

Facilitating refereed publication by health professionals: research informed software to scaffold the integration of research evidence with practice knowledge

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Health professionals strive to base their practice on the best available research evidence while needing to demonstrate best practice to meet accreditation requirements. This requires skills in interpreting and applying research evidence and also the ability to construct written reports describing health care practice.

This paper describes research processes underpinning the design of e-learning software used to support the preparation of refereed publications by health care professionals, postgraduate and undergraduate students. The project, Critique for Publication (CFP) draws together two existing research programs focusing on mentored refereed publication and online appraisal by embedding mentored publication subject content in a novel e-learning tool. CFP will be used by clinicians and students to facilitate collaborative publication development. CFP promotes learning by doing as clinicians and students are guided through scaffolded report construction based on integrating critically appraised research evidence with professional practice knowledge. The paper will describe how the development of CFP has been informed by survey and interview data examining barriers and facilitators for publication.

Postgraduate and undergraduate students, whose studies provided the potential for the generation of student led publications, were surveyed to identify facilitators and barriers to publication development. In depth interviews were also conducted with respondents who expressed interest in further study participation. These findings were then used to inform further CFP software development.

Keywords: teaching-research-practice nexus, best practice health care, student led publishing

Background

The workplace for most professionals, particularly health care professionals is exceptionally challenging with the latter facing busy patient loads, changing technology and demands for increased efficiencies (Yoo & Park, 2014; Aiken et al., 2013; Michtalik et al., 2013; Duffield et al., 2011). Within this complex and rapidly changing context, health care practice is also rapidly evolving as new research evidence emerges across a wide range of specialty areas (Sensmeir, 2012; Costa & Whitaker, 2011). Health professionals need to keep up to date and require life-long learning skills to interpret the research evidence, integrate this with their professional practice experience and then apply it to their specific client group (Heiwe et al., 2013; Eizenberg, 2011). Health professionals also need to be able to document and disseminate this professional knowledge in the limited time they have available (Sirikka et al., 2014; van Bekkum & Hilton, 2013; Heiwe et al., 2011; Thomas & Law, 2013; Gerrish et al., 2011).

This paper targets the critical area of applying research to practice by combining structured access to research evidence, critical appraisal, synthesis and integration of evidence with professional practice knowledge. The Critiique for Publication (CFP) project targets the teaching-research-practice nexus by engaging clinicians, postgraduate and undergraduate students in assessing reviews of research evidence which are then integrated with their professional knowledge and practice, and subsequently published.

CFP brings together two long standing educational projects, specifically the Critical Review Software (Critiique) project, and mentored publication involving staff and student collaboration. The Critiique project has involved the development of flexible software that guides highly scaffolded development of assignment content by students. The spelling of Critiique is intentional as it aligns with a unique domain name. The student mentoring program has successfully guided student refereed publication for many years at Flinders University. Students who seek to discover effective ways of disseminating findings from their research endeavours are often highly motivated about publishing in peer reviewed journals in collaboration with their mentors or supervisors. In particular, the publication of reviews of research evidence by undergraduate, postgraduate and higher degree students promotes the integration of professional practice knowledge with the best available research evidence using a process that is highly relevant to the contemporary information environment (Allen, 2011). At the Flinders University School of Nursing and Midwifery (SONM) the mentoring project has provided outstanding results in this area generating a 19% journal submission rate in the 2004 to 2009 cohorts with a very high acceptance rate of 65% (King, 2012), which would be regarded as high even for many academic staff. This data suggests that students are able to understand and synthesise research content if provided with suitable mentorship within a structured program. While successful publication rates are desirable, more important outcomes include new learning processes established when students become interested in publishing collaboratively. They also emerge as more likely to engage in postgraduate and higher degree studies and undertake research to inform their nursing practice (King, 2012). Similarly, other studies have identified that student-staff collaboration encouraged student research interest, confidence and willingness to participate (Behar-Horenstein & Johnson, 2010; Harsh et al. 2011; Taber et al. 2011).

