

peer reviewed **OPINION ARTICLE**

Critiquing a research article as an evidence-based practice assessment strategy within a radiography training programme

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Abstract

Evidence-based practice (EBP) has been identified by the Medical Radiation Practice Board of Australia (MRPBA) as one of the professional capabilities required by entry-level medical radiation practice professionals seeking to qualify for registration. EBP is the process of meticulously analysing current research in order to provide the best patient care. Therefore, EBP allows for systematic advancement of skills and practise within the radiography profession in order to consistently ameliorate the quality of imaging, technique and care of the patient. Hence it is of utmost importance that students enrolled within a radiography programme should, upon graduation, be able to demonstrate this critical thinking capability.

Students within the second year of a four-year degree programme at Monash University in Australia are required to critique a peer-reviewed research paper as an EBP assessment strategy. Students are provided with a qualitative critiquing framework and a marking rubric as guidance. A review carried out by a second year radiography student focuses on a qualitative publication and critically assesses its relative merits according to the EBP assessment strategy.

On reflection, the student concluded that although an article is peer reviewed, it is important to perform one's own review in order to gain a sound understanding of the purpose, methodology and findings. In undertaking this assessment strategy, the student was exposed to the necessary skills required to appropriately evaluate published research including knowledge of mixed-methods approach and thematic analysis. Such skills and knowledge should allow new graduates to reach the required standards for registration.

Keywords

assistant practitioners, evaluating articles, mixed-method approach, professional capabilities

Introduction

Evidence-based practice (EBP) has been identified by the Medical Radiation Practice Board of Australia (MRPBA) as one of the professional capabilities^[1] required by entry-level medical radiation practice professionals seeking to qualify for registration. In order to ensure that students upon graduation meet this expectation, they are required to critique an article provided to them. Students are introduced to the value of using a critiquing framework. Permission was sought from the University of McMaster to adopt the critical review form developed by the authors^[2] for use in our programme. In addition, students are provided with a marking rubric as a guidance tool outlining the expectations for achieving the desired assessment requirements (Figure 1).

This paper demonstrates the attempt at the EBP assessment task by a second year student enrolled in the radiography degree programme at Monash University. The student had to implement the critical framework provided^[2] and exemplify the relevant skills and knowledge gained through this assessment programme.

The value of this assessment strategy is highlighted such that students should be able to thoroughly grasp the methods of evidence-based practice and form a thorough, comprehensive review of the study with regards to its research question, methodology and findings. This provides the foundational knowledge required to reach the required standard for graduation and ensures that these future radiographers would be well equipped to critically analyse published work which should enable them to provide best practice to their patients.

The student's use of the critical framework is presented under the following headings.

- Article reviewed
- Methodological approach used in the critiqued article
 - Participant selection and sampling
 - Research design: mixed-methods approach
 - Research design: ontological mismatches associated with the mixed-methods approach
 - Grounded theory vs. adaptive theory
- Ethical considerations
- Results and data analysis: thematic analysis

Article reviewed

A 2013 study by Stewart-Lord, Ballinger and McLaren, which was published in *Radiography* was reviewed by the student^[3]. The title of the publication is: 'Assistant practitioners (APs) in radiography: An exploration of perceptions and experiences related to role development'. The study explored the role of APs in radiography and the manner in which AP roles have been integrated into the radiography workforce across England. The role of the AP came into being at the turn of the century to create a supportive workforce within radiography. The study is set in England; caution therefore needs to be administered when extending the findings to other countries such as Australia.

When making healthcare related decisions that pertain to patients, the most recent and up-to-date information which complements a patient's condition must be utilised to deliver the best possible care^[4]. Reviewing of previous literature by other researchers in a selected discipline is of paramount importance when deriving appropriate research problem(s) and research questions for a study. The aim for

the study reviewed^[3] arose from a gap in previous literature which failed to focus on the actual perceptions of the APs in the radiography workforce. The research in the critiqued article falls into an exploratory research category; the other two main categories being descriptive and causal research. The context of the research is significant when understanding, interpreting and generalising or replicating the research findings.

