's average in 2012

Table 2
Comparison of student satisfaction scores (SSS) in an entry-to-practice core research subject and the School of Health.

SSS questions	Research subject's 2012 scores n/N = 247/604 (40.9%)	School of Health (2012) scores n/N = 7574/3768 (49.8%)				Research subject's 2013 scores n/N = 179/523 (34.2%)	School of Health (2013) scores n/N = 2698/7769 (34.7%)			
	Mean (SD)	Mean (SD)	Mean difference	95% CI	Effect size	Mean (SD)	Mean (SD)	Mean difference	95% CI	Effect size
Q.1 The subject was delivered in a way which was consistent with its stated objectives	3.64 (0.93)	4.11 (0.77)	−0.47*	−0.57–−0.37	0.55	4.33 (0.69)	4.16 (0.78)	0.17*	0.05–0.29	0.23
Q.2 My learning experience in this subject were interesting and thought provoking	3.20 (1.17)	3.97 (0.94)	−0.77*	−0.89– −0.65	0.73	3.91 (1.01)	3.99 (0.98)	−0.08	−0.23–0.07	0.08
Q.3 I found the assessment fair and reasonable	3.60 (1.02)	3.91 (0.96)	−0.31*	−0.43–−0.19	0.31	4.00 (0.93)	3.93 (0.99)	0.07	−0.08–0.22	0.07
Q.4 There were appropriate resources available to support the subject	3.71 (0.95)	4.00 (0.87)	−0.29*	−0.40–−0.18	0.32	4.17 (0.80)	4.08 (0.84)	0.09	−0.04–0.22	0.11
Q.5 I received constructive feedback when needed	3.57 (0.95)	3.88 (0.95)	−0.31*	−0.43–−0.19	0.32	4.09 (0.95)	3.95 (0.95)	0.14	−0.00– 0.28	0.15
Q.6 Overall, I am satisfied with the quality of this subject	3.32 (1.12)	3.91 (0.96)	−0.59*	−0.75–−0.46	0.57	4.02 (0.95)	3.95 (0.97)	0.07	−0.008–0.22	0.07
Q.7 The teacher appears to be well prepared and presents the material in a well organised manner.	3.99 (0.82)	4.29 (0.83)	−0.30*	−0.41–−0.19	0.36	4.53 (0.67)	4.31 (0.80)	0.22*	1.10–0.34	0.30
Q.8 The teacher is able to explain concepts clearly	3.88 (0.88)	4.25 (0.85)	−0.37*	−0.48–−0.26	0.43	4.45 (0.80)	4.27 (0.83)	0.18*	0.05–0.31	0.22
Q.9 Overall, I am satisfied with the teaching of this staff member	3.89 (0.86)	4.23 (0.88)	−0.34*	−0.46–−0.22	0.39	4.46 (0.74)	4.23 (0.87)	0.23*	0.10–0.36	0.28
Total average:	**3.64 (0.97)**	**4.06 (0.89)**	**−0.42***	**−0.46—0.22**	**0.39**	**4.22 (0.84)**	**4.10 (0.89)**	**0.12**	**- 0.01–0.25**	**0.14**

*$P < 0.001$ Measured on a five-point scale from 1 = Strongly Disagree to 5 = Strongly Agree).

($P < 0.001$), to on par by 2013 ($P = 0.348$). Similarly, Question 5 referring to 'receiving constructive feedback when needed' received the third lowest SSS score in 2012 but significantly improved in 2013 ($P < 0.001$) with a medium effect size, and was now also in line with School's average in 2013 ($P = 0.0564$).

3.2. Subject Performance Ratings

In 2012, this core research subject was rated the lowest (−2.53 variance below standardised 0.00, with variation of 1.00 deemed as acceptable variance) compared with Subject Performance Ratings across the Bachelor of Nursing, ratings ranging from −2.53 to 1.68. After subject redesign, the subject had increased by 3.01 rating points to 0.48, above the average standardised 0.00. By 2013 the subject had also improved from 24th out of 24, to 7th within the Bachelor of Nursing.