By combining the Critique program of software development with the mentoring project, two areas of strength will complement each other and the resultant e-learning resource will be made accessible to both postgraduate students and clinicians. Furthermore, research findings addressing barriers and facilitators to publication will inform the development of this e-learning resource with the use of in built surveys providing the capacity for ongoing updating in response to user feedback.

Issue: Integrating clinical practice knowledge with research evidence

Critique for Publication (CFP) is a customised version of Critique e-learning software that scaffolds and guides critical review development. CFP will be made accessible to both clinicians and students, so students can develop necessary skills during undergraduate and postgraduate studies but potentially continue to use CFP as part of their ongoing continuing education. Clinicians or students currently using CFP are provided with a logon and data storage area and work step by step through protocol development, searching and summarising articles, critical appraisal, synthesis of findings and discussion of application to practice. At each step students are provided with guiding video, text or audio content and type into preset templates. The content entered by students is then retrieved from a backend database into preformatted comparative tables and reports. CFP instructions are authorable, meaning that the process underpinning the critical reviews can be modified to alter the emphasis. For example, emphasis on consumer input to critical reviews can be increased by asking reviewers to consult consumers for specific input at particular stages in the process. CFP can also facilitate professional and group collaboration, as groups of clinicians and students are able to collaborate on a topic with individuals contributing by critically appraising and summarising specific research papers related to the topic. The outputs from CFP are critical reviews of research evidence that may be suitable for publication.

A further important aspect of CFP is that the content included is informed by survey and focus group data examining facilitators and barriers to publication. Furthermore, the survey tools used have been embedded in CFP so that future modifications can be responsive to the changing needs of health professionals.

Theoretical basis

There are multiple layers of theoretical support for the CFP project that align with the capability of CFP to achieve several simultaneous goals including supporting clinician publication, promoting education about evidence based practice, addressing topics of clinical priority and targeting the teaching-research-practice nexus (Roberts et al., 2012; Kesler & Glasgow, 2011; Restifo & Phelan, 2011). The CFP project combines authentic assessment with elements of constructivism (Herrington et al., 2014) using a process that emphasises assessment for learning. When postgraduate students use Critique, they immediately engage in an authentic assessment item (Herrington et al., 2012), with all student activity contributing to their assessment and directly addressing a high priority clinical problem. Students are thus engaged with 'learning by doing' as they focus on developing their publication outputs. The

content within Critique combines evidence based practice theory with teaching content about writing for publication, enhanced by research findings investigating barriers and facilitators to publication. The entire CFP process supports the development of publications addressing the teaching-research-practice nexus. Furthermore surveys embedded in Critique promote the ongoing modification of the Critique tool.

Method

The overall CFP project will be implemented using a design based research framework (Wang & Hannafin, 2005) allowing ongoing iterations of research and software modification. Design based research is ideal for the development and implementation of software based education interventions in resource constrained complex settings (Wang & Hannafin, 2005). This paper describes part of the ongoing design based research process being description of the CFP software and implementation of a survey and interviews to inform software modification. Therefore the method section to follow describes the survey and interviews which form part of a larger ongoing evaluation and modification process.

Sample

Students who undertook research focused topics (subjects) across the 2011 and 2012 period that involved research based literature reviews, projects and theses production were sought from the School of Nursing and Midwifery Undergraduate, Honours, Masters and Research Higher Degrees programs. This included undergraduate nursing and midwifery students undertaking the Mentoring Project topic literature review assignment, postgraduate students undertaking a literature review assignment as part of a thesis preparation topic, postgraduate students undertaking a report of their project findings and PhD / MSc students are enrolled in the Research Higher Degrees programs.

Ethical considerations

Ethics approval was obtained from the Flinders University Social and Behavioural Sciences Research Ethics Committee.

Data collection techniques

Survey

Seventy nine students completed the online questionnaire with eight of the students participating in further one to one interviews

Students were asked to complete a survey questionnaire using SurveyMonkey software. The questions included in the survey questionnaire were derived from the findings of a previous study focused on students' dissemination of research findings through publication outcomes (King, 2012). Questionnaire feedback was also received from three 2012 mentoring project

students who had completed tutorials but were still working on their literature review assignments under the guidance of their academic mentors. A follow-up semi structured interview investigated further with students who were prepared to participate following completion of the survey questionnaire.