One of the main previous literature sources that the reviewed research cited is a cross sectional study conducted in 2007 to investigate the implementation of a four-tier structure across radiography by Price and Le Masurier.^[5] Woodford^[6] studied the impact of this four-tier structure on radiography practice and found that formalising the assistant practitioner role enabled more effective use of radiography practitioners. Woodford's study did not focus specifically on APs perceptions and experiences. Focusing exclusively on the AP role, Bennion and Irvine^[7] explored the role in terms of service delivery to gain insight into the improvements that could be introduced in embedding the role effectively. It appears that this is the only previous study that used a qualitative research method to study the AP role, albeit focusing only on the perceptions of managers and excluding experiences of APs themselves. Bennion and Irvine's study was further enhanced by Colthart et al^[8] who explored the nature of mentorship and supervision of the APs and found that they were challenged by the academic elements of their work but enjoyed the practical components.

Similar studies, which evaluate the perceptions of the AP role, were performed amongst other professional groups. These studies found comparable difficulties in integrating APs into the workforce. Mackey and Nancarrow^[9] conducted a study evaluating the perceptions of APs in occupational therapy which exposed the lack of definition of the AP role and uncertainties surrounding supervision and mentorship. Spilsbury et al^[10] conducted a complementary study for nursing which produced similar outcomes highlighting the need for clear role delineations. It appears that although similar studies have been performed on the topic in radiography, they do not focus primarily on the perceptions and views of APs as the reviewed article does. Hence the study under review^[3] is relevant to bridging the gap in the current

research in order to obtain a first-hand idea of APs' role in the radiography workplace. A strength of the critiqued study^[3] is the extensive review of literature which reflects an objective view of the study and its conceptual framework.^[11]

Methodological approach used in the critiqued article

The methodological procedure consisted of three phases. In the first phase, the researchers carried out a 'scoping exercise' by contacting 112 radiography sites employing APs. The second stage consisted of a questionnaire survey covering 357 respondents, resulting in 167 valid responses and amounting to a 47% response rate. The third phase consisted of a series of 38 semi-structured interviews with the questions derived from the objectives for phase 3 and the responses to questions in phase 2. The data collection method used for phase 3 is well demonstrated by the schematic diagrams which highlight the logical procedure as to how the questions were derived. This adds clarity to the description of the methodological process. The objective of the third phase was to extend the findings of the survey and explore the perceptions and experiences relating to the role development of the APs. The semi-structured interview approach allows a researcher to explore further on topics of interest in the interview although still adhering to a set of 'guiding questions' which points the conversation in a desired direction.^[12] This contributes positively to the study as comprehensive responses can be obtained. According to Beck and Manuel^[13] interviews are appropriate for data gathering if the researcher aims to explore participant experiences and themes in the data; the use of semi-structured interviews therefore appears to be highly appropriate to achieving the current research aim.

• Participant selection and sampling

A purposive sampling method was used where geographic dispersion and cross-contextual comparisons were the underlying principles for selecting the interviewees. This type of sampling is largely subjective as the resulting sample relies on the judgement of the researcher.^[14] Although the type of sampling is specified, the method of sample size determination is not. This study would be further enhanced by jus-

tifying the use of a small sample of 38 participants as a larger sample size is likely to produce more comprehensive findings and be more applicable.^[15] However, the sample includes a representation of the wider AP population across England and appropriately complements the aim of the research as the integration and role development is explored in many contexts.

• Research design: mixed-methods approach

Ideally research methodology should be derived from its ontology and epistemology.^[16] A researcher's ontology explains the ultimate presumptions about the reality which can either be subjective or objective. Epistemology is the science of obtaining knowledge.^[17] In utilising a mixed methods research approach, it adopts the strengths of both quantitative and qualitative methods. Although both research paradigms have their implicit and explicit elements from a methodological point of view, qualitative procedures and techniques are more implicit and indirect in nature as opposed to explicit quantitative studies.^[18] In appropriately combining these methods, a mixed methods approach can provide a thorough study which explores elements that can be generalised and those that can be replicated. According to Östlund et al^[19] the use of a mixed-methods research approach is extremely beneficial and useful when investigating healthcare related topics (including this topic) due to the complex nature of the studies. Hence it appears that the use of this research method is highly appropriate for this study. However, the benefits of this approach are only gained if the study is conducted and analysed in an appropriate manner.