3.3. Students' open-ended feedback prior to subject redesign

In 2012 a total 125 of 247 (50.6%) students responded to the two open-ended questions that asked what they particularly liked about the subject and suggested improvements that could be made. Students commonly reported that there was *"nothing"* positive about the subject, that it was "*not interesting*", "*irrelevant*", *"… caused so much anxiety of fear of failure",* and "*… some concepts are very hard to comprehend … '.* While students voiced that teachers had tried, there was an overall sense that the subject was "*confusing",* that *"… most students still don't get it … Why are we learning this subject?????",* and commonly questioned why "*the subject was there in our course"*. Several students noted that there was little relevance to clinical practice: *"… didn't see much about the link between this subject and the real-life nursing"*. Several made comments that this subject should be restructured or removed entirely: *"… most people in nursing will not use this in their career, this takes up space and time where students can actually study hard-factual nursing-practical material"*. Others suggested this should an elective for those already interested in research, *"I really don't think that this is required as a subject. It should be an option for those considering honours",* further indicating the disconnect between evidence-based approaches and clinical practice. There were positive comments made by a minority, and these related to tutors being knowledgeable in research methods, that a small number of students felt more able to find evidence to support study and practice, and a few students did comment that they found the subject interesting, however the majority of responses called for the subject to be changed and presented in an engaging and relevant way.

3.4. Students' open-ended feedback post subject redesign

In 2013 137 of 179 (78%) of students provided feedback through open-ended comments in 2013. There was a tangible positive change in comments following subject redesign, with five themes elicited, including: 1) change in pre-conceived negative ideas of research to something accessible and useful; 2) clear link between evidence and clinical and professional practice; 3) comments on learning format and scaffolded learning; 4) increased skills in effective data base searching; and 5) improvements for the future.

3.5. Change to preconceived ideas of research to something accessible and useful

Students commonly voiced preconceived ideas around research which had now been changed through undertaking the subject: *"I was negative before the semester started but only because I am not a good researcher. Since starting the course, I have actually found it very interesting and excited about doing assignments now that I can see how this relates to my other subjects and clinical"*. Even if faced with challenges, students commonly noted that this was still relevant: "*It's a challenging subject, but absolutely necessary and properly degree-level. I loved it"*. Initial anxiety over the foreign material often replaced with confidence: *"Challenge in learning totally new concepts. However, I felt confident by the end of the subject about these concepts"*. Several students even noted a fondness for research approaches:

> "Before this subject I did not like research, now it is like having fun every time I look for a research paper, learning about research has helped me to answer my clinical questions and to answer my patient with evidence, therefore evidence-based practice:)".

Students often noted that they had greater skills for appraising the quality of evidence used to make clinical decisions: "*It taught me a lot of what information is reliable and what isn't, how I can find reliable information and how I know it's reliable or not. Definitely an important subject"*. This critical appraisal extended to research reports themselves: "*I learned new research skills, and I learned to not automatically trust research"*.

3.6. Clear link between research and clinical and professional nursing practice

The redesign of the subject sought to make an overt connection between research learning and the clinical and professional context: *"I liked that the relevance of everything we learned to our future careers as nurses was made clear. All in all, I found the way the subject was taught extremely engaging"*. This increased focus on clinical nursing context and how evidence supports this was recognised by students repeating the subject:

> *"I hated the subject* [previously] *and was not looking forward to it this time. However, I've grown to like this format of Evidence-Based Nursing! Amazing … and I really do believe it's because the structure of the subject has been altered, better preparing me/students to make sense of the theory and the purpose of why we need evidence-based research as a registered nurse."*

Students commonly noted that they were more able to: *"… scrutinise my own and others practice* [in the clinical environment] *and to see how I can make the difference in practice, influencing care and outcomes for patients"*. There appeared to be a shift in the critical judgement of the techniques being observed: "*It makes you realise that not everyone is aware of the best evidence-based practice and that people still use old-school techniques out in the workforce"*. This confidence as important to future practice: *"I feel empowered in my practice and more confident knowing that I am able to find and appraise information"*.