Results

The results reported in this paper specifically relate to aspects of the survey and interview data that were used to inform software modification, with other results to be described in detail in future publications.

Descriptive and thematic analysis of data suggested facilitation and support was a major determining factor in publication success. Specific data related to facilitating publication development was then used to guide CFP software design and content. In addition, the survey tools developed have been strategically embedded in CFP to facilitate ongoing feedback and modification of CFP as it is used by health care professionals.

Demographics

Given that the target group for CFP will be postgraduate health care students and clinicians it is important to identify key demographic characteristics of respondents to the survey and subsequent interviews (overall n=79). The age of respondents (Table 1) reflect an age distribution that aligns reasonably well with the target group for CFP, being postgraduate students and clinicians with participants from all age groupings from 20-60. However the academic qualifications (Table 2) of respondents differed from the target group with 33 % of survey respondents having no prior qualifications.

Table 1: Age distribution

Age	Responses
<19	5.06%
20-29	37.97%
30-39	21.52%
40-49	15.19%
50-59	20.25%

Table 2: Highest qualification

No previous	33.33%
Certificate	23.02%
Honours	7.69%

Diploma	5.13%
Bachelor	17.95%
Graduate Certificate/Diploma	5.13%
Masters	6.41%
PhD	1.28%

Barriers

Respondents identified barriers to publication (Table 3) including lack of writing confidence and competence, difficulties starting and fear of undertaking such a major task. Grouped with over 50% of respondents seeing them as a moderate or major barrier, lack of writing confidence and difficulty in getting started were seen as the two most powerful barriers.

Table 3: Barriers to publication

	Not a barrier	Minor Barrier	Moderate Barrier	Major Barrier
Lack of writing confidence	15.38%	27.69%	20.00%	36.92%
Lack of writing competence	18.46%	36.92%	20.00%	24.62%
Difficulty getting started	10.94%	35.94%	28.13%	25.00%
Fear of undertaking major task	30.77%	29.23%	20.00%	20.00%

Responses to the open ended questions related to the barriers identified issues relating to confidence, the need for guidance and support, as well as specific issues such as remote area access and the perspective of international students. Specific feedback related to barriers included:

I do not know the processes involved in developing a manuscript for journal submission

Difficulty complying with the individual guidelines of each journal, especially referencing, which takes time

Not knowing where to start, how to get published and confidence issues

It all seems overwhelming and unstructured

English is my second language. I do not have sufficient academic vocabulary at this stage to produce a work of high standard that reflects the professionalism of nursing. I am new to nursing and feel that I require more practical experience in the field before embarking on such a venture

Facilitators

While the majority of prior research in the area has focused on barriers to publication, it is interesting to note a much stronger positive response in relation to facilitators (Table 4). Over 80% of respondents found encouraging supervisor and peer feedback very useful. The value of writing workshops and recognition of work beyond the university were also strongly valued, but to a lesser extent.

Table 4: Publication facilitators

	Not useful	Slightly Useful	Moderately Useful	Very Useful	N/A
Positive feedback on drafts	0.00	3.33	8.33	86.67	1.67
Feedback suggesting worthy of publication	1.67	1.67	13.33	81.67	1.67
Writing for publication workshops	3.33	10.00	18.33	61.67	6.67
Have my academic work recognised beyond the university	3.45	5.17	25.86	63.79	1.72

Responses to the open ended questions related to facilitators highlighted the importance of peer support, online support including video and the need to not exclusively focus on high impact journals. Specific feedback related to facilitators for publication included:

Writing for publication workshops are useful if you can access them - perhaps alternative methods of delivery need to be considered to assist off campus students to access workshops and tutorials e.g. online postings as videos.

Peers voicing enthusiasm for viewing research. Peers give confidence that writing up research is both a possible and achievable and worthwhile goal

That all publications in any area are celebrated, not just achieving being published in a high impact factor journal as being given feedback that it is a lesser publication as it is in a lesser journal is very deflating.