Mixed-methods studies have three ways of being conducted entailing parallel, sequential and concurrent analysis. In the critiqued article, sequential analysis is used where the initial quantitative survey is more extensively explored and enhanced by using and combining qualitative methods.^[19] This works well for the study in the critiqued article as it explores the importance of statistical,

Element	Fail N 0-1	Pass P 2-4	Credit C 5-6	Distinction D 7-8	High Distinction HD 9-10	Mark /10
Introduction: should include rationale for EPB and purpose of research undertaken related to the chosen article; discussion on purpose of abstract	Insufficient discussion that fails to satisfy the minimum requirement.	Limited discussion offered, too descriptive with lack of insight.	The information provided is correct, with adequate discussion; however lacks insight.	Sound discussion with critical analysis of all elements.	Excellent comprehensive discussion reflecting critical evaluation which is consistent and perceptive.	
	Fail N 0-4	Pass P 5-8	Credit C 9-12	Distinction D 13-16	High Distinction HD 17-20	Mark /20
Critical evaluation of research methodology to include e.g. ethical considerations, patient selection, research design, etc.	Insufficient discussion with inaccuracies that fail to display an understanding of the research methodology.	Limited discussion about the majority of methodology described. Additionally, limited understanding of the methodology concepts is demonstrated.	Adequate discussion of research methodology Attempt at critical evaluation evident.	Sound discussion of all aspects of the methodology Critical evaluation is a consistent feature.	A comprehensive discussion of the research methodology with excellent critical evaluation a consistent feature.	
	Fail N 0-4	Pass P 5-8	Credit C 9-12	Distinction D 13-16	High Distinction HD 17-20	Mark /20
Critical evaluation of research results	Lack of critical evaluation with insufficient understanding research results.	Limited discussion offered with majority of research results evaluated. Too descriptive with lack of critical insight.	Adequate critical evaluation of research results. Good understanding of research results demonstrated.	Sound critical evaluation of research results. Insightful discussion is offered, demonstrating a sound understanding.	Comprehensive and detailed critical evaluation of the research results. Evidence of well-informed comprehensive knowledge.	
	Fail N 0-4	Pass P 5-8	Credit C 9-12	Distinction D 13-16	High Distinction HD 17-20	Mark /20
Critical discussion of research outcomes and relevance of research undertaken.	Insufficient critical discussion and understanding of the research topic and research process.	Limited discussion and critical evaluation. Limited understanding of the research topic and research process.	Adequate critical evaluation and discussion offered. Adequate attempt at synthetic discussion and review of the literature.	Sound critical discussion demonstrating sound knowledge of the research topic and research process. Sound attempt at synthetic review of the literature.	A comprehensive critical discussion a consistent feature throughout demonstrating sound insight into the research topic and research process undertaken. Excellent synthetic review of the literature.	
	Fail N 0-1	Pass P 2-4	Credit C 5-6	Distinction D 7-8	High Distinction HD 9-10	Mark /10
Reflection	Insufficient reflection on the research process, outcomes of the research study and relevance to practice.	Limited reflection on the research process, outcomes of the research study and relevance to practice.	Adequate reflection on the research process, outcomes of the research study and relevance to practice.	Sound reflection on the research process, outcomes of the research study and relevance to practice.	Excellent comprehensive reflection on the research process, outcomes of the research study and relevance to practice.	
	Fail N 0-1	Pass P 2-4	Credit C 5-6	Distinction D 7-8	High Distinction HD 9-10	Mark /10
Professional standard of writing	Disorganised or inappropriate academic language with frequent grammar and/or spelling errors.	Limited attempt to organise in a logical manner. Limited grammar and/or spelling errors.	Adequate academic writing demonstrating organisation and coherence. Fluent grammar. Spelling mainly accurate	Sound academic writing; logically organised. Fluent grammar and spelling accurate.	Excellent academic writing demonstrating a polished and imaginative approach. Fluent grammar and spelling accurate.	
	Fail N 0-1	Pass P 2-4	Credit C 5-6	Distinction D 7-8	High Distinction HD 9-10	Mark /10
Referencing	Insufficient referencing or inadequate sources. Too much reliance upon textbooks.	Limited referencing and limited range of sources. Only 1 textbook & 3 journal articles. Contains limited referencing errors.	Adequate referencing; mainly accurate & appropriate & an adequate range of sources used. At least 3 textbooks and 8 journal articles.	Sound referencing; generally complete & consistently accurate. Very good range of sources used. At least 5 textbooks and 10 journal articles	Excellent comprehensive referencing; accurate approved referencing style, & is complete. A wide range of sources used. At least 5 textbooks & 15 journal articles	
COMMENTS						