Students also noted an increased confidence in asking teaching academics to justify their approach: "*I was able to question clinical practices and ask the nurses for the reasons behind certain practices which I could then research about for further clarification"*. Increased understanding of why certain techniques were used was also noted as important to future practice: "… *will be better versed to ask questions of the staff who are teaching me. I will also be better placed to understand how and why they use certain practices! I think this is invaluable for this Degree!"*. Other students connected their learning to their ability to advise and inform patients:

> "*Patients rely on us to get relevant, accurate, and evidenced based answers. Patients trust us and it is their right to be provided with evidence-based information and it is our duty of care to do so. Evidence-based practice will prevent us to put our patients at risk*."

Even if students did not find that the subject had a direct impact they could see the overall benefit: "*Can't say that it had an impact on clinical* [placement experience]*, but I think I can be a better professional in the future knowing how to search for answers and appraise the quality of the information I received. Can't look at any article anymore without making sure it's good quality info:)"*

3.7. Comments on subject format and scaffolded learning

Student engagement through innovative approaches was at the forefront of the subject redesign. In-class activities asked students to consider a broad clinical question each week and instead of focusing on one methodology, students were asked to consider a number of research articles each of which would add a different perspective to that question. In highlighting the different ways of interpreting and approaching a clinical topic, students began to understand skills in research appraisal, but importantly how evidence might help them to consider the questions which they have about their own clinical practice.

Learning and assessments were scaffolded with sequential activities to build confidence and knowledge development. For example, a low-stakes, early assessment allowed students to refine their work with feedback to build skills for subsequent larger assessment. This candid response illustrates a student's experience of this approach:

> "Let's face it, teaching research skills to a bunch of nurses is probably not the most exciting gig! I thought the "staging" of the assessment tasks introduced concepts in a really ordered and easy to understand way that built up my knowledge and understanding smoothly - so that they built on each other in required knowledge and complexity."

Easily recognisable and relevant case scenarios were also used to increase accessibility and engagement. For example, when discussing statistics, students were provided with the descriptive statistics and graphical representations of their own cohort's interim results: "*I liked the use of statistics relating to nursing students* [results]*' and 'I also loved how* [the subject coordinator] *used stats when she released our assignment marks."* The final assessment also allowed students to choose their own research topic which served to promote interest and applicability to what students were seeing in clinical practice: *"Freedom in choice of research* [topic] *very much helps in making assignments/work more interesting"*.

3.8. Increased skills in effective searching and extracting evidence

Students commonly commented on increased skills in database use and in their ability to find relevant information: *"It was good to learn about the proper way to search on a database as this is a good skill that will help improve nursing practice"*. To most students, understanding how to navigate research databases was a key component of developing confidence in their research skills and in fostering interest in continuing evidence-based research into future practice: "*It has sparked an interest in wanting to do research as I now feel like I know what I am doing to find what I am looking for"* and "*There was a certain satisfaction when the research strategies actually started to work and the papers I was looking for started to come"*.

There was an overwhelming view that effective searching and interpretation of articles, along with the overall subject, should be delivered earlier in the Bachelor of Nursing program: "*Finally at the end of second year I can actually search databases properly. It's a real shame we aren't taught these methods in our first semester because I have been doing my research incorrectly all of this time and have been struggling"*. While students did receive data searching workshops in earlier semesters, it is clear that students had not connected these skills: *"If I had learnt these skills in first semester it would have helped me develop research skills so that when I enter the work force I'm good/great at it"*.