Interview Responses

Interview responses (n=8) related to CFP software are reported here, with overall interview data relating to mentored publication to be reported in detail elsewhere. Participants discussed the need for organisation, analysis and critical thinking highlighting the value of seeing other students' work and using a step by step process. The complexity of linking clinical and academic areas was emphasised as were the longer term benefits of publication. Relevant respondents' comments included:

I think writing is a very mechanical skill. You think of your punctuation, you think of your grammar, you think of all those capitalisations but it's also an intellectual process and it involves critical thinking, like all those major forms. So you also do your analyses, your comparison, your conclusion and things like that, organise your argument, your evidence, your information.

If I published, what benefit that would be to me in the future and how easy it is actually from what I'd done. I thought, I'd done all this work and looking back I might think, God, what a fool, why didn't I?

There's so many different styles and trying to work out which one they want and then getting your manuscript to convert correctly and properly so the list is displayed correctly at the end and the in-text stuff is correct - gosh. I just find that difficult.

But yes, tutorials were really, really supportive. She went through everything step by step.

During the mentoring project we were given examples of other students' work as well and what they had done

I think with nursing it's always very difficult, like you were saying before, to mesh the clinical and the academic.

Discussion

Survey and interview results overwhelmingly affirmed the value of facilitators as an important factor to support publication development while also identifying specific barriers. Many of the findings affirmed approaches already incorporated within the CFP software. In relation to barriers, CFP scaffolds or breaks a major task into structured and guided step by step processes that will help future participants get started easily and build confidence as they progress. The ability to progress at one's own pace and replay content such as video, while receiving detailed structured writing support is expected to assist international students. Similarly, online access is likely to be convenient for both rural students and busy clinicians. The automated report formatting is also expected to be helpful for participants, although this formatting will not always align with the plethora of diverse journal requirements.

CFP includes the facility for automated report generation at any time, with pre-set milestones for the generation of such reports for example on completion of protocol development. Feedback and peer support were also identified as valuable facilitators. Therefore in response

to the survey, data processes will be established for increased peer review and lecturer/facilitator feedback at such milestone points. CFP can also facilitate group work since a team of clinicians could work on a critical review addressing a clinical topic of priority, with each clinician contributing to the critical analysis of a relevant paper. These individual critical appraisals can then be repeated by other team members to produce a shared review, with the process not only providing peer support but increasing rigour.

The suggestion to provide publication exemplars can be implemented very effectively within CFP, with the possibility of providing examples for each step of the writing process so that students can see the process broken down into manageable components.

While survey data is useful for affirming existing CFP structure and guiding modification of future implementation, the most interesting feedback comes from interview data which reveal the higher order skills of analysis, critical thinking and organisation of arguments and evidence involved in the process of writing for publication. As CFP operates in a manner similar to an online filing cabinet it is possible to manage the organisational components quite effortlessly and concentrate on elements such as critical appraisal. Furthermore this appraisal is broken into small steps that can be accompanied by expert guidance. The process involved with writing for publication such as refining text can help clarify and advance thinking as multiple concepts can be built upon in manner that is beyond the capability of what the human brain can do without documentation (Schuwirth & Van der Vleuten, 2011). The scaffolding offered by CFP offers the potential to facilitate this process as not only can the writing task be broken into small steps and organised, but in addition the software facilitates the development of building blocks capable of extending the benefits of the writing process at a level of even greater complexity. Furthermore video excerpts can be included at each step to allow timely provision of expert input.

Interview feedback about meshing clinical and academic areas can be addressed by prompting the consideration of issues related to the application of research to practice (Roberts et al., 2012; Kessler & Glasgow, 2011; Restifo & Phelan, 2011). Such discussion in critical reviews produced using CFP can help identify research gaps and help document important clinical practice issues, an area often neglected because clinicians are so time poor.

In summary, survey and interview data have been most valuable in terms of affirming CFP and informing changes to content and implementation. While there is some risk of bias in the process of selectively extracting relevant data to guide software modification, as part of a design based research framework the approach can be justified, particularly as ongoing evaluation will occur, including embedding the survey tool within the CFP software.