Figure 1. EBP ESSAY MARKING RUBRIC: Total available marks = 100

quantifiable data together with the human, social experience of emotions and perceptions. However, the researchers could have included this in their methodology description to provide the reader with more clarity as to the research design.^[11] To their credit, the researchers did effectively illustrate how phase 2 quantitative results are linked to the phase 3 interview questions. This can be considered a significant strength of the study in the critiqued article as it provides a deeper description of the whole procedure for understanding and replication purposes.

• **Research design: ontological mismatches associated with the mixed-methods approach**

When mixing two methods, caution should be exercised because if not properly done, it could result in confusion due to mismatches in ontologies.^[20] This means that when quantitative oriented surveys are combined with in-depth interviews, the result is a mix of subjective and objective ontologies and epistemologies. Unless a researcher effectively bridges the two approaches, ambiguities in results, explanation, generalisation and replication

would occur. In this study, there appears to be confusion at times when mixing the objective and subjective nature of the realities represented by quantitative and qualitative methods respectively. For example, phrases such as "integration was seen as the social reality..."^[3] falls into subjective ontology whereas, expressions such as "sampling criteria ensured representation of diagnostic and therapeutic AP roles..."^[3] indicate objective ontology. This shows that the researchers tend to oscillate from subjective to objective ontological assumptions, an illustration

of ineffective handling of the mixed-method research which tends to cause confusion when analysing the findings.^[20]

• Grounded theory vs. adaptive theory

In inspecting the methodology, it is evident that the researchers additionally used the grounded theory approach expounded by Glaser and Strauss^[21] when analysing the data. To illustrate, the researchers wrote, "all conclusions were grounded in data or explained by the researcher's interpretive scheme".^[3] The theories/conclusions from this study are derived from the data; there is no hypothesis-testing present unlike in quantitative paradigms where the epistemology is 'Popperian Falsification'.^[22-23] This emerging theory view is characteristic of the grounded theory approach. Although this method is appropriate as this is an exploratory study of perceptions, using the adaptive theory methodological approach may assist in developing better synergy between the two combined paradigms.^[24] In this approach, the quantitative empirical findings and qualitative theoretical findings can be combined so that the above mentioned 'ontological mismatches' can be avoided. This approach may be used to further enhance this research study.

Ethical considerations

Ethical approval was gained from the National Research Ethics Service prior to conducting this research. Furthermore, Research and Development offices were contacted to gain 'Site Specific Approval'. The privacy of the participants remains guarded by the anonymous quotations demonstrated in the findings.