3.9. Improvements for the future

While there was much positive feedback, other students still voiced that the content lacked relevance, was difficult and dry. While they were in the minority compared to overwhelmingly negative comments from previous years, it is important to consider what specific targeted activities could be developed to help those students who continue to struggle with the concepts.

Students identified the take-home exam, the teacher approach, and the online components as factors. The take-home exam was implemented to allow students time to develop a research problem and search and in this way better reflecting research skills. Closed book exams for topics perceived as difficult and unfamiliar, such as research, also create high levels of anxiety. Students commented, however, that while they were given lecture and tutorial time to complete the exam, that timing of this in the final week of classes created added pressure for upcoming formal exams in the following week. Face-to-face contact over the course was also considered too short when balanced with academic commitments in other subjects.

Students frequently commented that more face-to-face contact was needed. The subject was run as alternating face to face with online weeks and this was raised as a challenge when learning unfamiliar content: *"having face to face lecture and tutorial rather than online sessions would be better, as I find this subject quite difficult, and sometimes asking questions online is just not as good as having a tutor to explain the concepts"*.

In regards to the teaching team, the enthusiasm and engagement from the teacher was noted to have an impact, as seen in previous literature (Johnson et al., 2010). There was care to ensure that all teachers in the subject were nurses with clinical experience and that they were directed to overtly connect research theory to their clinical experience: *'Even the way the lectures were presented in conversational ways … with humour and personality and warmth regarding "statistics"!* [The teacher] *has the gift to do these things!!!'*. Teacher own enthusiasm about the content were recognised as important: '[The teacher's] *delivery of content - when the teacher loves what she is teaching, it makes even p values interesting:)'* and *'The teacher was extremely enthusiastic, she is very passionate about research, and you need that in order to make a "boring" subject a very interesting one'*.

4. Discussion

4.1. Summary of results

Satisfaction significantly improved following an increased focus on clinical and professional application and a focus on using research to find solutions to clinical questions. All nine survey questions shown to significantly improved from 2012 to 2013, with satisfaction moving from significantly below the overall School average to either in line with or significantly above School average. In overall subject ratings, the subject rose to seventh out of 24 core subjects within the Bachelor of Nursing program, a substantial increase in overall performance and satisfaction from lowest rated in the previous year. Analysis of open-ended questions further confirmed this marked change in performance with five themes emerging, including: 1) change in preconceived ideas of research to accessible and useful; 2) clear link between evidence and clinical and professional nursing practice; 3) comments on subject format and scaffolded learning; 4) increased skills in effective searching and extracting evidence; and 5) improvements for the future.

4.2. Understanding of the relevance to clinical and professional role

This study sought to understand nursing students' satisfaction and perspectives on research after an undergraduate research subject was redesigned to make overt the connection between research and professional nursing practice. This was in direct response to previous years' comments and to previous literature in the field that acknowledged stronger affinity that nurses students have with clinically-orientated material and concurrent dismissal of non-clinical subjects as irrelevant to practice (Levin and Feldman, 2006; Finotto et al., 2013; Rojjanasrirat and Rice, 2017; DeBruyn et al., 2014; Jackson, 2016; Saunders et al., 2016). In framing weekly tutorials around large, tangible clinical

problems students were facilitated to down clinical issues, like those they might see in practice, into smaller manageable questions that could be researched to find a clinical solution.

Placing learning within authentic and real-world applications is not a new concept in education and/or EBP learning (Ong and Narasimhan, 2010; Fawcett, 2009), however the divergence between highly theoretical subjects and personal knowledge and experience is particularly keenly observed when students are faced with research methods. This study showed through when an overt connection with clinical and professional practice was made, students responded with a clear understanding of why they were taking the subject and how it could be used in the future.