Conclusion

The CFP project provides a starting point for what is expected to be a sustained research program with broad implications. There are numerous potential benefits that may arise from this project as it directly targets the teaching-research-practice nexus. From a teaching and learning perspective students and clinicians will be provided with an authentic learning task as they actively develop skills related to the critique, synthesis and application of research findings to health care practice. From a research perspective CFP will promote an active research culture through research dissemination and publication. From a practice perspective

CFP will promote the application of research evidence to practice, while helping identify research gaps and promote clinician to researcher communication. More generally the CFP project can improve student confidence related to potential publication and research dissemination, identify barriers, facilitators and motivators relating to collaborative publication by students, clinicians and academics and encourage strategies to promote student-staff publications. An important aspect of the CFP project has been the use of research data to inform educational design and content. Furthermore the survey tools used are embedded in the software, creating a continual stream of evaluation data specific to content in CFP, to enable updating and content development specific to user groups.

While this paper has described CFP and its applications in health, the software, content and processes are potentially transferable to any profession or discipline where the evidence basis for practice is important. For example CFP can be readily adapted so it can guide reviews of research evidence and publication related to the practice of law, to tourism, psychology, biology, environmental science and education. While such trials are planned in the longer term for the education discipline, and a research program has commenced to investigate the broad potential applications of CFP, it is important to keep this in perspective. Student reviews require considerable work and time in order to produce high quality reviews of research and develop them to publication standard.

While there are other tools available to support publication development, there is nothing of this nature available that integrates teaching, research, publication and practice functions within a single tool.

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10 School of Public Health, Physiotherapy and Sports Science, University College Dublin, Dublin, Ireland. 11 School of Physiotherapy, Royal College of Surgeons in Ireland, Dublin, Ireland.Â Integration of EBP into clinical curricula in particular was considered essential to successful learning and practice outcomes. If students perceive a dichotomy between EBP and actual clinical care, then "never the twain shall meet" (GG) requiring integration in such a way that it is "seen as part of the basics of optimal clinical care" (GG).Â Enabling patients to engage with evidence with a view to informing healthcare professional/patient interactions and care decisions was also advocated Productivity Commission. Efficiency in Health Research Paper. April 2015. Commonwealth of Australia 2015.Â Good health is central to human wellbeing, economic progress and a prosperous society. Reflecting this, the efficiency of Australia's health care system is an important area of government policy.Â Health workforce scopes of practice play an important role in upholding safety and quality standards. However, they can constrain workforce flexibility and reduce workers' job satisfaction when certain tasks are made the exclusive responsibility of particular health professionals, even though they could be performed just as effectively and safely by others. The WHO Advisory Committee on Health Research (ACHR) is committed to the notion that WHO should exemplify best practice in use of research evidence to inform decisions about health. A major ongoing initiative of the ACHR is the Sub-committee on the Use of Research Evidence (SURE). This group is examining WHO's roles and responsibilities in the use of health research to inform decisions about health. WHO's leadership has expressed strong support for this initiative.Â Aim To examine the quality of evidence used to inform health policies. Policies on peripheral intravenous cannulas were used as exemplars. Design An organizational case study design was used, using the STROBE reporting guidelines. Research evidence presented in complex and technical jargon must be altered to simpler language that potential end-users will find easier to understand; it must then be disseminated to those audiences; and, finally, providers and others must incorporate it into existing health care processes and systems to improve health.Â The intent is to spread knowledge and the associated evidence-based interventions.4, 5. Implementation. The use of strategies to adopt and integrate evidence-based health interventions and change practice patterns within specific settings.6. In the sections below, we present background information for the three areas of the review"communication techniques, dissemination strategies, and communicating uncertainty. We thus suggest that evidence-informed practice is a decision-making process that incorporates: Research evidence.Â Evidence-based practices are built on theory and research but are not a complete, systematised program of intervention. Evidence-based programs are a collection of practices or activities that have been standardised so that they can be replicated, have been rigorously evaluated and are usually endorsed by a respected independent department or research organisation [16, 17].Â Centre for Community Child Health. (2011). Evidence-based practice and practice-based evidence: What does it all mean? Policy Brief: Translating early childhood research evidence to inform policy and practice(21).