Results and data analysis: thematic analysis

Although a mixed-methods research approach is utilised, the results presented are of the qualitative aspects only. These responses have been analysed and sorted into three main themes which comprise sub-themes within them. The findings are presented with appropriate, direct quotations gained from the participants during the recorded interview in a tabulated form. These quotations form sub-themes in the data, allowing the perceptions and

experiences of the APs to be analysed in a logical and organised format. In order to evaluate its findings, this study uses the process of thematic analysis which is a process that is theoretically bounded.^[25] According to Braun and Clarke^[26], thematic analysis can be of three forms; essentialist, constructionist and contextualist. The essentialist method relays the reality of the participants by reporting their experiences and perceptions whereas the constructionist method looks at the effects of 'a range of discourses in society' on these experiences and events. The contextualist method utilises a combination of both of the above. It seems that the authors of the critiqued study^[3] used essentialism in their thematic analysis of findings in an attempt to 'reflect reality'. This type of analysis is ideal as it supports the aim of their study which focuses on exploring and demonstrating the actual subjective perceptions and views of the APs with relation to future advancement in their role.

Themes and sub-themes presented should indeed be directly related to the research question and show meaning in the collected data with relation to the research aim.^[27] The critiqued article presents three main themes: the trajectory role of the AP; self-evaluation; and facilitating and constraining factors in practice. The first presents situations of gaining employment as an AP, the confusing boundaries related to supervision and uncertainty with regards to role development. This is followed by the second theme which evaluates workplace acceptance, contradictions and the skills needed for practice. The final theme encompasses the internal and external factors affecting the APs' role and their perceptions and experiences.

When determining a theme, the judgement of the researcher is an absolute necessity; a theme should not be identified merely as an issue that frequently arises in participant responses.^[26] Hence, researcher bias may be apparent in this scenario with regards to theme selection and the information the researcher wishes to portray. Here one is able to view the implicit nature of qualitative research. In order to present the data in a more explicit manner, researchers often use coding methods.^[18] The coding method and theory used in the critiqued article to obtain the resulting themes are not specified for further clarity of the research. However, the selected themes are coherent, consistent and do not show remarkable overlap.^[28]

Furthermore, they relate to the aim of the research focusing on the experiences of APs with regards to role development and issues surrounding their integration into the workforce.

If an element is to be criticised, the study could perhaps use a more extensive collection of participant responses in order to support the presently identified themes and sub-themes. Braun and Clarke^[26] recognise the inadequacy of supporting data as a contributing factor to a weak analysis of themes. However, the analytical claims made by the researcher complement the findings presented and relate to the research questions of interest.

Discussion

The purpose of data analysis is to emerge findings from the raw data.^[11] Qualitative research, unlike positivist paradigms, is often viewed as subjective and prone to bias.^[29] When critiquing qualitative research, the validity and reliability of the findings need to be analysed to evaluate the adequacy of the study and demonstrate rigour.^[30] Reliability refers to the consistency of findings whereas validity assesses if a test actually measures what it initially intended to measure.^[31] The rigour of a qualitative research can be assessed by the level of trustworthiness which is measured through credibility, transferability, dependability and conformability.^[32] This article demonstrates credibility in the sense that an appropriate, systematic method is outlined which produced findings highlighting the 'reality' of AP roles in the workplace. Some aspects of the method may contribute to biases which may in turn affect the findings. For example, purposive sampling is highly subjective and an estimation of bias and a measure of variance is required to gauge credibility/reliability.^[14] Furthermore, participant responses in face-to-face interviews may be affected by many factors including the demeanour of the researcher.^[12] In addition, the research demonstrates transferability of this study across other healthcare professions, such as nursing and occupational therapy as seen in the review of literature. The study is also replicable and the findings reflect the perceptions of the APs through direct quotations hence deeming it dependable. Concluding statements assert that the AP role is an evolving one and this study highlighted the need for clarification when it comes to supervision.

The student's reflections on the critiquing process

Research is constantly being conducted and published in an attempt to further explore gaps within our profession and provide adequate solutions to improve care of patients and staff. In performing this critique, I managed to acquire a more critical eye when reading published research. I now understand to some degree the complexities associated with research which were once unknown to me. In critiquing this article, I gained knowledge on a myriad of existing research theories, designs and forms which have been accepted and used for years. Both the mixed-methods approach and thematic analysis were unfamiliar to me prior to this research critiquing task. I can conclude that the relevance and paramount importance of evidence based practice was attained from this critiquing exercise.

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