The integration of EBP curricula within the context of other learning is seen, in other literature, to improve both appreciation for research and opportunities to translate this into clinical practice (Malik et al., 2015; Oh et al., 2010; Horntvedt et al., 2018). Allowing students to choose their own topic for their final assessment was a further attempt to increase personal interest and engagement, previously noted to increase engagement with EBP (Bjorkstrom et al., 2003). Increased engagement following the redesign in this study, was further evidenced in the marked increase in response to '*the learning experiences were interesting and thought provoking*', the previously lowest rated question in the satisfaction surveys.

4.3. Critical appraisal and application of research

Critical appraisal of research was a key focus of the subject redesign and sought to develop student's ability to decipher information for relevance to the clinical issue at hand. In providing a mixed methodological set of studies on the same topic students were guided in tutorials to scrutinise how best to answer their clinical question and what practices were indeed supported by evidence. Students commonly noted this in open-ended questions, with responses to this powerful in acknowledging their new ability to interpret data but also in their ability to appraise the quality of clinical practice. A strong understanding of the need to base practice on accurate data was a key finding following the redesign, and this was a marked change from experiences communicated from the previous year.

4.4. Use of scaffolding and sequential assessments to build confidence

Scaffolding learning through sequential assessments that repeated skills, but within a new context, was used as a tool to build confidence and allow for students to apply feedback from one assessment directly into the next. This did pose logistical issues with tight marking turnaround, however, the approach did appear to address previously held negative pre-conceptions and fears. Integration of EBP in this way, was observed, as with previous studies, to encourage a positive view of research and change in attitude, essential for long term engagement with EBP in future professional roles (Bianchi et al., 2018; Malik et al., 2015; Oh et al., 2010; Tanner, 2006).

There was also a change in the way students viewed their influence on practice, with several using the term 'empowered' when talking about their ability to now discuss and questions patient care practices. In noting that they had increased confidence and were 'better versed to ask questions', this encourages a questioning and reflective health workforce (Tanner, 2006). Nurses' ability to influence policy and practice will rely on the ability to use and articulate evidence, it is crucial for the discipline that students are equipped to appraise and question practice and argue for change where necessary.

4.5. Implications for practice and future research

EBP is acknowledged to improve patient outcomes, yet the majority of nursing graduates continue to have a limited understanding of the application of EBP (Horntvedt et al., 2018; Jackson, 2016; DeBruyn et al., 2014). Equipping nursing students to interrogate research evidence, and associated clinical practice, will build confidence in scrutinising practice when working in the clinical environment. Building this capacity within the majority health workforce will go far in providing the best, most appropriate and safest care for our patients. This increased confidence and skills in discussing evidence will also empower nurses to discuss issues with other health professionals on an equal footing.

5. Limitations

Self-report, anonymous surveys do limit the exploration of why participants respond or answer in a particular way. There is also a risk of polarised views in such surveys due to self-selection to complete the survey. It is also possible that the unfamiliarity of new material, i.e. research approaches, would lead to student discomfort and consequently impact satisfaction no matter the quality of the approach, however the positive results in this study suggest that the redesigned approach was a contributing factor.

There is also an acknowledgement that the positive impact in this particular redesign may be due to the specific academics implementing the subject, given in this instance that the academic was highly experienced in course re-design and recognised with teaching and learning awards. The impact of the enthusiasm and skill of the educator has been noted previously within the clinical nursing and general educational contexts (Malik et al., 2016; Johnson et al., 2010). It is therefore imperative that experienced and high performing staff teach subjects of unfamiliar conceptual material, and in the within nursing research (Malik et al., 2016) and this study found that students responded to academics who were experienced teachers and who also had a strong ability to translate conceptual learning into the clinical and professional context.

6. Conclusion

This study showed that student satisfaction increased when the connection between research learning and the context of clinical and professional practice skills was made overt in a core research subject. This approach, along with scaffolded activities to increase confidence in critical appraisal, had a marked positive impact on student's attitude and understanding of the utility of EBP and confidence in scrutinising practice in the clinical environment.

Funding

No external funding.

Declaration of competing interest

None.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.nepr.2019.102650.

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